THE IRISH NATURALIST

A Monthly Journal

OF

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ORGAN OF THE

Royal Zoological Society of Ireland; Dublin Microscopical Club;
Belfast Naturalists' Field Club; Dublin Naturalists' Field Club;
Cork Naturalists' Field Club.

EDITED BY

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

AND

R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.

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CORRIGENDUM.

Page 158, line 24, *for* "Nearly all the observations which I made," *read* "Nearly all the notes which the birds made."

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The Irish Naturalist.

VOLUME XXV.

THE CROSSBILL AND ITS DIET.

BY C. B. MOFFAT, B.A., M.R.I.A.

THE large influx of Crossbills into this country which took place in 1909 has not been made the subject of any communications to the *Irish Naturalist* since the short note furnished by Mr. Barrington in January, 1910. The invasion naturally attracted rather less notice than the previous one of 1888, since the birds were no longer such novelties as at the time of their earlier visit. But it would be a misfortune if the descendants of the invaders of 1909 should be suffered to die out, after breeding with us for a series of years, without some use being made of the opportunity of further studying the habits of a bird regarding whose economy much information still needs to be acquired.

The Crossbills that appeared in Ireland in such force in 1888 were probably the ancestors of most of the numerous parties of those birds that travelled about the country for nearly twenty years afterwards, breeding in many counties and visiting the wooded parts of others at times when their favourite food (the seed of the Larch) was abundant. To the best of my belief these birds reached their maximum abundance about the year 1894, but as they often increased in one district while declining in another, it is difficult to fix precise dates. Mr. Ussher, in his "List of Irish Birds," mentions that since 1905 they have been "scarce and uncertain." At Ballyhyland I saw none since September, 1898, and the only years in which the woods here were frequented by them for lengthened periods were 1892 and 1894.

Since 1909 there has undoubtedly been another increase of breeding Crossbills in Ireland, and this is probably a result of the large incursion noticed that year. Of course there may have been further reinforcements, but these must have been on a comparatively small scale. I think the birds have been more in evidence during the past twelve months (1915) than in any year since 1910. Of their presence in Co. Dublin early last summer proof was afforded me by the characteristic note of a small company that flew over my head during a walk not far from the city. In Co. Wicklow Mr. Barrington had the satisfaction of being able to watch a pair feeding their young in the nest at Fassaroe, and evidence of their presence in another part of the county was seen by the Dublin Naturalists' Field Club during its excursion to the Glen of the Downs, on July 10th, when some cones (Scotch Fir) that had been prized open by Crossbills were picked up under a tree by the roadside. Co. Wexford has also been again visited by them, and if I may judge from the large number of crossbill-opened cones that I found under the trees when I came down here in the middle of July, some families of the birds had probably bred in the woods. At any rate, they were still going about in small parties, that must have frequented the spot since at least the latter part of the spring.

In one respect the Crossbills of the present invasion seem to differ in their feeding taste from their predecessors of the invasion of 1888. At least, that is the result of my observations at Ballyhyland, and the single instance of the few cones picked up in the Glen of the Downs during the Field Club excursion last June points in the same direction. The Crossbills now with us do not show the preference that was so strongly displayed by our visitors in the "Nineties" for cones of the Larch, but feed with equal and even greater readiness on those of the Scotch Fir. Our visitors here in 1892 and 1894 (as I mentioned in a former article in this journal[1]) sometimes made a meal of the seeds of *Pinus sylvestris*, which they were

[1] Vol. iii., p. 207.

perfectly well able to extract, as the state of the cones dropped by them amply testified; but their preference for the Larch was so pronounced that they used to quit this neighbourhood altogether when the Larches failed to bear a satisfactory crop, though there never was any scarcity of cones of that much more regular bearer, the Scotch Fir. The summer of 1915 was not distinguished by any shortage of larch-cones, but the Crossbills, instead of duly appreciating the abundance of their favourite fare, went with unwonted zeal at the pine-cones, and gave the Larch only second place in every grove in which I found traces of their feeding.

I cannot help thinking that this change may indicate that the Crossbills came to us in 1909 from a somewhat different part of Europe from that which sent out the migration of 1888, and that in their original surroundings they were best accustomed to feeding in woods of Pine, as the earlier birds evidently were to taking their meals in Larch-trees. It would help much towards clearing up this question if naturalists resident in other parts of Ireland where Crossbills have been observed within the past few seasons would communicate notes stating whether the birds have in their neighbourhood fed more largely on the Pine (Scotch Fir) or on the Larch.

I have not yet mentioned the Spruce Fir, as to which, however, I think that something ought now to be said.

It will be remembered that Mr. Seebohm—and other writers following him—have laid it down that the practice of feeding on cones of Scotch Fir is a peculiarity of the large form known as the Parrot Crossbill, while the less robust Common Crossbill is considered not so well adapted to force open the very close-set scales of the pine-cone, but to restrict itself chiefly in its feeding to the seeds of Spruce and Larch. A good deal of theorizing has been built on this distinction. Mr. Edmund Selous, for instance, in Kirkman's "British Bird-Book," speaks of the Parrot-Crossbill as a stronger and newer form evolved by the necessities of its heavier task when reduced to feeding on Scotch fir-cones; and he also thinks it a valid argument against Mr. Ussher's suggestion that the Crossbill's plumage

has a "protective" harmony with the reds and greens of the Scotch Firs, that, as the bird is so much more addicted to feeding on cones of the Spruce than of the Scotch Fir, a coloration that made it harmonize chiefly with the latter would be hopelessly astray.

I think I showed in a review of the first part of Mr. Kirkman's fine book[1] that the reasoning employed by Mr. E. Selous on both of these subjects was faulty, even assuming his premises, founded on Seebohm, to be correct. The earliest Crossbill would never have needed to *be* a Crossbill at all unless it had wanted to force open cones with a strong close structure like those of the Scotch Fir; for those of the Spruce and Larch present no problem whatever to any of the finches, and are readily opened by the Siskin, the Lesser Redpole, and the Goldfinch—our three smallest representatives of the family. The pine-feeding Parrot-Crossbill is therefore more likely to have been the ancestral than the recently evolved form; and a type of coloring that is practically common to all the Crossbills might very well be explained (as Mr. Ussher thought from his observations at Cappagh) by its agreement with the foliage and boughs of the Scotch Firs that had, from time immemorial, been the typical Crossbill environment.

If, however, it be correct to say that our Crossbill, in the Continental parts of its range, now feeds principally on the seeds of the Spruce, some explanation is needed of its very different attitude towards that tree in the south-eastern part (and probably throughout the rest) of Ireland.

In Co. Wexford, at any rate, the Crossbill seems never to touch the cones of the Spruce Fir. This has been equally the case with the birds of the 1888 incursion—which visited us in at least six different seasons, sometimes staying for half a year or more—and with those that are with us now. The former, as I have said, in all their visits to Ballyhyland fed chiefly on Larch, but in a lesser degree also on Scotch Fir. The latter make the seeds of the Scotch Fir their principal food, and give a "good second" place to the Larch. But in no case have I seen either a Crossbill at work

[1] *Irish Naturalist*, vol. xviii., pp. 250, 251.

on a spruce-cone or a spruce-cone on the ground that bore marks of having been opened by a Crossbill.

This is not because we have any lack of spruce-cones with edible seed, for many are dropped on the ground by Squirrels, denuded of scales for the greater part—though never, I think, for quite the whole—of their length ; and I have several times watched Siskins at work in the upper branches of Spruce trees, picking out the winged seeds from under the scales of growing cones—when the light "wings," drifting earthwards, have given me the first clue to the birds' presence. The seed is evidently good enough eating to Squirrel and Siskin ; but the Crossbill, which has been alleged to make Spruce-seeds his staple diet, passes them by in this country with contempt, and seems to devote himself exclusively to our two other conifers, the Scotch Fir and Larch[1].

At one time I thought it possible that this neglect of the Spruce—his supposed staple—might be apparent, not real ; in other words, that the Crossbill might pursue a different method with the Spruce-cones, in consequence of their larger size, and might extract the seed—as a Siskin does—from the growing cone, instead of snipping the cone bodily off its branch, as he does those of Larch and Pine, and holding it in his claws while tearing out the seeds. In that case there would, of course, be no litter of spruce-cones on the ground to betray the fact of Crossbills having held banquet in the branches above ; and in the absence of such litter the feeding-place might long remain undiscovered. This year, however, there has been a pretty extensive felling of timber—including Spruce—at Ballyhyland ; and as flocks of Crossbills had been in the woods all the summer I made a special point of examining the cones on the felled trees to see whether any of these bore marks of having been probed by feeding Crossbills. The result was that I found in all cases the scales of the cones undisturbed and whole—showing none of the peculiar gashes with which the Crossbill invariably leaves his mark on the scales of a rifled larch-cone. The evidence was

[1] I need say nothing of the Silver Fir, whose cones, saturated as they are with turpentine, offer no attraction, so far as I can see, to any seed-eating creature.

conclusive—taken, of course, in connection with what had been previously noticed—that seeds of the Spruce Fir form no part of the Crossbill's customary diet during his visits to this part of Co. Wexford.

If naturalists having access to woods where Crossbills are settled in other parts of Ireland would take note—as is easily done by examining the cones on the ground—as to whether the Spruce has entered at all into the bird's bill of fare, it would be a considerable help towards a better understanding of this subject. It is certainly a great mistake to go on grouping the Crossbills into a section that feeds on pine-cones and another that feeds on larch- and spruce-cones. Our Irish Crossbills would fall into neither of those groups—their trees are the Larch and Pine.

Mr. Seebohm did not, of course, speak without some warrant when he described the Common Crossbill as feeding chiefly on Spruce. He must have found it doing so in some parts of its range during his extensive travels. But it is unfortunate that these observations were not checked by others made nearer home. I shall be very glad if my own notes lead to further evidence being brought forward as to the feeding habits of this remarkable bird during its present visit to Ireland.

Ballyhyland, Co. Wexford.

EDITORIAL.

The Editors of the *Irish Naturalist* feel regret, doubtless shared by readers, that again after an interval of thirteen years, the magazine appears without the name of a colleague resident in Ulster. In 1903, Robert Patterson joined us, When pressure of work compelled him to give up his editorial duties at the end of 1910, Robert J. Welch took his place ; he now in his turn feels obliged to seek release from this activity. Although it has not been possible to secure a northern naturalist to continue the work—highly valued and gratefully acknowledged—of these two helpers, the Editors enter on the twenty-fifth year of the *Irish Naturalist's* career confident of the faithful support of friends both in North and South.

OBSERVATIONS ON PHOTOTROPISM AND THE DEVELOPMENT OF EYE-SPOTS IN THE MARINE NEMERTINE, LINEUS GESSERENSIS.[1]

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

WHILE shore-collecting near Bullock Harbour, Dublin Bay, on the 26th April last I found attached to stones near low water mark several gelatinous egg-masses, apparently the spawn of some marine annelid. One of the largest of these masses, about an inch and a half in length, was taken home, and on examination and comparison with the plates of McIntosh's "Monograph of the British Annelids" was found to closely resemble the spawn of the Nemertine *Lineus gesserensis* (Müller). The egg-mass, or "mucus chord," as McIntosh terms it, was roughly sausage-shaped, the creamy ova being distributed through the transparent mucus in two irregular longitudinal bands quite visible to the naked eye. Under a low power the apparently simple ova were resolved into diaphanous, flask-shaped capsules containing from three to five eggs each. Development was already far advanced, and on the 2nd May, just six days after the removal of the egg-mass from the shore, the first of the young worms emerged from its capsule and pushing its way through the general mucus envelope began to travel rapidly along the bottom of the glass dish. The close resemblance of this infant worm to figure 9 of Plate XXIII of the "Monograph," taken along with the equally close correspondence of the egg-capsules with figure 6 of the same plate put beyond all doubt the identity of the worm with Müller's *Lineus gesserensis*, a species common all round our shores.

The young Lineus, just 1.5 mm. in length was remarkably active. It moved backwards and forwards with equal ease and rapidity, and, mounting the side of the glass dish, launched out on the surface of the sea water where it floated

[1] I have used throughout these notes the name adopted by McIntosh in his "Monograph," though the synonym *L. ruber* has of late years superseded it.

and travelled with an even, gliding motion. By the 5th of May all of the young worms had left their capsules, though a majority of them still remained within the general mucus envelope. Here they crawled about restlessly, gathering into writhing knots or wandering about singly on exploring expeditions, until finally a few days later they had all achieved their freedom, and the general envelope was left empty save for a few aborted eggs and a curious tangle of deflated capsules. The young worms were elongated, elliptical in form, the length about six times the breadth. The general colour was white, the anterior third of the body much lighter than the posterior two-thirds which were marked by longitudinal bands of pale tawny. Between these bands and occupying the central region of the body the convoluted proboscis was clearly visible. The head bore two very distinct and compact eye-spots, red-brown in colour and placed transversely and symmetrically, that is to say, each separated from the adjacent head-margin by an equal space. The whole body was clad with cilia in active motion, those along the head-margins or cephalic slits being the most conspicuous.

The eggs had been hatched out in a circular glass petrie dish, $2\frac{1}{4}$ inches in diameter by $1\frac{3}{8}$ inch in depth, fresh sea water being supplied from time to time, and about ten days after hatching I noticed that the young worms, about fifty-five in number, showed a tendency to seek one side of the dish. The side preferred happened to be somewhat better illuminated than the others, and this action of the worms suggesting positive phototropism, I was induced to make some test experiments with very simple apparatus.

The first experiment was made by lamplight on the 17th May. The dish, with the worms evenly spread over the bottom, was covered with a cardboard box having cut in one side an opening one-third inch in diameter. This opening, the only one by which light could find access to the dish, was placed close up to the side of the dish and turned towards a small lighted lamp distant two feet. On removing the box after the lapse of fifteen minutes all the worms were found congregated in a dense mass on the wall of the dish directly opposite to the opening. A few

days later, having focussed the brood of worms at one point on the wall of the dish by the method just described, the cover was again placed over the dish with the opening at the side farthest removed from the worms. After an exposure of twenty-five minutes the worms were found to have crossed the dish and assembled themselves in a dense group opposite to the opening.

The next experiment was made in diffused daylight. On this occasion the hole in the covering box was reduced to $\frac{1}{4}$ inch diameter and placed, not at the side, but at the top, so that the light impinged on the surface of the water not far from the edge of the dish. After an exposure[1] of ten minutes five of the worms were found floating foot upwards on the water surface immediately beneath the hole admitting the light. After a further exposure of twenty minutes all the worms were found densely congregated beneath the hole, most of them floating on the surface, the remainder clinging to the side of the dish near the surface. As the worms had been evenly scattered over the bottom of the dish at the beginning of the experiment, they must have travelled across the bottom and up the side so as to reach the surface at the point where the light entered.

In the next experiment a larger dish $3\frac{1}{2}$ inches in diameter was used. Having collected all the worms into a dense group at one side of the dish by the use of a perforated cover, as in the second of this series of experiments, the dish was turned through half a revolution so as to separate the group of worms by the whole diameter of the dish from the opening in the side of the cover box. After five minutes' exposure nearly all of the worms had crossed the dish and assembled themselves directly opposite the light opening. Another three minutes' exposure and the laggards had made good the crossing and joined the family group.

This experiment was immediately repeated by another reversal of the dish, while the cover retained its original

[1] The word "exposure" used here and in connection with the following experiments is to be taken as meaning exposure to diffused daylight of the orifice in the box while the box covers the dish with the worms.

position. But on this occasion only half of the worms were found to have crossed the dish after the lapse of fifteen minutes, and a further exposure up to a total of half an hour produced no effect: the laggards remained stationary. Apparently the young nemertines were fatigued by their forced marches or their appetite for light had been satiated.

On the following day, the 23rd of May, the final experiment was made. The worms, now grown to a length of nearly 2.5 mm., were transferred to a rectangular glass dish, $7\frac{1}{2}$ inches long and filled with sea water. The worms having been focussed at one end of the dish by the method used in previous experiments, the dish was reversed, so that the group of worms was separated by an interval of $7\frac{1}{2}$ inches from the opening, $\frac{1}{4}$ inch square, by which light was admitted. After half an hour's exposure all save six of the worms were found to have travelled the whole length of the dish and congregated round the light opening.

The uniformity of the results obtained in these experiments appears to me to fully justify the inference that the young *Lineus gesserensis* almost as soon as it is hatched is highly sensitive to light, and this notwithstanding the rudimentary character of the eye-spots as organs of sight, or rather of light perception. The action of heat rather than light is, I think, out of the question. McIntosh, in Part I. of his "Monograph of the British Annelids," published in 1874, speaking of the eye-specks of the mature worm, in the Anopla section of the Nemertines, to which this species belongs, says they "are simply masses of black pigment arrayed on the sides of the snout with greater or less regularity and without any special optical structure. The textures of the head and nerve-fibres themselves are so unfavourable for observation that I have had difficulty in making out nerve branches thereto." Subsequent observers have detected such nerve branches, but nevertheless the development of the eye-spots as organs of light perception must be regarded as elementary.

In the mature *Lineus gesserensis* the eye-spots differ both in number and position from those of the young worm.

They range from ten to twelve, and are placed not across the head, but along the head-margins, five or six on each side. As the worms hatched out early in May last lived with me up to the following 28th June, I was enabled to observe at least the earlier stages in the transition from the two symmetrically placed transverse eye-spots of the young Lineus to the numerous marginal spots of the adult. On the 4th June in several individuals the original dense eye-spots showed signs of breaking up, while small accessory specks made their appearance at some distance from them and usually nearer to the head-margins. Two days later several other specimens were examined. In these the original eye-spots had become a loose aggregation of blotches and specks accompanied in some instances by spots much larger than the components of the old eye-spots and placed closer to the head-margins. In some individuals a constellation of minute specks, a sort of ocular Pleiades, was observed lying outside of the old eye-spot and apparently the result of its dissolution. Such groups of of close-set specks only needed a coalescence of their members to originate the secondary marginal eye-spots of the adult. These changes in the form of the original eye-spots suggested that the transition from the binocular immature state to the multocular mature state was effected, not by the development of new eye-spots from previously unpigmented tissue, but rather by the disintegration of the original spots, succeeded by a re-integration of the fragments for the formation of the ultimate marginal spots of the adult worm. McIntosh ("Monograph," Part I., p. 119) found change in the eye-spots to be much less rapid. "Ten weeks afterwards" [after hatching], he says, "the young animals . . . . still possess only two eyes, rarely an additional pigmentary fragment."

The highly developed positive phototropism of the young *Lineus gesserensis*, its tendency to seek the light, is not shared by the adult. Dr. Oxner, in a paper published in the *Bulletin de l'Institut Océanographique* in December, 1907, declares as the result of observations made on marine gatherings kept in basins of sea water that *Lineus ruber* (=*L. gesserensis*) is negatively phototropic in a high degree ;

that, in fact, it is repelled by the light which so strongly attracts the infant worm. ("L. ruber est extrêmement sensible à la lumière dans le sens negatif").[1] This positive phototropism in the young worm, as contrasted with the negative phototropism in the adult, probably subserves the dissemination of the species by attracting the fry to the water surface from the dark stations where it is hatched out on the under side of stones.

It seemed probable that the positive phototropism demonstrated for the young *Lineus gesserensis* might be found to extend to the immature stages of other members of the Annelida. An opportunity of testing this supposition was afforded me on the 20th July last, when I took in the Grand Canal, Dublin, a specimen of the fresh-water leech, *Glossiphonia heteroclita*, carrying under its wing, as it were, a brood of seventeen young leeches. These were all attached to the underside of the parent by their posterior suckers, and twined together in a Laocoon-like group. The length of each was just 1 mm., and all had six well developed eye-spots disposed in the arrangement characteristic of the species. By the 29th of July all of the juvenile leeches had abandoned the parent and begun to fend for themselves. They looped briskly across the bottom of the dish after the manner of their order, and some individuals climbing the sides launched out on the water surface, where a film of mucus enabled them to continue their looping progress. These young leeches were subjected to a series of experiments similar to those already described in the case of the juvenile *Lineus gesserensis*; but, contrary to expectation, they proved absolutely insensitive to light. Repeated exposures failed to elicit any movements either of attraction or repulsion.

Sandycove, Co. Dublin.

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[1] I am indebted to Mr. R. Southern for a reference to this paper, which is entitled; "Quelques Observations biologiques et Expériences sur la Faune des bords de Cuvette."

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 10.—The Club met at Leinster House, the President (D. McARDLE) in the Chair.

H. A. LAFFERTY showed the perithecial or perfect fruiting stage of the fungus hitherto known as *Verticillium cinnabarinum* (Corda) Reinke and Berth. The fungus is one of the commonest saprophytes associated with decayed potato-tubers. Pure cultures of it on various media have been grown for many months, but no form of fructification other than the conidia borne on characteristically branched verticillate conidiophores has developed. On some decaying potatoes which had been thrown in a wet ditch two or three kinds of perithecia developed, one of them dark red in colour and associated with the conidial stage of this fungus was especially abundant. Repeated cultures, starting from a single ascospore in each case, from these perithecia resulted in the development of pure cultures of *Verticillium cinnabarinum.* Hence it is quite definitely proved that the perithecia in question are those of this fungus. From their structure it is clear that the fungus must now be transferred to the genus Nectria.

PROF. G. H. CARPENTER showed specimens of a species of Lepidocampa from the Seychelles, drawing especial attention to the exquisitely fringed pulvilli of the feet and the delicately ribbed scales with which the body-segments of the bristle-tails of this genus are clothed. The familiar Campodeae, which represent the family in Europe and the British Islands, are destitute of scales. Hitherto Lepidocampa has been known to inhabit the Malay Archipelago and various parts of South America. Its presence in the Seychelles is therefore of considerable geographical interest.

W. F. GUNN exhibited a nest of one of the social wasps, which construct them in trees and thorny hedges. Under the microscope he showed a portion of the " paper " of which the nest is constructed. Portions of wood and bark are bitten off from fences and trees, masticated, and worked up into a pulp, from which the layers of paper are formed. These materials could be clearly discerned on the slide, and the characteristic fibres of the particular kind of wood used could be identified.

D. MCARDLE showed the flask-shaped receptacles of *Blasia pusilla* (one of the frondose Hepaticae), which were full of globose gemmae, also issuing through the mouth of the ascending tubes. These gemmae, when matured, float in a protoplasmic fluid ; among them are glandular hairs, which become swollen by secretion and force the gemmae through the mouth of the tubes. At this period most of the gemmae are furnished with root hairs, and under favourable conditions will grow and repeat the life cycle. This is the asexual mode of reproduction in these curious plants, which in this species are seldom found in fruit on account of their dioicous character. The specimens exhibited had been collected by W. F. Gunn on a damp bank near the roadside at Clifden, Co. Galway, in October, 1915.

BELFAST NATURALISTS' FIELD CLUB

October 27.—Annual Conversazione was held in the Carlton Hall, Fountain Street, when a most enjoyable evening was spent by a large number of members and their friends. The various sections of the Club were well represented by numerous interesting exhibits, which were carefully inspected by those to whom they afforded special interest. After tea had been partaken of, the President (R. Lloyd Praeger) gave an address upon "Photographing Wild Flowers in the West of Ireland." The address, which was keenly enjoyed by the audience, was illustrated by numerous lantern slides from photographs taken by R. J. Welch, several of which had been obtained by the photographer under very difficult circumstances. At the close of the meeting ten new members were admitted to the Club, after their names had been duly proposed and seconded. A condensed list of the exhibits is as follows :—

Zoology.—N. H. Foster : books showing recorded distribution of Woodlice, Myriopods and False Scorpions in Ireland. Joseph Wright : Foraminifera. Botany.—S. A. Bennett : Plants from Seaforde, England, also some recently found in Antrim and Down. Miss S. Blackwood : Plants collected, 1915. N. Carrothers : Introduced plants from Down and Antrim. Miss M. W. Rea : Mounted seaweeds from Ballycastle. A. W. Stelfox : Irish Mossy Saxifrages arranged on miniature rock-garden. Rev. C. H. Waddell : Collection of special plants. Geology.—Miss E. Andrews : Minerals collected by the late Miss M. K. Andrews in 1914. R. Bell : Minerals from the basalts of Antrim and Down, including plant remains with chabazite. Dr. Charlesworth : Amber containing insects, Carboniferous limestone from Castle Espie containing Actinoceras sp. and other interesting fossils. A. McI. Cleland : specimens from the cliffs of Murlough Bay. Robert May : fossils from Ballycastle coal-field, and a specimen of "Landscape Marble." Antiquities, &c.—R. Bell : Very early types of rude flint implements from Islandmagee. F. J. Bigger : Ancient coloured glass from the ruined Church of St. Nicholas, Ardtole, Ardglass. Miss S. Blackwood : Flint implements from Toomebridge. W. B. Burrows : Jade chisel, &c., from New Zealand. W. A. Green : Rude stone axes from site of manufacture near Cushendall. J. T. Greeves : Humourous print, showing method of making arrow-heads. A. R. Hogg : a fine series of photographs taken on the Club excursions, 1915. R. May : "Peerman" type of rushlight candlestick from Austrian Silesia. B. McCoy : the loving cup presented by Lady Hamilton to the men on Lord Nelson's flagship.

November 16.—The President, R. Lloyd Praeger, delivered his presidential address, entitled "Club Retrospects and Prospects." He briefly alluded to the formation of the Club in 1863, in which the moving spirit was the late Professor Ralph Tate. The founding of the Field Club was not the commencement of field work in the North of Ireland, for previously Templeton, Hyndman, Thompson, Patterson, and many others had been well known for their natural history studies and researches. Mr. Praeger then narrated some of his own early experiences at the time—thirty years since—when he joined the Club, and mentioned some of the

principal scientific workers who at that time and since had been intimately associated with the Club's proceedings. In this review he paid special tribute to the work of the late Samuel Alexander Stewart, and said that "not only did the Club make Stewart, but that Stewart in great measure made the Club." The constitution of the Club had always been democratic, and its excursions were noted as models of organisation. Coming to the present time, the speaker said that the old policy of the Club in devoting its attentions practically to the Counties of Down, Antrim, and Londonderry, had to a great extent been revised, and that the present-day workers had expanded the scope of their researches so as to include all Ireland, or even in many cases to distant lands. In speaking of the valuable results obtained during the Clare Island Survey, Mr. Praeger said these were due in many cases to the training received by some of those who took part in the work of the Field Club. Although a large amount of scientific work had been already done, there was still much to be accomplished, and he hoped that the Club would long continue to examine and study the natural history of the district.

Adam Speers, J.P., B.Sc., thanked the president for his inspiring address. Robert May spoke of the work done by the Club's members in the domain of archæology, and Geo. Donaldson, an original member, gave some interesting reminiscences of the Club's early days. Mr. Praeger briefly replied to some of the questions asked by these speakers, and after the election of five new members, the proceedings concluded.

DUBLIN NATURALISTS' FIELD CLUB.

September 18.—A party of nineteen, under the leadership of R. Lloyd Praeger, took the 1.30 steam tram from Terenure to Balrothery, whence they walked to the ruins of Montpelier House, noting a fine example of *Populus nigra*, a rather rare tree. Thence they crossed the shoulder of Montpelier Hill and descended to Friarstown, and made their way down the wooded glen to Glenasmole bridge. In the glen *Lamium Galeobdolon* and *Viola Reichenbachiana* were seen in abundance. Tea was provided at Glenasmole by Mrs. Healy, after which the party returned down the Dodder to Tallaght, seeing a remarkable bloom of *Parnassia palustris*, where tram was taken back to town.

October 9.—Excursion to Woodlands, the demesne of the Right Hon. Lord Decies at Lucan, under the leadership of the President, N. Colgan, assisted by W. F. Gunn. Meeting at the terminus of the Lucan steam tram, which runs through the valley of the Liffey, the autumn tints of the tree foliage was noted as well as the considerable quantity of flowers still in full bloom. Arriving at Lucan, the party made their way to Woodlands, studying the vegetation on the way. *Scrophularia umbrosa*, *Chelidonium majus*, *Salvia Verbenaca*, *Mentha Cataria* and *Sisymbrium Columnae* were the most noteworthy plants seen, all of which were in fruit, and seeds were secured. The main object of the excursion was the study of the fungi in the woods of the demesne, but unfortunately, it was found that there was a singular absence of species, which, considering the

time of the year and the suitability of the locality, should have been found. Several species of Russula, Hygrophorus, a few Polypori and Clavariae only were met with. After tea in Lucan, the return to town was made by tram.

NOTES.

ZOOLOGY.

Harpalus quadripunctatus, Dej., in Co. Wicklow.

I took a specimen of the above rare ground-beetle under a stone about half-way up the Little Sugarloaf, near Greystones, on August 13th, last. Messrs. Johnson and Halbert in their excellent *List of the Beetles of Ireland*, only give one previous record of a specimen taken on the top of the Sugar-loaf by Mr. G. C. Champion in 1878. Its re-occurrence in almost the same locality is interesting and proof of its being undoubtedly indigenous. I am indebted to Mr. O. E. Janson for kindly naming the beetle for me.

L. H. Bonaparte-Wyse.

Ealing Common, London, W.

Eagles in Ireland.

In the year 1911, the late Mr. Ussher visited the counties Galway, Mayo, and Donegal, expressly for the purpose of finding out by inquiry or observation if the Golden Eagle still existed in Ireland. As far as I can gather he could not trace any sign whatever of their appearances in Co. Galway. In Mayo he was more fortunate, as he saw one bird on the North Mayo cliffs. In Donegal there were reports of one bird, but no evidence whatever from any source that the Eagles still breed in any part of these three counties, which was at one time their stronghold. The Donegal bird was shot last January, as recorded in the *Irish Naturalist* by the late R. M. Barrington. The owner, in answer to my enquiries, stated the bird was well known for many years in the vicinity of Ardara, but was always seen alone. I regret to record the capture of the Mayo bird on the 21st October, which was shot on a fence asleep having gorged on a dead farmyard goose. It was a female in excellent plumage, measuring 6ft. 4 inches in space of wings and weighing 9½ lbs. This, I fear, closes the career of the Irish Golden Eagles. Poison has done more to destroy these noble birds than any other agency. At least on two occasions, I have heard of their remains being found on the mountain side (months after death had taken place) from partaking of poisoned lambs laid for the destruction of foxes. Their well-known habit of eating carrion of all sorts has in a great measure hastened their destruction. The White-tailed or Sea Eagle has entirely disappeared from Ireland.

W. J. Williams.

Dame Street, Dublin.

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THE SCOTTISH NATURALIST,

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EDITED BY

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

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Royal College of Science, Dublin.

R. LLOYD PRAEGER,
National Library, Dublin.

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ICHNEUMONIDAE AND BRACONIDAE FROM COUNTIES ARMAGH AND DONEGAL.

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

THESE insects continue to engage my attention, and I find them increasingly interesting as I become better acquainted with them. The publication of the fifth volume of Morley's "British Ichneumons," dealing with the Ophioninae has been a great help to me, and I am able in consequence to bring forward a number of these insects. The species enumerated in the present list were all captured in the neighbourhood of Poyntzpass and Coolmore. My captures at the latter locality were all made in the month of September, which I spent at that delightful spot. I am much gratified at being able to record the occurrence of several rare and interesting species, showing that Ireland possesses in this group of insects many remarkable forms. Thus the specimens of *Chasmias motatorius* which I took at Coolmore are remarkable for their pale coloration, a form which has not so far been observed elsewhere. Other remarkable variations will be referred to under the separate species. In the case of *Ichneumon militaris* a point is cleared up by my specimen which had long been in doubt.

I find *Lissonota variipes* very abundant, and the male form with pale face quite frequent. They abounded especially on thistles both here and on the sandhills at Coolmore. *L. sulphurifera* I have met with very frequently here; in October I caught one in a railway carriage at Goraghwood. I was fortunate enough to capture a pair of this species *in cop.* They were on bramble leaves in the ditch in one of my fields. This is a most unusual circumstance with the ichneumons, and is the source of much difficulty, as very often it is quite an open question what male should be referred to what female, especially as in many cases they are quite different in appearance. Curiously enough I had a few days before observed another pair on the same place but did not succeed in capturing them; as far as I could judge they were a species of Pimpla.

My collecting here was done mostly in my own fields, also on the roadside between my house and Poyntzpass which I denote by "hill," and in the wood near here, known as Acton Wood, which I found to be an excellent collecting ground. At Coolmore I took many of my best captures among sallows which grow in profusion in the roadside hedges, an especially good locality was a grassy lane off the old Ballyshannon road. As on former occasions umbelliferous flowers and thistles proved always attractive to these insects.

I have once more to thank Mr. Claude Morley, F.E.S., the talented author of "British Ichneumons," for most kind help with many critical species, as well as much encouragement.

ICHNEUMONINAE.

Cratichneumon liostylus Th.—Coolmore, among sallows on the roadside.

C. dissimilis Gr.—Coolmore, among sallows on the roadside. Neither this nor the preceding are common species.

C. fugitivus, Gr.—Coolmore, among herbage and sallows.

Melanichneumon sanguinator Rossi.—Poyntzpass, in field, in August.

Barichneumon gemellus Gr.—Poyntzpass, hill, in June. I had named this specimen as above, but not having a type, thought it better to send it to Mr. Morley for confirmation. He is much pleased at having a specimen to fit the description of this species. His record of *Melanichneumon monostagon* Gr. from Kenmare in *Ent. Mo. Mag.*, 1902, p. 54, is to be altered to this species.

B. ridibundus Gr.—Coolmore, among sallows; by no means common.

B. albicinctus Gr.—Coolmore, among sallows.

Ichneumon sarcitorius L.—Poyntzpass, hill, in August, at flowers of Angelica. Among these was a female with the head entirely black.

I. latrator Fab.—Coolmore, at Umbelliferae, a remarkable variety of this common species with the scutellum white, a form which Mr. Morley informs me he has never before seen. This specimen is a female, in which sex the scutellum is said to be always black, though in the male it is very rarely flavous-marked.

I. bucculentus Wesm.—Coolmore, at Umbelliferae.

I. suspiciosus Wesm.—Poyntzpass, in August, at Angelica; Coolmore, in porch of the bungalow.

I. terminatorius Gr.—Poyntzpass, field, at Angelica, in August.

I. stramentarius Gr.—Coolmore, among sallows.

I. militaris Gr.—Poyntzpass, in field, at Angelica, in August. Mr. Morley ("British Ichneumons, vol. i., p. 134) says of this species; "Not very common; found in the spring near London, and in Salop (Stephens, October, 1835). I know of no other records from Britain,

and it would appear to be known on the Continent only from Piedmont, whence it was originally described." In his original description ("Ichneumonologia Europaea, i., p. 342) Gravenhorst does not state whether the coxae of the female are scopuliferous or not. In my specimen they are, so that but for the colour of the mouth parts and legs, it agrees with *I. extensorius* Linn., of which it seems not improbable that it is a variety.

I. confusorius Gr.—Poyntzpass, on hill, at Umbelliferae, in July, and in Acton Wood flying over brambles, in June.

I. albiger Wesm.—Poyntzpass, in Acton Wood, on the wing, in June.

I. gracilicornis Gr.—Poyntzpass, in field, at Umbelliferae, in July.

I. caloscelis Wesm.—Poyntzpass, in stable window and in field; Coolmore, on roadside at Wild Carrot.

Chasmias motatorius Fab.—Coolmore, among sallows. All my specimens are males, which do not appear to be met with as often as the females. The latter hybernate, and as many as twelve have been found together in rotten wood. They prey upon reed- and grass-feeding Noctuids.

Spilichneumon Fabricii Gr.—Poyntzpass. I obtained both sexes in my stable window in June.

Amblyteles subsericans Gr.—Coolmore, among sallows on the roadside. I obtained two specimens, both females and both remarkable forms of this species. One has the scutellum black with a white spot to either side, a form which Mr. Morley says he has never seen before; the other is remarkably large and stout and has the scape of the antennae dark red below, the first and second joints of flagellum black, the following ten wholly or partly white and the remainder black. It does not appear to be common.

Platylabus pedatorius Fab.—Coolmore, among the sallows.

P. albinus Gr.—Coolmore, among sallows; not common.

Phaeogenes heterogonus Hlgr.—Poyntzpass, in July, on hill, on the wing, and in field at Ragweed. Very rare in Britain; occurs in Sweden and northern Spain.

P. ophthalmicus Wesm.—Coolmore, at flowers of Wild Carrot. One of these specimens, a female, varies from the type in the following points—the incisures of the apical segments of the abdomen are pale and the two anterior pairs of legs have the femora, tibiae, and tarsi entirely red.

P. coryphaeus Wesm.—Coolmore, on roadside among sallows. Rare in Great Britain, occurs in Belgium and Germany.

Dicaelotus rufilimbatus Gr.—Poyntzpass, in moss from a wood, in January.

D. ruficoxatus Gr.—Poyntzpass, in stable, in July. Not common; occurs in France and Belgium.

Colpognathus celerator Gr.—Poyntzpass, in July, in stable and at flowers of Hogweed.

CRYPTINAE.

Microcryptus perspicillator Gr.—Poyntzpass, in Acton Wood, in June.

M. arridens Gr.—Coolmore, at flowers of Wild Carrot.

M. brachypterus Gr.—Poyntzpass, in avenue among herbage, in May.

Microcryptus labralis Gr.—Poyntzpass, in field, in July, a male. This species is rare in the British Isles, and all the captures recorded are, curiously enough, males.

Acanthocryptus nigricollis Thoms.—Poyntzpass, in August, by sweeping among herbage on roadside. Not a common species.

Glyphichnemis profligator Fab.—Poyntzpass, in stable, in July. Coolmore, on thistles ; this female has the dentiparal area of metathorax trans-costate, thus varying from the type.

G. brevis Gr.—Coolmore, on flowers of Umbelliferae.

Hemiteles subzonatus Gr.—Poyntzpass, in window, in August.

H. similis Gmel.—Poyntzpass, in stable, in July.

Idiolispa obfuscator Vill.—Poyntzpass, in Acton Wood, in June. Rare.

PIMPLINAE.

Pimpla robusta Morley.—Coolmore, among sallows.

P. punctiventris Th.—Coolmore, at *Daucus carota* ; not common.

P. detrita Hlgr.—Coolmore, at flowers of Umbelliferae.

P. turionellae L.—Poyntzpass, among herbage ; Coolmore, at sallows. *P. examinator* Fab. is now sunk as a mere colour variety of this species.

P. alternans Gr.—Coolmore, among sallows.

Glypta elongata Hlgr.—Poyntzpass, in field in July ; Coolmore, on road-side among herbage. Not common.

G. fronticornis Gr.—Poyntzpass, in fields, in August.

G. ceratites Gr.—Poyntzpass, in August, in fields and at Hogweed in hedge.

G. genalis Môll.—Coolmore, at Umbelliferae on roadside.

G. trochanterata Bridg.—Poyntzpass, in June, in field.

G. bifoveolata Gr.—Poyntzpass, in August, at Angelica.

Lissonota cylindrator Vill.—Poyntzpass, in July and August, at flowers of Umbelliferae and thistles ; Coolmore, at thistles and Wild Carrot.

L. errabunda Hlgr.—Poyntzpass, in August, at Angelica ; Coolmore, at flowers of Wild Carrot.

Banchus volutatorius L.—Poyntzpass, in July, at Hogweed. This female differs from the type in having the head entirely black except the mouth clypeus and facial orbits, which are pale ; the scutellar horn, all the coxae and the entire abdomen are also black.

TRYPHONINAE.

Metopius micratorius Fab.—Coolmore, among sallows.

Chorineus longicornis Th.—Poyntzpass, in June, in field.

Exochus squalidus Hlgr.—Poyntzpass, in August, at Hogweed ; an uncommon species.

Pierostigeus anomalus Hlgr.—Poyntzpass, in May.

Bassus variicoxa Th.—Poyntzpass, in August, in field among herbage.

Homocidus pectoratorius Gr.—Coolmore, among sallows.

Promethus albicoxis Th.—Poyntzpass, in August, at Hogweed.

Mesoleius rufolabris Zett.—Coolmore, at Umbelliferae.

Tryphon signator Gr.—Poyntzpass, in Acton Wood, in June.

Diaborus lituratorius L.—Coolmore, among sallows.
Perispudius sulphuratus Gr.—Coolmore, on the wing.
Polyblastus variitarsus Gr.—Coolmore, among sallows.

OPHIONINAE.

Megastylus conformis Fòrst.—Coolmore, at flowers of Wild Carrot. Apparently a rare species, for Mr. Morley, in "British Ichneumons," vol. v., published 1914, only mentions records from Suffolk, Surrey, Devon, and Aix, in Prussia.
Helictes mediator Schiod.—Coolmore, at Umbelliferae.
Diaparsus nutritor Fab.—Coolmore, in the sandhills, about thistles. This appears to be the first record of the species as British.
Cremastus spectator Gr.—Coolmore, on wing at sallows.
Campoplex falcator Fab.—Poyntzpass, in August, in field; Coolmore, among sallows.
Casinaria vidua Gr.—Coolmore, at Umbelliferae, on the roadside. Parasitic on the common Magpie Moth and consequently of much benefit to gardeners.
Omorga ensator Gr.—Coolmore, among sallows.
Angitia majalis Gr.—Coolmore, in window, and flying round sallows.
A. fenestralis Hlgr.—Coolmore, on porch of bungalow, and on the wing at sallows. Both this and the preceding species were taken by me flying round the top of sallow bushes on windy days. They were males, and were possibly in search of females.
Anomalon cerinops Gr.—Coolmore. I took a fine female of the species flying over a low bank at the roadside on a windy day, where the road runs through a sort of lagoon, and there is water on either side.
Ophion luteus L.—Coolmore; flew to light.
O. calcaratus Morley.—Poyntzpass, flew to light in October.
O. distans Th.—Poyntzpass; flew to light, in August. Coolmore, at flowers of Wild Carrot.
O. scutellaris Th.—Coolmore, in window of bungalow and among sallows.
Paniscus melanurus Th.—Poyntzpass, in Acton Wood, on the wing, in June. Not a common species.
Mesochorus viticollis Hlgr.—Poyntzpass, in field, in June.

BRACONIDAE.

Bracon mediator Nees.—Coolmore, at Wild Carrot.
Spathius rubidus Rossi.—Poyntzpass, in windows, in July. This and its ally *S. exarator* L. are most useful, as they attack *Anobium domesticum*, the beetle which does so much injury to furniture and woodwork.
Agathis rufipalpis Nees.—Poyntzpass, in May, flying at hawthorn.
Earinus gloriatorius Panz.—Poyntzpass, in May, flying at hawthorn; var. **delusor** Wesm.—Poyntzpass, on hill, and flying at hawthorn.
E. nitidulus Nees.—Poyntzpass, in May, on hill, and flying at hawthorn.
Macrocentrus marginator Nees.—Coolmore, at flowers.

Poyntzpass, Co. Armagh.

NOTES ON IRISH OLIGOCHAETS.

BY REV. HILDERIC FRIEND.

Having recently had occasion to review some of the questions relating to our British Annelids, I have come across a number of facts which are not without interest in relation to Ireland. The following notes are intended to assist in a better understanding of this important group of animals. Our first problem is :—

What is Lumbricus lineatus O.F.M. ?

In W. Thompson's "Natural History of Ireland," vol. iv., p. 428 (1856), we find the following :—

Genus Lumbricus.

L. lineatus, Müller. Coast of Down, W. T. Was so named by Dr. Johnston, to whom a large collection of Irish Annelides was submitted for the purpose of being named and described ; the localities noted were attached to the specimens.

That, so far as I am aware, is the first and only reference to the occurrence of this Pachydrilid in Ireland. Can it be confirmed ? In 1865 the Trustees of the British Museum published a Catalogue of Worms(1), by Dr. George Johnston, of Edinburgh, in which we find, under the Genus *Saenuris* Hoffmeister, this record :—

"*S. lineata*, dorsal vessel simple, tortuous ; segments about 40 ; anal segment sinuate. Length 6mm.

Der rothe Wurm, Müller, *Wurm-Arten*, 110 ; der Faden-Wurm, 118, tab. 3, f. 4, 5.

Lumbricus lineatus, Müller, *Verm.* i., ii. 29, *Zool. Dan. Prod.*, No. 2606. Fabricius, *Faun. Groenl.* 278.

Nais littoralis, var. Müller. *Zool. Dan.*, tab. 80. f. 1-4.

Saenuris lineata, Grube, Fam. Annel. 103, [146].

Hab.—In wet gravel or sand on the shore where the water is brackish.

Desc.—Worm slender, slightly narrower at both ends, of a reddish colour to the naked eye, smooth, the sides neatly crenulated. Segments about equal in length to their diameter. Anal segment obtuse, deeply sinuate, mutable in form, for the little prominences which bound the sinus can be expanded or shut at pleasure.[1] Spinets in four series, equidistant, from two to four in each fascicle, short, curved like an italic *f*, and sharp at the apex.

(*L.*) Ferne Isles, Northumberland, Dr. Johnston."

[1] This is a curious point, indicating in my judgment that specimens were examined whose anal extremity was infested with parasites. These are of frequent occurrence. Otherwise a Naid may have been mixed with the material.

Though the other species placed under *Saenuris* in Johnston's Catalogue are either Tubificids or Lumbriculids, it is evident that this is a red-blooded Enchytraeid (Pachydrilid). But confusion begins when we turn to Grube,(2) who makes it a Tubificid.

"Gattung Saenuris.
Uebersicht der Arten.

Haarförmige Borsten { Solang als der Leib breit, viel langer als die Hakenborsten, letztere zu je 4 oder 5, Blut roth, etwa 140-160 Segmente. *S. variegata.*
Wenig länger als die Hakenborsten, letztere zu je 8 oder 9, Blut orangegelb, etwa 70 Segmente. *S. lineata.*"

From the days of Grube till those of Michaelsen(3) the confusion has gradually become worse confounded.

On the occasion of my visit to Ireland in March, 1913, I first gained a clue to the solution of the mystery so far as the Irish material is concerned. Along with certain Pachydrilids found in and around Dublin were also some specimens of a Tubificid whose identity has not yet been determined. But it was during the recent examination of a large quantity of material from the Manchester sewage works that I was able to place the matter in its true light. Michaelsen(4), in 1909, published an account of *Lumbricillus lineatus* O.F.M., and added that it was doubtful whether this species can be differentiated from *L. subterraneus* Vejd., which is remarkable for its long, thin, sperm-funnel. I would further suggest that we have to enquire whether it can be distinguished from *L. verrucosus* Clap. ? Now both *subterraneus* and *verrucosus* are recorded by Southern for Ireland, who further draws attention to the fact that *L. litoreus* Hesse is practically indistinguishable from *lineatus* O.F.M.

Some years ago (1912) I found typical specimens of *Lumbricillus lineatus* O.F.M. at Middlesborough, and in the same year it was found by me in great abundance in a streamlet at Blackfordby, near Ashby-de-la-Zouch, and by the Canal in Nottingham, as well as by the Gelt, at Gilsland. In recording the fact in the *Zoologist* for that year I gave some attention to the present question, and shewed that two different genera had been confused.

The problem before us has exercised Southern(5) as well as myself, and he hesitated whether or not to record *L. lineatus* as Irish. On looking over my notes of Irish Oligochaets collected by myself in Belfast and Dublin in former years, however, I find that more than one description agrees entirely with that of *lineatus*, while the material from Manchester provided specimens of such diverse form that one could be named *lineatus* and another *verrucosus*, though every intermediate stage could be traced. Since Müller's name takes precedence, and his species is undoubtedly to be recorded as Irish, we have the following results :—

1. *Lumbricillus lineatus* O.F.M. Collected at Belfast by myself, Whitsuntide, 1896 ; Ringsend, Dublin, March, 1913 ; Dodder, in mud, by Ballsbridge, same date.
2. *Lumbricillus verrucosus* Clap.
3. *Lumbricillus subterraneus* Vejd.
4. *Lumbricillus litoreus* Hesse,

all to be regarded as more or less closely related to *lineatus*, either as mere varieties or as subspecies.

5. An undetermined worm, wrongly associated by me with *Saenuris lineata* Grube, found at Ringsend, Dublin, with *L. lineatus*, March, 1913.

I wrote in the *Zoologist*(6) : " While it is an undoubted Tubificid, it is the only species yet discovered in Britain which has setae like *Lumbricillus*. In this respect, therefore, it is a link between the red-blooded Enchytraeids and the Tubificids." As it is desirable to be able to refer to this interesting worm in future under a definite name, and as my attempt to co-ordinate it with *Saenuris lineata* Grube was an error, I propose the following solution of a difficult question.

GENUS AEGIALINA Friend, n. gen.[1]

Characters as defined for the family Tubificidae by the authorities, except that there are " absolutely no capilliform setae, and no forked setae, but all of the Pachydrilid (*Lumbricillus*) type."—*Zoologist*, June, 1912, p. 221.

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1 The generic name is from the Greek word αἰγιαλός, the seashore, strand ; and the specific name has allusion to the sigmoid shape of the setae.

AEGIALINA SIGMA, n. sp.

Saenuris lineata Friend, *Zoologist*, 1912.

Length about 20 mm.; segments 65 or thereabouts; Tubifex-like in character, coiling up, and not swimming like Lumbricillus. Head and tail pale, middle portion of the body ruddy brown, owing to the blood vessels (red) and chloragogen cells (brown); setae sigmoid, or shaped like an italic *f*, 4 bundles in each segment, 2-4 per bundle. Hearts as in Clitellio and other genera in the 8th or 9th segments. Nephridia in 6-7 and 7-8 with glandular cells, clear as in Limnodrilus (*Hoffmeisteri*, &c.); also in segments 12 and later. Chloragogen cells begin in 6; no strong pharynx as in Enchytraeus, but cephalization exactly as in Tubificids. Male pores on segment 11, without ventral setae. Brain concave in front, incised behind. Cf. *Zoologist*, as cited above.

Distribution.—Ringsend, Dublin, March, 1913, in sand, with *Lumbricillus lineatus* O.F.M. and other Pachydrilids. Generally distributed on the sea coast and estuaries of the British Isles—Middlesborough, Gravesend, Plymouth, and Aberystwyth. At present unknown on the Continent of Europe or elsewhere.

A NEW IRISH NAID.

During my visit to Ireland in 1896 a good deal of material was collected which has never yet been properly examined. Among my notes I find references to a water-worm which has not hitherto been recorded. It is a species of *Naidium* which differs from all whose descriptions I have been able to study, and I therefore name it *Pristina variabilis*.[1] The full description will appear elsewhere, but the following detail may serve for its recognition should it again be found:—

Pristina variabilis, sp. n.—Number of segments, 25. Very transparent. Two black eye-spots. Setae commence in the second segment, and consist of two kinds, bidentate and capilliform. The capilliform are of unequal lengths,

[1] The name *Pristina inaequalis*, which I intended to use, has already been employed by Ehrenberg.

hence the trivial name; they begin in segment 6, and number 2 to 5 in each dorsal bundle. Usually one finds 1 or 2 long and 2 to 3 short ones. The setae of the first segments are paired; they are more numerous in the middle of the body and stouter than those at the extremities. The length of the bidentates fully equals one half the body diameter, while the capilliforms gradually diminish in length posteriorly—another inequality. The intestine begins with the sixth segment, and the coelomic corpuscles are circular or globular. Fission was in process.

Habitat.—Lough Erne; also in water at Aghaderg. Collected Whitsuntide, 1896.

An unknown Annelid.

Among my gleanings around Belfast in 1896 were a few tiny worms which I have only once found since, viz., in 1912, at Middlesborough. They were about 10 mm. in length and 1 in diameter, looking at first very like a newly emerged *Allolobophora rosea*. The breadth was much greater than is usual in aquatic worms. They were so delicate that they either did not survive transit, or died as soon as they were placed on a slide in fresh water. The great peculiarity was the setae, which were of three kinds, one of which has never come under my observation in any other worms. In segments two to seven there were five or six *sickle-shaped* setae of quite a typical nature. Next followed palmate setae, which ultimately gave place to forked setae, of which there were only one or two in each bundle posteriorly. Two black eyespots gave the worm a certain resemblance to the Naids. The living creature was pale pink in colour, and had strongly developed blood vessels about the eighth or ninth segment, as in *Clitellio* and *Limnodrilus*.

I should be very grateful to collectors if they could rediscover it. The ooze by river or estuary is the most likely locality.

Popular Irish Names for Worms.

By some means I have entirely omitted in past years to draw attention to this subject. But now that Dr. Scharff has interested us in Bird names, the matter ought to be touched upon.

In April, 1893, I received a letter from Mr. G. E. J. Greene, of Ferns, saying that he had been in conversation with an angler, and had obtained from him the names of certain earthworms. Mr. Greene had been studying my articles and knew the species, and this is his list :—

1. Maggot worm or Long worm—*Lumbricus papillosus* Fr. (with *L. terrestris* and *A. longa* probably).
2. Sprat worm—*Lumbricus rubellus* Hoffm.
3. Brambling (—Brandling)—*Eisenia foetida* Sav.
4. Green worm—*Allolobophora chlorotica* Sav.
5. Milk worm—*Allolobophora turgida* Eisen.
6. Small Brambling—*Dendrobaena subrubricunda* Eisen.

The angler had never heard the latter called Gilt tail or Cockspur, the names which anglers in England frequently employ.

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Dept. of Zoology, University, Birmingham.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Grivet Monkey from Mr. Mooney, a Bonnet Monkey from Mr. J. S. Sandes, two Rabbits from Mr. C. Maude, a Cavy from Miss Gaisford, a Grass Parrakeet from Mrs. Cusack, a Roseate Cockatoo from Mrs. Glenn, a Silver Pheasant from Dr. Timmon, an Amherst Pheasant from Lady Ardilaun, and a Heron from Mrs. Potterton. Three Egyptian Dogs have been received on deposit, and two Lion-cubs —the parents " Red Hugh " and " Mitze "—have been born in the Gardens.

DUBLIN MICROSCOPICAL CLUB.

December 8.—The Club met at Leinster House, the President (D. M'Ardle) in the chair.

Dr. Geo. H. Pethybridge showed *Sphacelotheca hydropiperi* de Bary, collected at Clifden, Co. Galway, on *Polygonum Persicaria* (" Redshanks "). This is a parasitic fungus belonging to the group of " Smuts " (Ustilagineae) from the majority of which it differs in the comparative complexity of its compound sporophore. The parasite destroys the ovule, with the exception of a small portion of its micropylar end, but instead of becoming wholly converted into spores, as occurs for instance in the smuts of cereals, the fungus produces a peripheral colourless plectenchyma surrounding the purplish-violet mass of spores, while through the centre of this spore-mass a central colourless " columella " is developed. Owing to the continued growth of the fungus in the basal region of the ovule the sporophore is pushed upwards until eventually the wall of the ovary is ruptured and thus the spores are set free. The fungus is included in Plowright's monograph, but the present record is the first indicating its presence in Ireland.

H. A. Lafferty showed preparations of the parasitic fungus *Septoria chrysanthemella* Sac., on Chrysanthemum leaves ; on the leaf the fungus forms circular brown spots which increase in size and become slate-coloured with age, eventually the entire leaf becomes involved and dies. The pycnidia, which contain the spindle-shaped spores, appear as little black bodies on the diseased areas. This disease, although known in England and the Continent, has not, until now, been recorded from Ireland.

BELFAST NATURALISTS' FIELD CLUB.

December 15.—J. Erik Hamilton, m.sc., f.z.s., delivered a lecture on " Experiences at an Irish Whaling Station." The station in question was that on Ardelly Point, Blacksod Bay, where the lecturer spent parts of two seasons as an investigator on behalf of the British Association's Committee on Whaling. A detailed description was given of the modern method of whale-hunting, which is conducted by small, fast steamships. These vessels are armed with small cannon of about 3in. bore, having a range of 50 yards which fire a harpoon about six feet long, the point of which is a conical shell of cast iron containing a charge of blasting powder. The harpoon lines are 2½in. cable and are either 300 or 400 fathoms in length. The fishing-ground is extensive, one ship sometimes going as far as Rockall, 240 miles distant from Blacksod. When brought in, the animals are hauled up a long wooden slope on to a wooden platform about 100 ft. square. On this platform the dissection is very completely conducted by means of large knives which have a blade of 18in. length, set on a wooden haft four or five feet in length. It is necessary to use steam winches in cutting up the whales. The process starts with complete removal of the blubber from the outside of the animal, this is followed

by the removal of the viscera, the cutting off of the head, and finally the chopping apart of the vertebrae. Every fragment of the animals is boiled down in large iron boilers, the end products being oil, and a residue which, when dried, forms a valuable cattle-food and guano.

In the 1914 season about 3,000 barrels of oil were manufactured from 86 whales.

A brief account was given of the six species of whale taken on the northern stations. These are :—*Balaena australis*, *Balaenoptera physalus*, *B. musculus*, *B. borealis*, *Megaptera longimana*, and *Physeter macrocephalus*. Of these the three species of Balaenoptera and Physeter are usually taken. The other two species are now of only casual occurrence.

The lecture was illustrated with a number of blackboard sketches and lantern slides of *B. physalus*, by Mr. R. Welch.

DUBLIN NATURALISTS' FIELD CLUB.

November 16.—The first business meeting of the session was held in the Royal Irish Academy House, the President, N. Colgan, M.R.I.A., in the Chair. Professor A. Henry, M.A., delivered a lecture on "Trees and their varieties," illustrated by a series of lantern slides. The lecturer gave a very interesting account of the differences of form between the Austrian and Corsican Pines, and then discussed the causes which have probably produced these different species. Some remarkable examples of varieties of beech, elm, oak, and yew, which have been produced in the British Isles were also described and then a number of diagrams explaining the Mendelian theory as it effects "sporting" were placed before the meeting. A number of points mentioned in the lecture were discussed by the President.

NOTES.

ZOOLOGY.

Spotted Rockling from Co. Down.

Towards the end of August of last year I got at Ballywalter a fish that was strange to me, and it was identified in Dublin Natural History Museum as a Spotted Rockling (*Motella maculata*), with the observation—"The fish sent is a rare one, and I have not seen one before from the east coast. There are three specimens in the Museum from the west coast of Ireland." I got it from a fisherman, who told me that he caught it in a lobster pot. It was 17 in. long, about 1 lb. in weight, of a pinky bronze colour. It had feelers on the forehead and side of mouth, and was something the shape of a South African Barbel.

J. ffolliott Darling.

The Bay, Athlone.

Some Notes on Winter Birds near Dublin and in Ulster.

The first Great Northern Diver I saw this winter was at Seapoint, on September 27th; since then I have seen them on various occasions on the south side of Dublin Bay. The last Tern which I saw this season in the vicinity of Kingstown was on the 23rd of October, on the outside of the West Pier; it was a specimen of the Common Tern. The first Snow Bunting which I saw this winter was at the Forty-foot Hole, Sandycove, on the 9th of November. The next occasion on which I saw these birds was on November 18th, on the West Pier, a small flock of five, and one very beautiful specimen amongst them. I believe the names Snow Bird and Frost Bird are applied to this bird synonymously. I was driving on an outside car some time ago from Newbridge to the Curragh Camp, and on the way the carman remarked to me that he thought we were going to have a very hard, frosty winter, as the "White Sparrows" had been seen already on the Curragh.

On November 11th I saw a Kingfisher on the rocks at the edge of the sea behind Sandycove Battery, not a usual place to see this bird. I saw it twice afterwards on the rocks between that and Kingstown, and the following week there was one in the Park at Blackrock.

On November 25th and on one other occasion I saw a Purple Sandpiper on the rocks between Bullock Harbour and Sandycove. I do not recollect having seen this bird as far south in Ireland before; the great storm of the 12th November may have had something to say to its appearance here. I used to see it every winter on the coast of North Antrim and Donegal.

The week previous to this a Black Redstart had put in its appearance not very far from Dublin and not far from where I saw it last year, but I will refrain from specifying the locality as it might result in a tragedy for the poor bird. On November 13, the morning after the storm, three Grey-backed Crows were to be seen at Booterstown, and on several occasions since. These birds are not often seen near Dublin in late years. Strange to say, there was one which came in through an open bedroom window of a house in Kingstown towards the end of October last, much to the astonishment of the occupants of the room; but this one, I think, must have been a pet, as it seemed quite at home, and after getting something to eat it took its departure in the same way in which it had come.

I have not seen a Razorbill about Kingstown since the 2nd of October, on which date I saw seven. The Common Guillemot I have seen on various dates up to December 6th, generally ouside the West Pier, but on this date off Sandycove.

Though not in the vicinity of Dublin, it may be of interest to note that I picked up a dead Fulmar Petrel on the shore between Portstewart and the mouth of the river Bann, in County Londonderry, on the 17th of last April; there had been some very stormy weather just before this.

Another bird which I saw at the mouth of the river Bann, in the month of August, and which is by no means common, was the Curlew Sandpiper; there was a small flock of them. I have never come across this bird in the neighbourhood of Dublin.

Geo. Brown Crawford.

Rathgar, Dublin.

Velvet Scoter on Lough Ree.

On December 27 I shot, in Hodson's Bay, Lough Ree, County Roscommon, a black diving duck, which has been identified at the Dublin Natural History Museum as an immature male Velvet Scoter (*Oedemia fusca* Linn.). I made the following notes from the bird while quite freshly killed :—Irides—very dark brown—nearly black (alive) ; beak, upper mandible—black, with greenish tinge near front, nail black ; lower mandible—black, with a semi-circular whitish mark like a " nail " at the end ; inside of mouth and tongue—white, including both mandibles ; legs and feet—dark flesh colour in front, behind black ; webs and claws—black. He looked quite black on the water, but the upper plumage has a brownish tinge and the breast is mottled with white. Speculum white. He dived off after being shot, and I had to pursue him for a long distance in a boat before getting a chance to finish him off. I believe he is being mounted for the Museum. These birds are occasionally seen on the lake, and are called " Black Divers." On 1st August, 1914, I wounded and lost one on this lake when shooting ducks. It dived, and probably went into a patch of weeds, for I saw it no more. In Ussher and Warren's " Birds of Ireland " they say that about twenty records are known from along the coasts, nearly all from the east coast. They do not say anything about their being found on inland loughs.

J. ffolliott Darling.

The Bay, Athlone.

This duck is a rare winter visitor to Ireland, chiefly to the bays of the East coast, but usually keeping out to sea. Mr. Ussher in his " List of Irish Birds," refers to a specimen having been obtained on Lough Ennell in Westmeath ; its occurrence inland however is quite exceptional, probably due to having been blown in by storms.

A. R. Nichols.

National Museum, Dublin.

Rooks nesting near the Ground.

In the December *Irish Naturalist* (vol. xxiv., p. 217) Mr. Praeger refers to nests of Rooks being only fifteen feet from the ground at a place in Co. Wicklow, but if he were to visit a certain small island on Lough Fern, in Co. Donegal, covered with little more than bushes, he could obtain Rooks' eggs in the season without having to climb for them at all, provided the bushes are still as they were some years ago, and the Rooks still nesting in them.

Geo. Brown Crawford.

Rathgar, Dublin.

Icterine Warbler on Migration at Tuskar Light-Station.

I should like to correct a slight error in regard to the period which elapsed between the capture of the two Irish Icterine Warblers now duly authenticated by specimens. The period should be fifty-eight years and three calendar months, less six days, instead of 59 years as previously stated (*vide Irish Naturalist*, February 1915, p. 42). The first bird was secured on June 8th, 1856. The second on September 2nd, 1914. It is a matter of great interest that one was obtained at the close of the vernal migration, and presumably arrived in this country some time in April or May as a vernal migrant, while the other was obtained during the autumn migration.

C. J. Patten.

University, Sheffield.

Hawk and Heron.

One afternoon in the last week of December I was witness of an attack made on a Heron by a large Hawk, presumably a Peregrine Falcon, although I can claim no certainty as to that. Three times the Hawk was seen to stoop, but apparently without the purpose of actually striking the Heron. After each swoop, the latter turned and faced its enemy as it rose, fleeing again before the next attack. Finally it flew, closely pursued by the Hawk, away over a wood, and both were lost to sight, so that the probable result of the conflict could only be guessed at, for there seemed little hope for the ultimate escape of the poor Heron. During the whole time no cry was heard uttered by either bird.

W. E. Hart.

Kilderry, Co. Donegal.

Missel-Thrush on Migration at Tuskar Lighthouse.

I am indebted to Mr. Glanville, principal lightkeeper, for kindly forwarding to me an adult female Missel-Thrush, in splendid plumage and condition. He procured the bird as it struck the lantern-glass of Tuskar Rock light-station, at 10.30 p.m., on October 31st last. This is the first specimen which has come into my hands from Tuskar, and only the second since 1911, *i.e.*, when I commenced investigating the migrations of birds at Irish light-stations. I obtained the previous bird as it was striking the glass of the lantern of Maidens Rock light-station, at 1.30 a.m. on April 17th, 1914 (*Irish Naturalist*, May, 1914). The scarcity of this species, contrasted with the great frequency of the other Irish Thrushes as observed on migration at the above light-stations, is a matter of considerable interest.

C. J. Patten.

The University, Sheffield.

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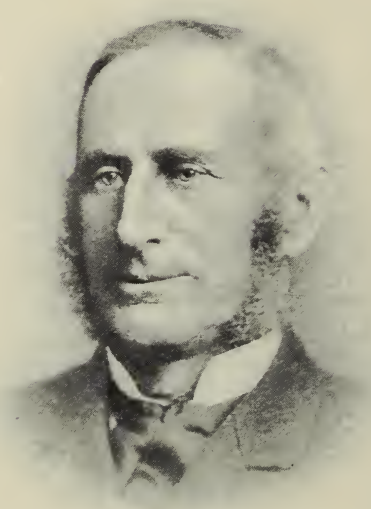

ROBERT WARREN.

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ROBERT WARREN.

In Robert Warren, who passed away at Ardnaree, his Co. Cork residence, on the 26th of November, 1915, we have lost the last survivor of the group of distinguished ornithologists to whose long-continued collaboration this country is indebted for nearly all the progress made in the study of Irish birds in the sixty-four years that have elapsed since William Thompson's death.

Born in Cork on the 22nd of March, 1829, he was the eldest son of Robert Warren, of Castle Warren, Co. Cork, and of his wife, Matilda, youngest daughter of Edward H. Hopper, a Cork merchant. Besides Robert, three other children, a brother and two sisters, were reared. When the eldest boy was a few years old his parents took up their residence at Castle Warren, where they lived until 1851, his education being at first carried on under a tutor, after which he went to a school in Cork.

The surroundings of Castle Warren conduced strongly to fostering young Warren's love of birds—a love that was inherited from his father, and was shared in an almost equal degree by his brother Edward. In early boyhood he formed an aviary, rearing many young birds from the nestling stage, and easily winning the affection of all his pets, which included several gulls and a Heron. But the great delight of both the brothers was to accompany their father on long boating excursions to the breeding haunts of sea-birds on the coast outside Cork harbour. A favourite goal of these excursions was the Sovereign Islands, and throughout his life he retained a vivid memory of these delightful trips—sometimes made in a yacht, but more often in a whale-boat—with the glorious pictures they afforded of the Peregrine Falcons wheeling about their eyrie, the Shags and Rock Pigeons at their nesting haunts in the caves, the Black Guillemots swimming about in pairs, and that bold robber, the Raven, seizing every opportunity to carry off on his bill an egg of one of the hatching Cormorants. In these expeditions were laid the foundations of a store of knowledge that was almost incessantly added to in later years.

An early friendship was formed with Dr. J. R. Harvey, author of the Fauna of Cork, to whom he often reported visits (sometimes sending specimens also) of the rarer birds that came under his notice. More important was the beginning of his correspondence with William Thompson, whose work on the natural history of Ireland was still in course of preparation. Warren in later years used to like relating how Thompson, seeing him look with evident interest at some specimens of gulls in Belfast Museum—this was during a visit to his cousins, the Taylors, who lived in College Square, Belfast, and probably in 1846—entered at once into conversation, pointing out to him the easiest method of distinguishing at sight the Glaucous and Iceland Gulls from any of the common species frequenting the Irish coast. It was a peculiarly happy lesson, as Warren was destined to add so much to our knowledge of the visits of these two species, then believed to be so rare. His first meeting with the Iceland Gull was in January, 1849, when he and his brother noticed in Cork Harbour some gulls that they at once recognised to be of one of the wished-for species, and after much perseverance a specimen was secured in time to be recorded in Thompson's work as the fourth Iceland Gull obtained in Ireland.

Among other records for which Thompson was indebted to his young correspondent was that of the Alpine Swift (*Cypselus melba*) shot at Doneraile in 1844 or 1845—the third Irish occurrence. Very little of their correspondence, however, referred to such occasional stragglers. Thompson soon came to place his chief reliance on Warren for full information touching the birds of the southern coast, their breeding-places, respective numbers, migrations, and general habits. In many of his letters (kindly lent by Miss Warren for the purposes of this memoir), the elder naturalist shows his appreciation of the help he had received by pressing for still more frequent communications. "I hope," he writes on May 3rd, 1849, "my not acknowledging receipt of your letter of 7th March has not prevented your communicating any information to me. As long as I am kept *continuously* occupied preparing matter on the Birds of Ireland for the press, I expect that ornithologists will absolve me from

letter-writing." And again, " I stop in the midst of writing on the Heron to inquire where it was that you knew this bird and the Rook to build in the same tree. I should be glad of full particulars on that subject." There are many similar notes, and Thompson freely sketches the plan and extent of the information he hopes to be able to lay before his readers if supplied with proper material from every quarter.

The matter of most of Warren's letters is largely worked into Thompson's book, and the name of his southern home has been made familiar to many readers by the amusing passage that tells how " the family at Castle Warren, near Cork, were much alarmed on one occasion by hearing a loud snoring noise, like that made by a man after a hard day's work, proceeding from one of the chimneys ; and all apprehension was not dispelled until some Barn Owls, which had a nest there, were discovered to be the snorers."

In 1851 the family home of the Warrens was transferred to Moyview, Co. Sligo, where a new field for investigation presented itself, Killala Bay and its shores proved an ideal hunting ground alike to the sportsman and the naturalist. Working hard at the farm as they did, the brothers used to be up before dawn so as to enjoy a run in their punt before the day's work began, and they had not been many weeks in their new home before several interesting discoveries rewarded their efforts. The month of April was marked by two particularly welcome surprises—the finding of the Sandwich Tern in considerable numbers frequenting the island of Bartragh, and the securing of the first Irish-killed specimen of the White Wagtail on the same island about a fortnight later. The actual breeding-haunt of the Terns was not found till six years later, and the discovery that Bartragh Island is practically a regular halting place of the White Wagtail on its migratory spring voyage was not made until nearly another half-century had elapsed ; but the delight of coming across these two rare and little-known visitants within so short a time, after settling in a new home, would naturally leave a strong and abiding impression on any bird-lover's mind.

The story of his life for the next fifty-eight years is inseparably bound up with the birds of Killala Bay and of the surrounding country. Correspondence with Thompson continued briskly up to the date of that naturalist's death, early in 1852. Though the third and last volume on the Birds of Ireland was already out in the spring of 1851, so that all letters on the ornithology of the West were too late to be of use for that work, Thompson continued to take the deepest interest in all that he could collect on the subject. More than once he mentions having read and made many extracts from letters shown him by Warren's cousin and close friend, Alexander Taylor, another great lover of birds. In the case of a letter relating to the White-tailed Eagle shot at Bartragh in December, 1851, Thompson states that he has copied nearly the whole. Fishes as well as birds were sometimes discussed. Almost every branch of natural history had some attraction for Warren, and when returning from distant expeditions he brought home specimens of many forms of marine life—particularly among the mollusca, these being the subject to which his sister, Miss Amy Warren, has, as is well known, long devoted special attention.

About 1862 he began contributing notes to the *Proceedings* of the Dublin Natural History Society. Some of his papers were read for him in his absence; but one which he read in person on the 2nd of February, 1866, on rare bird visitors to the Moy and to Killala Bay, had an important effect in leading to the formation of his friendship with A. G. More. Among the birds dealt with was the Fulmar Petrel—at that time only known to Irish naturalists on the strength of dead specimens picked up along certain parts of the coast. Warren's remarks as to the comparative frequency of such occurrences on the Connaught coast, and the absence of any records from Donegal or Derry interested More, who volunteered an explanation. From this time onward the friendship between the two steadily grew, and the cementing of other ornithological friendships—including those with Ussher, Barrington, and Howard Saunders—was much promoted.

In 1875 Warren had the good fortune to be able to add the Pied Flycatcher (*Muscicapa atricapilla*) to the list of Irish birds. Shot at Moyview on the 19th of April in that year, the specimen remained until (curiously enough) the 19th of April, 1914—when Mr. Barrington received one from Ballycottin lighthouse—the only example of the Pied Flycatcher known to have visited Ireland in spring, or, indeed, to have reached the Irish mainland at all.

By this discovery, and by his observations on the Spotted Redshank, the Pomatorhine and Richardson's Skuas, the Glaucous and Iceland Gulls, Sandwich Tern, and other little-known visitants, Robert Warren soon came to be recognised as the only ornithologist possessing an exhaustive familiarity with the birds of the Irish West ; so that when, in 1890, the preparation of a new book on Irish birds was planned with a view to embodying in a standard work the knowledge acquired since Thompson's day, the inclusion of Warren's name in the Committee formed for the purpose was almost a matter of course. With him were associated More, Ussher, and Barrington, and the preliminary step was at once taken of announcing in the *Zoologist* that the book had been taken in hands.

It is of course well known that when " The Birds of Ireland " appeared, it was not the work of four, but (so far as the actual writing was concerned) practically of one man—R. J. Ussher. Failing health prevented More from taking more than a nominal part in the undertaking ; absorption in his more special work on the lighthouse observations compelled Barrington to forego his share in the larger scheme ; and Warren, while placing his voluminous notes entirely at the disposal of his remaining colleague, had such confidence in Ussher's power to deal with all the material in his hands that he took no part in the writing, except as regards half-a-dozen favourite species. Ussher was, of course, largely indebted to Warren for a mass of facts dealing with the western birds ; and he would gladly have made a far larger use than he actually did of that material, had the publishers not deemed it necessary to place rather stringent limitations on the space to which they could allow the volume to run.

In this last-mentioned fact we have the clue to a somewhat singular sentence in the preface, which states that while Warren had written the articles on White Wagtail, Surf Scoter, Spotted Redshank, Greenshank, Bar-tailed Godwit, and Sandwich Tern, he was "not responsible for the rest of the work." Warren felt strongly that such limitations as the publishers had imposed, made it impossible for the book to discharge what he conceived to be its aim—that of covering in the light of later research the ground that had formerly been occupied by Thompson's three volumes on Irish birds. He was, therefore, far from satisfied with the outcome of his own and his colleague's work. But he yielded to no one in his admiration for the manner in which Ussher had laboured under such difficult conditions. Had it been possible to treat of all the birds on the scale on which a few, such as the Chough and the Peregrine, were handled, his enthusiasm for his friend's work would have been unbounded.

As a personal observer of the habits of birds, Warren had probably—despite his unremitting activity in pursuit of specimens—acquired a larger fund of information than any of his colleagues. Being out at all hours and in the sharpest weather, he could scarcely miss a sight or sound having any bearing on ornithological subjects. The deep nuptial note of the male Long-eared Owl—essentially a bird of the woods—was as familiar to him as if it had been a cry of the treeless wastes or the open sea-board, though not one naturalist in ten—even of those living in the better wooded parts of the country—seems ever to have heard this somewhat uncanny sound of the January and February nights. The discovery that the Sandwich Tern, even in its far inland breeding ground in Fermanagh, feeds its young with sand-eels brought from the sea instead of with fish caught in the adjacent fresh water, was made by his observant eye a little too late to allow of its being mentioned in "The Birds of Ireland." He was probably the last naturalist who saw the Sea-Eagle in one of its Irish haunts before it became extinct in this country. Though he shot rare stragglers without compunction, and revelled in turning over the skins in a large collection for the purpose of

comparing various phases of plumage, he felt as deep an interest as any nature-lover in the preservation of seriously threatened bird-life—as in the case of the Red-throated Diver in its Donegal breeding home. He warmly disputed the charge brought against Irish naturalists and sportsmen by an English ornithologist of having helped on the extermination of the Osprey in Scotland by shooting the birds during their migration across Ireland; and he certainly succeeded in showing that the charge had been made on very slender foundation.

The National Museum is indebted to his vigilance in the field for many interesting birds, the best being probably the two Surf Scoters shot in the winter of 1896–7, the Pied Flycatcher, and a Black Tern shot on the Moy in 1859. The White Wagtail shot on Bartragh in 1893 also merits notice as the second example obtained in Ireland. Among the rest, as Mr. Nichols kindly informs me, are an immature male Eider Duck, a male and female Gadwall, an Iceland Gull in second year's plumage, and a Glaucous Gull, Fulmar Petrel, and Little Auk. He was also largely instrumental in securing for the Museum the specimen of the Humpbacked Whale (*Megaptera boops*), which hangs from the roof of the Upper Room directly under the Common Rorqual, and which forms the subject of an article contributed by him to this journal (vol. ii., p. 119), in 1893. Next to birds, the whales and seals were the animals that seemed to interest him most, and when visiting the Museum he used to enjoy conversing about them. To the Royal Zoological Society of Ireland, of which he was a Corresponding Member, he often sent gifts of living birds. Several of his earlier specimens were also given to the Museum of Queen's College, Cork. The skins that formed his private collection—including some American birds sent him for comparison by his cousin and old correspondent, A. Taylor—are, I understand, now in the possession of his friend Mr. W. Williams.

Throughout the whole term of his residence in Sligo, he cherished the hope of ultimately returning to his native county; and in 1909, having completed his eightieth year,

he realised this wish, and settled at Ardnaree, Monkstown, where the remainder of his life was spent.

In August, 1911—at eighty-two—he went on his last exploring tour, when he and Barrington together visited the chief bird-resorts of the North Mayo coast, including the scene of Ussher's welcome discovery—made only a month before—of a colony of Irish-breeding Fulmars. Though his interest in the ornithology of the West never flagged, southern birds now claimed a large share of his attention. To the *Zoologist*, *British Birds*, and this journal—as well as to the *Field*, he contributed various notes from Ardnaree, reporting occurrences of rare stragglers in Cos. Cork and Waterford, the best being the Blue-winged Teal (*Querquedula discors*), shot at Ballycottin in September, 1910, which made a welcome addition to our list of American bird-visitors to Ireland. As a correspondent, his activity remained unabated to the end of his life, and the care with which he digested the contents of communications from his brother-ornithologists helped to make his memory a remarkable storehouse of facts.

His death in his 87th year was the result of an accident sustained in his own house on the 12th of November, 1915. Only a few days before, he had written to express strong doubts as to the accuracy of a statement in the obituary notices of his friend Barrington in the November issues of this and another journal; and further inquiry proved that he was quite right in thinking the statement erroneous. He had passed away before the correction could be published; but his timely intervention prevented confusion on the subject from arising at a later date.

Barrington's death (which occurred ten weeks before his own) had made him the last survivor of the original "Bird Committee," of whom he had, from the first, been the oldest in years; and the vigour of mind and body that he retained was a remarkable tribute to the soundness of his constitution, well sustained throughout life by active, regular, out-door habits. A man of quick, eager temperament, he had much of that distrust for the "book-man," that marked Charles Waterton and other first-rank field

students ; but he could always be captivated by evidence of real, solid work. The importance which all his brother ornithologists attached to securing his co-operation in any undertaking they contemplated is a sufficient proof of the high value they set on his judgment, acumen, and friendship.

C. B. Moffat.

LIST OF THE LATE ROBERT WARREN'S MORE IMPORTANT WRITINGS.

COMPILED BY A. R. NICHOLS, M.A.

1857. Notes on the Natatores of Killala. *Natural History Review*, vol. iv. (Proc.), p. 50.
1863. Rare Birds, and Oblong Sunfish in the County of Mayo. *Dublin Nat. Hist. Soc. Proc.*, vol. iii. (1859–62), p. 2.
1863. Birds of Prey, Perchers, and Waders of Mayo and Sligo. *Ib.*, vol. iii. p. 113.
1863. Swimming Birds (Natatores) of Killala Bay and the River Moy. *Ib.*, vol. iii., p. 119.
1865. Winter Migration of the Pomarine Skua, and occurrence of the Bridled Guillemot and of the Fulmar. *Ib.*, vol. iv. (1862–65), p. 3.
1865–1871. Occurrence of birds on the Shores of Killala Bay and the River Moy. *Ib.*, vol. iv., pp. 38, 62 ; vol. v. (1865–69), pp. 23, 154.
1875. Pied Flycatcher in County Mayo. *Zoologist* (2), vol. x., p. 4498.
1875. Autumnal Migration of Lestris Richardsonii, and L. pomarinus in Killala Bay and the Moy Estuary. *Ib.*, vol. x., p. 4699.
1876. Avocet in Ireland. *Ib.*, vol. xi., p. 4764.
1877–1896. [Many Notes in *Zoologist*, (3), vols. i.–xx.]
1877. Eiders in the Estuary of the Moy, County Mayo. *Ib.*, vol. i., p. 50.
1877. Freshwater breeding haunt of the Sandwich Tern. *Ib.*, vol. i., p. 101.
1877–1878. The Birds of the Moy Estuary and the surrounding district. *Ib.*, vol. i., pp. 233, 284, 321 ; vol. ii., p. 60.
1877. Absence of the Weasel from Ireland. *Ib.*, vol. i., p. 379.
1878. Terns and Skuas in the Estuary of the Moy. *Ib.*, vol. ii., p. 26.
1878. Spotted Redshank in the Co. Mayo. *Ib.*, vol. ii., p. 28.
1878. Ornithological Notes from the Moy Estuary. *Ib.*, vol. ii., p. 173.
1878. Godwits and Knots retaining their winter plumage in Summer. *Ib.*, vol. ii., p. 341.
1878. Rare Birds in the Counties of Mayo and Sligo. *Proc. Belfast Nat. Hist. and Phil. Soc.* (1877–1878), p. 61.
1879. Wildfowl in County Mayo. *Zool.* (3), vol. iii., p. 126.
1879. The Effect of severe frost on animal life, as observed in the County Mayo. *Ib.*, vol. iii., p. 291.
1880. Ornithological Notes from the County Mayo. *Ib.*, vol. iv., p. 129.
1880. Great Grey Seal in Killala Bay, Co. Mayo. *Ib.*, vol. iv., p. 358.

1881–1890. Ornithological Notes from Mayo and Sligo. *Zool.*, vol. v., pp. 131, 254 ; vol. vi., p. 129 ; vol. vii., p. 370 ; vol. x., p. 296 ; vol. xi., p. 296 ; vol. xii., p. 289 ; vol. xiii., p. 262 ; vol. xiv., pp. 129, 273.

1881. Supposed occurrence of the Sooty Shearwater off Cork Harbour. *Ib.*, vol. v., p. 420.

1882. Inland Breeding Haunt of Larus canus. *Ib.*, vol. vi., p. 241.

1884. Spotted Redshank and Long-tailed Duck in the Moy Estuary. *Ib.*, vol. viii., p. 143.

1886. Spoonbill in Co. Kerry. *Ib.*, vol. x., p. 73.

1886. Blackcap and Grasshopper Warbler in Co. Mayo. *Ib.*, vol. x., p. 366.

1888. Pied Flycatcher in Ireland. *Ib.*, vol. xii., p. 267.

1889. Fulmar and Spotted Redshank in Co. Sligo. *Ib.*, vol. xiii., p. 34.

1889. Hybrid between Bernicle and Bar-headed Goose. *Ib.*, vol. xiii., p. 394.

1890. Reported nesting of Red-throated Diver and Barnacle in Ireland. *Ib.*, vol. xiv., p. 352.

1891. Wildfowling in the Estuary of the Moy. *Ib.*, vol. xv., p. 9.

1891. Ornithological Notes from Mayo. *Ib.*, vol. xv., p. 210.

1892–1915. [Many Notes in *Irish Naturalist*, vols. i.–xxiv. See R. M. Barrington's Index to vols. i.–xviii. and indexes to subsequent volumes.]

1892. The Iceland and Glaucous Gulls in Ireland. *Irish Nat.*, vol. i., pp. 129, 154.

1892. Leptocephalus Morrisii at Killala Bay. *Zool.* (3), xvi., p. 154.

1892. Iceland Gulls and Wild Swans in the Moy Estuary. *Ib.*, xvi., p. 193.

1892. Supposed occurrence of Ivory Gull in Co. Dublin. *Ib.*, xvi., p. 266.

1892. Fulmar Petrel on the Irish Coast. *Ib.*, xvi., p. 406.

1893. The Hump-backed Whale on the Irish Coast. *Irish Nat.*, vol. ii., p. 119., and *Zool.* (3), xvii., p. 188.

1894. Little Auk in Co. Sligo. *Zool.*, vol. xviii., p. 20.

1894. Great Shearwater in Killala Bay, Co. Mayo. *Ib.*, vol. xviii., p. 22.

1895. The Breeding Birds of Loughs Conn, Carra, and Mask. *Irish Nat.*, vol. iv., p. 117.

1895. Birds observed breeding on the Coasts of Sligo and Mayo. *Ib.*, vol. iv., pp. 180, 198.

1895. Notable increase of the Lesser Tern in Co. Mayo. *Zool.* (3), xix., p. 270.

1896. The Terns of Killala Bay. *Irish Nat.*, vol. v., p. 145.

1896. The Gulls of Killala Bay. *Ib.*, vol. v., p. 169.

1896. The Skuas of Killala Bay. *Ib.*, vol. v., p. 258.

1897–1914. [Many Notes in *Zoologist* (4), vols. i.-viii.]

1897. Surf Scoter in Killala Bay. *Irish Nat.*, vol. vi., p. 59.

1897. Fulmar and Surf Scoter in Cos. Sligo and Mayo. *Zool.* (4), vol. i., p. 84.

1897. On the breeding range of the Yellow Wagtail in Ireland. *Ib.*, vol. i., p. 346.

1898. Extraordinary run of Herrings in the Moy Estuary. *Irish Nat.*, vol. vii., p. 19.

1898. The Long-tailed Duck in Killala Bay and the Estuary of the Moy. *Ib.*, vol. vii., p. 121.
1898. The White Wagtail in Ireland. *Zool.* (4), ii., p. 245, and *Irish Nat.*, vii., p. 160.
1899. Ornithological notes from North-Western Ireland. *Zool.* (4), vol. iii., p. 364.
1900. [With R. J. Ussher]. The Birds of Ireland. London.
1900. Golden Plover and Lapwings in the Moy Estuary. *Zool.* (4), vol. iv., pp. 40, 144 and *Irish Nat.*, ix., p. 49.
1900. A Visit to Lough Erne in search of the Sandwich Tern. *Irish Nat.*, vol. ix., p. 220.
1902. Increase in the numbers of Breeding Birds in Mayo and Sligo, *Ib.*, vol. xi., p. 246.
1903. Short Sunfish in the Moy Estuary. *Ib.*, vol. xii., p. 54.
1903. The Harvey Collection of Irish Birds. *Ib.*, vol. xii., p. 55.
1903. Some ornithological notes from Moyview. *Ib.*, vol. xii., p. 199.
1903. Protection of Red-throated Diver at its Irish breeding place *Zool.* (4), vii., p. 154.
1904. Snow Geese (Chen hyperboreus) in Co. Mayo. *Ib.*, vol. viii., p. 32.
1904. Ornithological notes from Killala Bay and the Moy Estuary. *Ib.*, vol. viii., p. 301.
1905. Supposed Wild Cat in Ireland. *Irish Nat.*, vol. xiv., pp. 135, 166, 183.
1905. Seals in Killala Bay and the Moy Estuary. *Zool.* (4), vol. ix., p. 134.
1905. The sounds produced by the Long-eared Owl. *Ib.*, vol. ix., p. 234,
1906. Remarkable change in habits of the Herrings visiting Killala Bay, Co. Mayo. *Ib.*, vol. x., p. 105.
1906. A new Irish Breeding haunt of Sandwich Terns. *Ib.*, vol. x., p. 277.
1906. Disappearance of many of our home-bred birds in Autumn. *Ib.*, vol. x., p. 459.
1907. Is the Weasel a native of Ireland ? *Ib.*, vol. xi., p. 29.
1907. Some Rare Visitors to Bartragh Island, Killala Bay. *Ib.*, vol. xi., p. 72.
1907. Spring arrival of Sandwich Terns in Killala Bay. *Ib.*, vol. xi., p. 195.
1907. Breeding of Tree Sparrows and Dunlins in Co. Mayo. *Ib.*, vol. xi., p. 344.
1908. Ornithological Notes from Mayo and Sligo. *Ib.*, vol. xii., pp. 75, 229.
1908. Migration of Small Birds in Co. Sligo. *Ib.*, vol. xii., p. 431.
1909. Large take of Herrings in the Moy Estuary, Killala Bay. *Ib.*, vol. xiii., p. 32.
1909. Snow Geese in Co. Mayo. *Ib.*, vol. xiii., p. 76.
1909. Some Bird Notes from Ballina. *Ib.*, vol. xiii., p. 227.
1910. Rare American Teal in Co. Cork. *Ib.*, vol. xiv., p. 436.
1911. Wild Cat supposed to be within historic times a native of Ireland. *Irish Nat.*, vol. xx., pp. 80, 96.
1911. White Wagtail on migration, visiting Bartragh Island, Killala Bay. *Zool.* (4), xv., p. 197.
1911. White-tailed Eagle no longer breeding in Ireland. *Ib.*, vol. xv., p. 346.

1911–12. Causes of our Rare Birds disappearing. *Ib.*, vol. xv., p. 391; vol. xvi., pp. 37, 74, 109.
1913. Wild Cat in Ireland. *Irish Nat.*, vol. xxii., p. 94.
1913. Some notes on the migration of Richardson's and Pomatorhine Skuas. *Ib.*, vol. xxii., p. 152.
1913. Some notes on the migration of the White Wagtail on the Island of Bartragh, Killala Bay. *Ib.*, vol. xxii., p. 174.
1913. The occurrence of a rare arctic visitor made known by a Falcon. *Zool.* (4), vol. xvii., p. 108.
1913. Occurrence of Greenland Falcon in Co. Mayo. *Ib.*, vol. xvii., pp. 155, 231.
1913. Squacco Heron (Ardea ralloides) in Co. Cork. *Ib.*, vol. xvii., p. 276.
1914. On some Gulls observed in Ireland. *Ib.*, vol. xviii., p. 21.
1914. Some Extracts from a shooter's note-book, from January 6th, 1866, to January 23rd, 1867, including the great frost of the latter year. *Ib.*, vol. xviii., p. 441.

Mr. Warren contributed many zoological notes to the *Field* from 1875 onward.

ARE WHITE WORMS INJURIOUS?

BY REV. HILDERIC FRIEND.

During the past year, while engaged in the study of Enchytraeid Economics in the Department of Zoology, under the direction of Professor Gamble, F.R.S., at Birmingham University, I have had occasion to examine the communications which took place some years ago between myself and a number of Irish correspondents. In looking over the letters received, I have been somewhat surprised to find how many of them had reference to the existence of white worms (Enchytraeids) at the roots of decaying plants. Unfortunately I did not keep a copy of my replies, and in some instances I do not even possess a memorandum to show what particular species of worm was discovered in the material examined. It is possible, however, to bring together a sufficient body of evidence to shew that Enchytraeids were liable to serious suspicion, and I purpose in this article to summarize that evidence in the hope that it may lead to further correspondence, and the final solution of the problem. These notes relate solely to Ireland.

The first communication relating to this subject which I have been able to trace, came from Miss M. J. Delap, Valencia Island, Kerry, on February 23rd, 1893. It ran as follows :—" These worms are making fearful havoc in my seeds and plants, eating the seeds especially. They hide in the crevices of the little wooden boxes in which I keep the seed, and come out at night. They crawl along very fast, and when frightened, seem to sink into the wood till almost invisible."

My memorandum is " A number of Enchytraeids received" ; but I fear there are no records by means of which I can identify the species, nor can I at present be certain whether the specimens were preserved.

Nearly a decade passed, apparently, before I received any further enquiry on the subject from Ireland. In 1902, however, several letters came to hand, the first being dated January 27th, when Professor Carpenter wrote :— " Would you kindly name the enclosed worms for me ? They are burrowing in celery stems, and the person who has sent them to me believes them to be the primary destructive agent. I think they may have got into the stem through old fly-maggot burrows."

I have to refer the reader for my reply to an article which appeared in the *Irish Naturalist* for May, 1902, vol. xi., pp. 110–115, on " Studies in Irish Enchytraeids," where reference is made to the fact that asters, tulips, fritillaries and celery had suffered in a similar way in England. The culprits were *Enchtryaeus parvulus* Friend (*E. argenteus* Mich.).

In May of the same year Professor Carpenter wrote again as follows :—" I send herewith some mould containing live Enchytraeus (?), which are reported as injurious to tomatoes. Perhaps you will kindly let me know what you think of them." My reply has not been preserved by me, so that I am unable to say what species was suspect.

The late Mr. Geo. Hart wrote me from Howth on September 22nd (1902 ?), enclosing some white worms found inside a big root. They proved to be a species of Fridericia, and I should imagine from a note in my possession that I named it *Fr. galba* Hoffm.

Professor Carpenter wrote again on December 1st, 1902 :—" The enclosed annelids seem to me very similar to the species of Enchytraeus you kindly examined for me early in the year. These are said to be very destructive to Swede Turnips. Could you kindly identify the species, and let me know if any reliable application for getting rid of these worms is known ? " The locality was given as Co. Sligo, and a good deal of correspondence followed.

In this case I believe that the Enchytraeus was quite a secondary cause of trouble, Finger-and-Toe and the Slime fungus having prepared the way for its entrance to the plants.

The year 1903 brought a recrudescence of the celery disease, for on February 3rd Prof. Carpenter sent me a further supply of worms which he had received. I noted five species of earthworms, in addition to *Enchytraeus albidus*, and a species of Fridericia. The two latter are white worms (Enchytraeidæ). On the 21st of February came a sample of earth containing Enchytraeids which were said to be injuring Turnips in Co. Mayo.

The correspondence respecting worms injurious to celery was continued in January and February, 1904, after which followed another break of nearly a decade. My next notes of an economic character are dated 1912. In the *Irish Naturalist* for that year (vol. xxi., pp. 171–4), will be found an article on Irish Oligochaets, based upon material supplied by the Rev. W. F. Johnson, of Acton Glebe, Poyntzpass. In the following year (*Irish Naturalist*, vol. xxii., pp. 7–11), the matter was still further discussed, and a new species of Henlea described. It may be of interest, however, to add a few sentences from Mr. Johnson's letters which deal with the conditions under which the worms were found, and the plants affected.

The first extract is from a letter dated May 7th, 1912. " My wife, who is an ardent gardener, accuses the worms of injuring this plant ; so I send plant, worms and all for you to examine, and I shall be greatly obliged if you will inform me whether you think the worm is to blame or not." After the appearance of my article containing the first report, Mr. Johnson wrote as follows :—" Our garden is an old one,

and I do not think anything has been done to banish the worms out of it. They are found mostly about carnations and primroses. We are on the top of a hill, and the garden has a south aspect, and are well sheltered by trees, mostly beech. The rock here is Silurian, and there is no limestone nearer than Armagh, 14 miles off, consequently there is an entire absence of lime in the soil. I think your suggestion that the worms do not begin the attack is probably correct. I will try the lime and let you know the effect."

Since the publication of my last paper in 1913, no further enquiries have reached me. It remains only to offer one or two concluding remarks.

1. The range of plants which have been reported to suffer from worms is somewhat wide. Asters, carnations, lilies, primroses, fritillaries, and a number of other flowers have suffered, while of field and garden crops we have celery, tomato, swede turnips and others. Seeds are also said to suffer. The English list is much more extensive.

2. The Enchytraeids found under suspicious circumstances also vary greatly. Long ago Vejdovsky reported Achaeta from roots of Corydalis and other plants. At least three species of Enchytraeus (*E. albidus*, *E. Buchholzii*, and *E. parvulus*) are suspect, while *Fridericia agricola*, *F. galba*, and *F. hegemon* may be placed in a similar category.

3. The researches of Southern and myself during recent years have placed the study of Enchytraeids on a firm scientific basis, and it will not be a difficult matter in the future to give a satisfactory opinion whenever Oligochaets are submitted for examination.

4. An earnest appeal is therefore made to all who are interested in the subject to supply material whenever available. Plants which are affected should be placed in tin boxes with as many specimens of the worms as possible. Boxes should not be punctured to supply air, as the worms crawl out and die. They can live indefinitely on the amount of air contained in any well-secured box, and will travel safely if a little moss is inserted when necessary to keep stones or dry soil from injuring them. Correspondence should be addressed to me as under.

Zoological Dept., Birmingham University.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 27.—ANNUAL MEETING held in the Royal Dublin Society's Lecture Theatre, W. E. PEEBLES (Vice-President) in the Chair.

Professor G. H. CARPENTER (Hon. Secretary) submitted the Report.

The depressing influence of the war on the Society's resources was a feature emphasised in the Report for the year 1914. The Council regrets to find that during the year just passed the difficulties of the situation have not diminished, though, thanks to the generous response of Members to the appeal made, at the end of 1914, for special gifts—which amounted to an aggregate of £424—the financial position of the Society is slightly better than it was twelve months ago. This is encouraging, when we find that the gate receipts have fallen £241 during 1915 after the alarming drop of £270 in the preceding year, the amount being £1,682 as compared with £1,923 in 1914.

In the present condition of the country, a large influx of Members is hardly to be expected, and the Council are glad to record the enrolment of twelve new Life Members, as many as joined in 1914.

With the view of increasing the number of applicants for Annual Membership the Council announced that candidates up to fifty in number would be elected during July without payment of the usual entrance fee. This resulted in the addition of thirty-three new names to the roll, and it is gratifying to find that altogether fifty-two Annual Members and nine Garden Subscribers have joined during the year. To meet the wishes of some military officers stationed in Dublin for short periods, it has been decided in such cases to make half the contribution of a Garden Subscriber payable for a six-monthly term.

The Marquis of Aberdeen relinquished his office as Lord Lieutenant of Ireland early in the year. He is a Life Member of the Society ; together with Lady Aberdeen he had often visited the Gardens and taken interest in their working. His successor, Lord Wimborne, kindly came specially to the Gardens on May 4th in order to receive an address from the President and Council. The Royal Hibernian School Band and Scouts' Troop attended, by kind permission of the Commandant. The address read by the Secretary gave a brief account of the Society's work and expressed the hope that His Excellency would favour us with his interest and support. Lord Wimborne read an encouraging reply.

Sir Charles Ball, Bart., having held the Presidency for a term of five years, now relinquishes the office according to the Society's bye-law. The Council wish to pay a hearty and unanimous tribute to his unfailing kindliness to his colleagues, his keen interest in the Society's welfare, and his zealous efforts on its behalf. In the future, as an ex-President resident in Dublin, it is hoped that he will continue to attend often the meetings of the Council, with which his family has been so long and so honourably connected. For the vacant chair of the Society the Council confidently submit the name of Mr. W. E. Peebles, J.P., whose invaluable services during his thirty-six years' membership of the Council are appreciated by all frequenters of the Gardens.

The Hon. Mr. Justice Boyd, having completed twenty years' service on the Council, is nominated as an Honorary Vice-President. For the vacancies in the Council the names of Mr. C. Green (Inspector of Fisheries), Lt.-Col. Johnstone (Chief Commissioner of the Dublin Police), and Mr. A. Miller are suggested.

The year 1915—with its sad memories for many—will be notable for the death of two prominent and highly valued Members of Council. Mr. J. Nugent Lentaigne joined the Society in 1877, was elected on the Council in 1888, and became an Honorary Vice-President in 1912. He was one of the most regular of attendants at the meetings, and showed his love for the Gardens by frequent gifts of rare birds and other specimens. Mr. R. Manliffe Barrington joined the Society in 1880 and the Council in 1907; combining as he did great eminence as a zoologist with sound business capacity, his service was highly valued. An all-round naturalist, with a special and unrivalled knowledge of the habits of birds and mammals, his sudden death is an irreparable loss to Irish science. A good account of his life and a list of his numerous original contributions to zoology and botany will be found in the *Irish Naturalist* for November, 1915.

With the cordial assent of the Council, the Superintendent, Dr. B. B. Ferrar, has accepted a temporary commission in the Royal Army Medical Corps. He is daily on duty in the Dublin barracks and military hospitals, but continues his residence in the Gardens, and gives all his spare time to supervising the work of the Society's staff.

The presence in our collection during 1914 of examples of each of the four types of Anthropoid Ape was a noteworthy feature. This "record," was brought to an end as early as March by the death of the Orang-utan, "Sandy." In December the small female Chimpanzee, "Susan," died succumbing in a few days to an attack of pneumonia. However, the other, four Apes that were in the House a year ago are still alive and vigorous—the Hoolock Gibbon, the Chimpanzees, "George" and "Charlie" and the Gorilla "Empress," the last-named having now lived two years in the charge of the Superintendent and Keeper J. Supple. As "Empress" grows older, she gains rapidly in weight, and the slow deliberateness of her movements contrasts more and more strongly with the agility of her companion, "Charlie." A succession of swellings on "Empress's" neck have been diagnosed as due to actinomycosis—a fungus-caused condition often prevalent among stablemen and persons addicted to chewing straws. Visitors to the Ape House who watch the Gorilla's habits will not be surprised to know that she is afflicted with this complaint.

The large out-door Monkey Cage has been renovated and eight Rhesus turned into it in the spring from the Monkey House have kept well through the year. Their indoor places have been occupied by three Sooty Mangabeys, part of Mr. Laidlaw's gift already mentioned. Of the rarer African Monkeys acquired in 1914, only one—the Moustache—survives, but we still have the American group represented by three species of Capuchin—the White-fronted, the Weeper, and the Tufted. Among the Lemuroids the death of the Galago is much regretted.

All the older animals in the Lion House a year ago are still on view,

but during the summer a welcome and unexpected enquiry for cubs was followed by the sale of most of the youngsters available, for which a good price was received. During 1915 three litters were born, comprising four males and five females, all of which were alive on December 31st, when our total Lion stock amounted to twenty-three animals, twelve males and eleven females.

The large felines, besides the Lions, in the Roberts House are much the same as a year ago, only one Leopard having been lost by death, Dr. Combe's two young Tigers are growing into large and handsome specimens, and show remarkable docility. In the outdoor dens the adult male Puma died, but a cub of the same sex was borne in June. The Indian Wild Dog was one of the most interesting specimens lost during the year; three curiously marked domestic Dogs from Egypt have been placed on deposit in the Gardens by Butler Pasha.

The Ungulates are the only other group of mammals among which noteworthy changes have to be recorded. We have lost by death some interesting and familiar specimens, including the Grant's Zebra, the Wapiti Stag, the Blesbok, and the Bactrian Camel—all old inhabitants of the Gardens—as well as a male Chamois which had lived for some years on Lambay, and was placed on deposit by the Hon. Cecil Baring, but did not long survive in the restricted surroundings of his paddock. On the other hand, the collection of Antelopes has been greatly enriched through the generosity of the Duke of Bedford, who sent early in the year, a male Brindled Gnu and a pair of Elands. The Eland cow died after giving birth to a calf, which also, unfortunately, succumbed. On hearing of this, the Duke was kind enough to forward a second Eland cow, so that a pair of these noble Antelopes are now on view to our visitors.

Our collection of Birds suffered during the November frosts, when a Flamingo and the two Black-necked Swans hurt themselves on the ice and died as a result of the injuries. Another loss is the large Domestic Goose, believed to have attained the age of 44 years. The Reptiles have undergone no change, but the stock of Axolotls and of Fish is smaller than last year. The Fish Hatchery was supplied with 10,000 Brown Trout ova by the Irish Fisheries Office, and most of these developed into healthy young fish, which were handed over to the Riparian Owners of the Liffey.

Wednesday afternoons at the Gardens were very attractive throughout the summer and autumn, thanks to the excellent musical programme given each week by the Band of the South Irish Horse. The Council's hearty thanks are due to Col. Lord Decies and the officers of the regiment for allowing the Band to attend free of charge as well as to the Bandmaster and Bandsmen, and to the Dublin United Tramways Company for facilitating the transport of the musicians and their instruments to and from Phœnix Park. On the days of these performances it was pleasant to see a large number of convalescent wounded soldiers who had the opportunity of enjoying themselves in the Gardens through the generosity of various friends.

The sets of pictures sent in to the yearly photographic competition in November were again of a high degree of merit. The Silver Medal in the Senior Class was won by Mr. Arthur MacCallum, of Rathmines.

The sets sent in by the Juniors (under 18) were so excellent that a special Silver Medal has been awarded to Miss M. A. H. Goodman and a Bronze Medal to Master James FitzGibbon.

Dr. Macdowel Cosgrave (Hon. Treasurer), presented the Statement of Accounts, which showed a debt to the Bank of £448 at the close of the year. The Report was adopted, and the Officers and Council for 1916 as proposed, were duly elected.

W. E. Peebles, J.P., the President-elect, proposed a cordial vote of thanks to the retiring President (Sir Charles Ball, Bart., M.D.), for his zealous discharge of the duties of the office during the past five years, referring to the services rendered to the Society in time past by Sir Charles' father—Robert Ball and his brother Dr. Valentine Ball and Sir Robert Ball. The vote was passed by acclamation.

Professor J. A. Scott gave an account, with lantern illustrations, of the changes in the Gardens and their inhabitants during 1915.

DUBLIN MICROSCOPICAL CLUB.

January 11.—The Club met at Leinster House, the President in the Chair.

H. A. Lafferty showed microscopic preparations of the fungus *Langloisula macrospora* (A. L. Sm.) which he had frequently found associated with *Phytophthora infestans* in "blighted" potato foliage and tubers. Pure cultures of the fungus were obtained; and infection experiments carried out on leaves and tubers, which proved it to be nonparasitic. The species was first found in Britain on germinating farm seeds, and this constitutes the first record of its presence in Ireland.

Dr. Geo. H. Pethybridge exhibited a new species of fungus for which the name *Colletotrichum tabificum* is proposed. It occurs not infrequently as a saprophyte on the underground portions of decayed potato stalks and produces sclerotia on the surfaces of which the conidiophores and conidia are produced. In mass the conidia are amethyst-coloured and when grown in pure culture the fungus produces an amethystine-coloured fluorescence in the medium. In all probability this fungus forms one part of what was described by Hallier under the name of *Rhizoctonia tabifica*, the other being probably *Verticillinum albo-atrum* R. et. B. It is hoped to publish a detailed description of the new fungus in due course.

W. F. Gunn exhibited mixed spicules of ten or twelve species of Gorgonia, and explained that they are found in the soft common body-substance of the colonies, and act as strengthening structures. They can be obtained by macerating the bodies in water and repeated washing. Prepared material was distributed amongst the members.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 14.—The second business meeting was held in the Royal Irish Academy House, the President in the Chair. Professor G. A. J. COLE, F.G.S., lectured on "Nature and Man in the Balkan Peninsula." The general outlines of the geology of the Balkan area were first dealt with, and the ancient land-masses, the younger folded mountains and the foundered areas described. The arid limestone of the Karst and its influence on the vegetation was then discussed. The present tortuous courses of the rivers were noticed and the geological theories advanced to explain them were examined. The latter part of the lecture was concerned with the position of Constantinople in past and present time. A large number of maps and lantern-slides were used to illustrate the different problems. The lecture was discussed by the President and Professor Henry, who gave an interesting account of the vegetation of the Balkan area. Mr. Walter Clarke was elected a member of the Club.

JANUARY 18.—Annual meeting, Professor G. H. CARPENTER in the Chair. In the absence of the Hon. Secretary, J. de W. HINCH submitted the Annual Report, which was passed. The Committee and Officers for 1916 were elected:—President, Prof. Carpenter; Vice-President, Prof. Cole; Secretary, Mrs. Long; Treasurer, C. J. Bateman. An interesting discussion on the Club's work and prospects for the New Year then took place.

NOTES.

ZOOLOGY.

Frogs Spawning in January.

As a result of the high temperature during the whole of January, I found a small pool close to the Rocky Valley road (Co. Wicklow), covered with frogs' spawn on the 30th January. Some of the spawn might have been there for a week. The frogs had invaded the pool in such numbers that they were unable to find hiding places when I advanced to the edge of the shallow pool. I could not hear the croaking of the animals until I came within 20 yards of the spot and failed to distinguish the roar produced by a large number of frogs which was compared by the late R. M. Barrington to the passing of a distant railway train over Bray Bridge. During a mild January in 1904, much like the present one, Mr. Moffat first observed the spawning of frogs at Ballyhyland (Wexford), on the 25th January (*Irish Nat.*, vol. XIII., p. 86), and no doubt his locality was less exposed than the one I visited.

R. F. SCHARFF.

Knockranny, Bray.

THE NATURALIST

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THE MUSEUMS, HULL;

AND

T. W. WOODHEAD, Ph.D., M.Sc., F.L.S., TECH. COLL., HUDDERSFIELD.

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The Irish Naturalist

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DUBLIN MICROSCOPICAL CLUB,
BELFAST NATURAL HISTORY & PHILOSOPHICAL SOCIETY,
BELFAST NATURALISTS' FIELD CLUB
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
TYRONE NATURALISTS' FIELD CLUB.

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THE CROSSBILL AND ITS DIET.

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

In reading Mr. Moffat's article (*supra*, pp. 1–6), on the favourite diet of *Loxia curvirostris* in Ireland, it struck me that the following extract from probably the earliest record of the presence of this bird in this island might be of interest. The letter from which I quote is dated January 28, 1707, and was written by Mr. Samuel Waring of Waringstown, near Lurgan, Co. Down, to Dr. Thomas Molyneux, F.R.S., and is contained in a fasciculus of MSS. on natural history collected by the latter, now preserved in the Library of Trinity College, Dublin. The writer commences: "I herewith send you an account of a sort of birds seen in this neighbourhood these three months past, never known to be in these parts before." He describes them as being of the size of a Blackbird, with their heads and bodies of a bright flame colour, and their wings and tails duskish green. The females are all grey. "Their bills are like those of parrots, and like them they eat out of their claw. They keep altogether in Firr trees, whose seed is their only meat, for with their bills they break off the cones off the firr trees, and holding it in their claw, they nibble and force open the leaves or folds thereof, and so pick out the seeds. The points of the bill lye over or sidewise of one another, and have points like a pair of scissors. 'Tis thought they came from Norway and Denmark with the fieldfares."

The question arises of course whether the "firr trees" of the writer could have been any other conifer than *Pinus sylvestris*? Professor Henry in a very learned and valuable study of the "Woods and Trees of Ireland" [1] shows that *Pinus sylvestris* once flourished as a native tree throughout most of the island, and lingered on in the North of Ireland round L. Erne till about 1800, and flourished in 1566 on the mountains of Co. Down, and mentions that the Capercailzie "with the gradual extinction of the pine became scarcer and scarcer and appears to have died out about the year 1760." The Spruce and Larch were not indigenous

[1] *Louth Archaelogical Journal*, 1914.

to Ireland, but may have been introduced at an early date into such demesnes as Mount Oriel Temple which was largely planted about 1776, Castlewellan, and Tollymore Park. The mansion at Waringstown seems to have been built about 1660–70. But the writer would probably have indicated any newly introduced conifers if they were the chosen food. "Firr trees," therefore, would seem to apply to the Scotch Fir, which was the indigenous fir of Co. Down and elsewhere. I regret that I am unable to adduce any evidence on the question Mr. Moffat discusses so ably, as to whether one species or another affect *Pinus sylvestris* rather than the Larch or Spruce. I can only say that on such occasions as I have seen flocks of Crossbills in Ireland, they frequented plantations of Pinus, but as no specimens were killed, no evidence is available on the point mooted.

It would seem as if the suggestion that the preference shown for the seeds of one rather than another conifer, was probably correct, and merely indicated that the migrants in question arriving from different Continental habitats, chose the species of food they were most accustomed to.

Drumreaske House, Monaghan.

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

February 14.—The Club met at Leinster House.

W. F. Gunn showed by reflected light some teeth of an unnamed species of Eel. The teeth are hollow for the greater part of their length, but the apex or tip is solid, and they have a gradual curve inwards. This curve serves to facilitate the engulphing of the prey. Unlike most mammalian teeth, those of fishes are renewed frequently during life, and a number of those on the slide bore evidence in their blunted points of considerable wear. On another slide a thin transverse section of the tooth of a Ray was shown, to illustrate the internal structure, in which the lacunae and ramifying tubules or canaliculi were well seen, as also the hexagonal tessellated appearance formed by the pressing together of the separate groups of tubules.

E. J. Sheehy, A.R.C.SC., exhibited *Histiostoma rostro-serratum*—a tyro-glyphid mite. The species—found on a rotting mushroom—was considered to be the cause of decay, but was afterwards shown to attack

only diseased tissue. The preparation demonstrated the toothed non-chelate mandibles of the genus, adapted for cutting through cell walls.

D. McArdle demonstrated further details of an interesting character in *Blasia pusilla*, previously shown. A portion of the thallus separated from the nerve, showed the first formation of two dorsal rows of leaves and the rudimentary stipules or ventral row usually found in the foliose group; the plant, therefore, is one of those forming the connecting link between the foliose and frondose sections of Hepaticæ. The specimens were gathered by Mr. Gunn last year on a wet bank by the roadside, at Clifden, Co. Galway. It is evenly distributed in Great Britain, nowhere common; it is also found on the Continent, and the range extends to N. Asia and N. America. The male plant is smaller than the female, and it may be known at once when not in fruit by the flask-shaped receptacles containing gemmae. A remarkable feature in the plant was also exhibited, a portion of the thallus showing colonies of Nostoc, which evidently settles on a cell in a very young tube stage and develops, finding a constant supply of moisture from the thallus which at the outside is quite membranous (one cell thick). Immersion in water for some days improved the growth of the Nostoc, which occupied a circle in the tissue, and from pressure of its growth a ring of cells surrounds it. At this stage the colony is easily pushed off the thallus, leaving a circular space with empty cells, with the walls thickened and the contents used up; the two outer cells of the circle have their walls more thickened than the others, and form a shallow rim. When immersed the Nostoc colony grows more conical and does not spread beyond the circle formed of thickened cells, and a question strikes one—is this an instance of symbiosis of Nostoc with Blasia? No difference in the cells of the thallus, excepting the thickened walls, is observable, and probably the host derives no benefit from the Nostoc; on the other hand, the plant, which grows in wet places, serves as a reservoir of moisture for the Nostoc in the young state, and probably when mature falls off the thallus and completes its life history on marshy earth or wet moss. It is remarkable that on the circle of tissue adjacent to where a colony has been, the walls are uninjured and unbroken, and that the Nostoc does not ramify in the membranous tissue of the liverwort; and there is no apparent difference of growth in the thallus, nearly the whole surface of which is occupied. Under a high power a colony was exhibited; it was very like *Nostoc muscorum* found on mosses in damp places.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Blackbird from Mr. Gore, Finches and Wood-pigeons from Mr. R. W. Despard, Doves from Mrs. Phipps and Sir Frederick Shaw, and a Swan from the Countess of Kilmorey.

LEPIDOPTERA FROM COUNTY TYRONE.

BY THOMAS GREER.

The following account of the lepidoptera met with in this district will, I hope, be of interest to some readers of the *Irish Naturalist.*

The country examined is included by a nine-mile radius from the town of Cookstown, situated in a closely tilled district. There is very little woodland outside the several demesnes, except some small patches of mountain scrub, a survival of the great forest which at one time covered the whole county.

I have noted at length the more interesting species and local forms met with. Those marked thus * are new to the county, according to Mr. W. F. de V. Kane's catalogue of the lepidoptera of Ireland.

NOTES ON RARER SPECIES.

Pieris napi.—One female, the ground colour of the wings on the upper side of a dirty yellow.

Argynnis paphia.—Abundant in woodlands. One example with bleached areas on upper side, owing to failure of pigment.

Melitaea aurinia.—This species occurs in several worked-out bogs. The specimens taken are large and brightly marked—the var. *praeclara* Kane.

Vanessa io.—Not uncommon from 1900 to 1904, when it disappeared; last year, 1915, I again met with larvae and noticed the imago in the late summer.

V. cardui.—Not uncommon in some warm seasons.

Coenonympha typhon.—Abundant on bogs at the west side of Loch Fea at 800 feet, also abundant on the bogs around Lough Neagh, near Washing Bay. The specimens from the former locality are much darker in colour, and the undersides more ocillated.

Lycaena icarus.—Very local, the males large and brilliantly coloured, and the females often of a violet colour over the whole of the upper side of wings.

Acherontia atropos.—One specimen, taken at rest in a barn at Beechgrove, Newmills.

Smerinthus ocellatus.—Larvae generally very abundant on sallows growing on bogs.

Zygaena lonicerae.—The common burnet of this district; a few with confluent spots have been noted and a dwarf race also occurs.

Gnophria rubricollis.—Beaten out of dwarf fir trees, Lissan demesne.

Spilosoma mendica var. **rustica.**—Not uncommon, the type does not occur here, the males varying from a cream to a light buff, also sometimes smoke coloured, streaked with cream.

Dasychira fascelina.—Larvae met with at various times, but always infested with parasites. Last year I took a female at rest on heather, but did not succeed in obtaining ova.

Notodonta dictaea.—Very abundant in the larval state on Aspens.

Mamestra furva.—One specimen on Ragweed bloom.

Apamea unanimis.—Rare, in damp woods.

Grammesia trigrammica.—Common at sugar and light, and also the var. *obscura.*

Stilbia anomala.—Abundant in one locality in the district.

Agrotis agathina.—Not uncommon on heather bloom on bogs which have planted with fir trees; I have never noticed the species on open moorland or bog.

Agrotis cinerea.—One specimen taken at light, recorded in the *Irish Naturalist.*

Pachnobia rubricosa.—Abundant at sallows growing on the bogs around Loch Fea.

Taeniocampa gothica.—Abundant; also the var. *gothicina* occasionally, one specimen with the gothica mark well defined on one side, and on the other represented by a dark streak only.

Taeniocampa gracilis.—Not uncommon at sallows, and var. *rosea.* I have a form with darkish central band.

Taeniocampa opima.—Very local, frequents the bogland around Lough Neagh.

Anchocelis helvola.—One specimen at sugar, Killymoon demesne.

Cirrhoedia xerampelina.—At rest on an Ash trunk, and at light.

Hadena glauca.—In the mountain district where there are steep little gullies or ravines, with the sides covered with a luxuriant growth of *Vaccinium Myrtillus.* I have observed this species flying in great numbers at dusk to the blossoms of this plant.

Plusia bractea.—Several captured at flowers.

Plusia festucae.—Very common in damp situations at flowers of *Lychnis Flos-cuculi.*

Eurymene dolobraria.—A few at light.

Eugonia alniaria.—Several taken at light.

Geometra papilionaria.—Not rare, flying very late at night.

Zonosoma pendularia.—Fairly abundant among Birch scrub.

Acidalia inornata.—Two specimens beaten out of heather.

Panagra petraria.—Local, among Bracken.

Selidosema ericetaria.—Several, on the bogs at Washing Bay.

Bupalus piniaria.—Abundant in fir woods.

Ligdia adustata.—Local.

Oporabia Christyi.—Local among alder.

Emmelesia decolorata.—Abundant among *Lychnis diurna.*

E. adaequata.—Occurs on poor moorland pasture where the food plant (*Euphrasia officinalis*) is abundant.

Eupithecia pygmaeata.—Local and rare.

Lobophora viretata.—Local among holly trees.

Melanthia unangulata.—Locally abundant and widely distributed in this district, the larva feeding upon *Galium palustre.*

Melanippe fluctuata.—One example of the var. *costovata*, with the central band only indicated by a small spot on the costal area of the wing.

Coremia munitata.—Local, but there abundant.

Cidaria populata.—Some specimens approaching the var. *musauria.*

LIST OF SPECIES OBTAINED.

Diurni.

Pieris brassicae.
rapae.
napi.
Anthocaris cardamines.
Argynnis paphia.
*Melitaea aurinia.
Vanessa urticae.
io.
atalanta.
cardui.
Satyrus aegeria.
megaera.
Epinephile janira.
hyperanthus.
Coenonympha typhon.
pamphilus.
Thecla rubi.
Polyommatus phlaeas.
Lycaena icarus.
argiolus.

Sphingidae.

Acherontia atropos.
Chaerocampa elpenor.
*Smerinthus ocellatus.
Smerinthus populi.
Macroglossa stellatarum.
bombyliformis.

Nocturni.

Hepilaus velleda.
humuli.
hectus.
*Zygaena lonicerae.
filipendulae.
Hylophila prasinana.
Nola cristulalis.
*Lithosia lurideola.
*Gnophria rubricollis.
Euchelia jacobaeae.
Nemeophila plantaginis.
Arctia caia.
Spilosoma fuliginosa.
mendica *var.* rustica.
lubricipeda.
menthastri.
*Dasychira fascelina.
Orgyia antiqua.
Poecilocampa populi.
Lasiocampa rubi.
quercus *var.* callunae.
Odonestis potatoria.
Saturnia pavonia.
Demas coryli.

Drepanulae.

Drepana lacertinaria.
falcula.
Cilix glaucata.

Notodontidae.

Notodonta dictaea.
dictaeoides.
dromedarius.
ziczac.
Phalera bucephala.
Pygaera pigra.
Dicranura furcula.
vinula.
Lophopteryx camelina.

Noctuae.

Thyatira derasa.
batis.
Cymatophora duplaris.
Acronycta psi.
rumicis.
Leucania lithargyria.
comma.
impura.
pallens.
*Calamia lutosa.
Tapinostola fulva.
Hydraecia nictitans.
var. lucens.
micacea.
Axylia putris.
Xylophasia rurea.
lithoxylea.
monoglypha.
Neuria popularis.
Charaeas graminis.
*Cerigo matura.
Luperina testacea.
*Mamestra furva.
brassicae.
Apamea basilinea.
gemina.
*unanimis.
*ophiogramma.
leucostigma.
didyma.
Miana strigilis.
fasciuncula.
literosa.
arcuosa.
Celaena Haworthii.
*Grammesia trigrammica.
*Stilbia anomala.
Caradrina morpheus.
taraxaci.
quadripunctata.
*Rusina tenebrosa.
Agrotis ypsilon.
*Agrotis saucia.
segetum.
exclamationis.
*corticea.
*cinerea.
*agathina.
strigula.
Noctua glareosa.
augur.
plecta.
c- nigrum.
triangulum.
brunnea.
festiva.
rubi.
dahlii.
umbrosa.
baia.
xanthographa.
Triphaena ianthina.
fimbria.
comes.
pronuba.
Amphipyra tragopogonis.
Mania typica.
maura.
Pachnobia rubricosa.
Taeniocampa gothica.
incerta.
*opima.
stabilis.
munda.
gracilis.
Orthosia lota.
macilenta.
*Anchocelis helvola.
pistacina.
Cerastis vaccinii.
Scopelosoma satellitia.
Xanthia fulvago.
flavago.
circellaris.

*Cirrhoedia xerampelina.
Calymnia trapezina.
Dianthoecia nana.
cucubali.
*Hecatera serena.
*Epunda nigra.
Miselia oxyacanthae.
Agriopis aprilina.
Euplexia lucipara.
Phlogophora meticulosa.
Aplecta prasina.
nebulosa.
Hadena adusta.
glauca.
dentina.
oleracea.
pisi.
thalassina.
Xylocampa areola.
Calocampa vetusta.
exoleta.
Xylina socia.
Cucullia umbratica.
Gonoptera libatrix.
Habrostola tripartita.
triplasia.
Plusia chrysitis.
bractea.
festucae.
iota.
pulchrina.
gamma.
interrogationis.
Anarta myrtilli.
Rivula sericealis.

Geometrae.

Uropteryx sambucaria.
Epione apiciaria.
Rumia luteolata.
Metrocampa margaritaria.
Ellopia prosapiaria.
*Eurymene dolobraria.
Selenia lunaria.
bilunaria.
Odontopera bidentata.
Crocallis elinguaria.
*Eugonia alniaria.
*quercinaria.
Himera pennaria.
*Amphidasys betularia
Cleora lichenaria.
Boarmia repandata.
Tephrosia biundularia.
Pseudoterpna pruinata.
*Geometra papilionaria.
Iodis lactearia.
Zonosoma pendularia.
Acidalia dimidiata.
bisetata.
aversata.
*inornata.
Cabera pusaria.
exanthemata.
Macaria liturata.
Strenia clathrata.
*Panagra petraria.
Numeria pulveraria.
Scodiona belgiaria.
*Selidosema ericetaria.
Ematurga atomaria.
*Bupalus piniaria.
Aspilates strigillaria.
Abraxas grossulariata.
*Ligdia adustata.
Lomaspilis marginata.
Hybernia rupricapraria.
aurantiaria.
marginaria.
defoliaria.
Anisopteryx aescularia.
Cheimatobia brumata.
Oporabia dilutata.
*filigrammaria.
*Christyi.
Larentia didymata.
multistrigaria.
caesiata.
salicata
viridaria.
Emmelesia affinitata.
alchemillata.
albulata.
*decolorata.
*adaequata.

Eupithecia oblongata.
*pygmaeata.
satyrata.
castigata.
nanata.
vulgata.
rectangulata.
Lobophora viretata.
carpinata.
Thera variata.
Hypsipetes ruberata.
trifasciata.
sordidata.
Melanthia bicolorata.
ocellata.
albicillata.
*Melanippe unangulata.
montanata.
sociata.
fluctuata.
Anticlea badiata.
nigrofasciaria.
Camptogramma bilineata.
Coremia munitata.
designata.
ferrugata.
unidentaria.
Phibalapteryx vittata.
Cidaria siterata.
miata.
corylata.
truncata.
immanata.
suffumata.
silaceata.
prunata.
testata.
populata.
fulvata.
*dotata.
Pelurga comitata.
Eubolia limitata.
plumbaria.
Anaitis plagiata.
*Chesias spartiata.
Tanagra atrata.

Stewartstown, Co. Tyrone.

HYMENOPTERA ACULEATA IN THE COUNTIES OF ARMAGH AND DONEGAL.

BY REV. W. F. JOHNSON, M.A., M.R.I.A.

Bees were not as early as usual on the wing in the spring of 1915. The first that I saw were *Bombus lapidarius* and *B. lucorum* on April 17th. I have seen the latter about as early as March 15th. On April 23rd I saw *Andrena cineraria*, *A. albicans* and *Bombus agrorum*, on the wing, the two former being busy at their burrows in a bank. On June 6th I took a male of *A. cineraria*, which was only 6 mm. in length. I could not at first imagine what it was, but further examination showed it to be this species, the ordinary form of which is 11-14 mm. in length. During the summer and autumn I picked up various other Aculeata here and at Coolmore, where I spent the month of September, and I append a list of the more interesting captures.

Myrmica scabrinodis Nyl.—Males flying along the sea shore at Coolmore in the middle of September.

M. ruginodis Nyl.—Males flying along the road on September 9th.

Pompilus pectinipes V. de L.—A female, at Coolmore, on the roadside among herbage.

Pemphredon lethifer Shuck.—A female, Poyntzpass, in June, in my fields.

Salius exaltatus Fab.—Coolmore, in September.

Mellinus arvensis L.—Coolmore, in September. I took females of this species flying about thistles on the sandhills, probably hunting for flies, of which there were a number about. I did not, however, see them attacking any.

Crabro capitosus Shuck.—Poyntzpass, in June, on the roadside between my house and Poyntzpass. This species has been bred from bramble stems.

C. varius Lep.—Poyntzpass, in August, in my fields.

C. cephalotes Panz. (*cavifrons* Thoms).—Poyntzpass, in August, in one of my fields. I had great difficulty in catching this bee, for it would keep among the brambles where to strike it was to expose my net to being torn to pieces.

Odynerus pictus Curt.—Poyntzpass, in my garden on laurel.

Halictus malachurus Kirby.—Poyntzpass, in August, Coolmore, in September. All the specimens taken were males, for the females of this brood hardly leave their burrows and hibernate like the Humble Bees and Wasps. They do not make any cells in their burrows till the spring, when they start the new brood.

H. longulus Smith.—Coolmore, in September; also males.

H. pauxillus Schenck.—Poyntzpass, in August; Coolmore, in September, males.

Andrena albicrus Kirby.—Coxtown, Co. Donegal, in June. Sent by my friend, W. A. Hamilton, Esq., J.P., who took it in his grounds at Coxtown. The Andrenae are often attacked by the little parasite Stylops, which assails them in the larval stage and causes curious alterations in the bee's appearance. One effect, which has been observed to occur in both males and females, is to cause the head to be smaller than ordinary. These bees are also attacked by the inquiline bee Nomada, which enters their burrows and lays its egg beside that of the Andrena, and its larva eats up the food intended for the Andrena's larva and comes to perfection in its stead.

Psithyrus campestris Panz.—Coolmore, in September. This genus, like Nomada, is parasitic, but confines itself to one genus Bombus, while Nomada is thought to affect more than one genus. Then again Nomada is quite unlike its hosts in appearance and does not molest or be molested. Psithyrus, on the other hand, resembles its host very closely, and attacks and kills the queen Bombus and then assumes her place.

Poyntzpass.

NEW BEETLE RECORDS FOR CO. WATERFORD.

BY L. H. BONAPARTE-WYSE.

During a short visit to Waterford last May I spent part of my time collecting insects. Among my beetle captures I find the following species are apparently new to Co. Waterford, and therefore worth recording. They are :—

Dyschirius aeneus Dej.—Two specimens under a stone on the Tramore strand on May 20th.

Pterostichus oblongo-punctatus F.—I took a specimen crawling on the road in Curraghmore demesne on May 24th.

Philonthus umbratilis Grav.—A specimen in dung on the sandhills near Tramore on May 20th.

Aphodius pusillus Herbst.—One or two specimens in horse dung near Waterford on May 21st.

Helodes marginata F.—A few specimens on white-thorn in Curraghmore demesne.

Podabrus alpinus Payk.—A specimen beaten from fir in Curraghmore demesne on May 24th.

Malachius bipustulatus L.—One example on white-thorn in Curraghmore demesne. I first took this pretty beetle in the same locality in 1897, and recorded it in error as *M. viridis* F. (*vide I. N.* vol. vi., pp. 220-221).

Pogonochaerus dentatus Fourc.—A specimen on white-thorn in Curraghmore demesne on May 24th.

Crepidodera smaragdina Foud.—A specimen was obtained by sweeping near Waterford on May 21st. It is not included in Messrs. Johnson's and Halbert's "List of the Beetles of Ireland" (1902), but I believe it has been taken since.

Erirrhinus scirpi F.—A specimen taken by sweeping near Waterford on May 21st.

Anthonomus ulmi De G.—One specimen near Waterford on May 22nd.

I am much indebted to Messrs. E. A. Newbury and O. E. Janson for kind help in naming some of the above.

Ealing Common, London, W.

REVIEW.

MARINE SEGMENTED WORMS.

The British Marine Annelids. By W. C. McIntosh, M.D., LL.D., F.R.S. Vol. iii., Part 1.—Text, pp. viii. and 368; and Part 2, Plates lxxxviii.-cxi. London (Ray Society), 1915. Price 50*s.* net.

The present volume of Professor McIntosh's Monograph has been the victim of one of the minor disasters of the war. It was to have been illustrated with six coloured plates, as well as numerous uncoloured ones. The coloured plates were in an advanced state of preparation at Frankfort-on-Main when they were trapped by the outbreak of hostilities. It was decided to issue the text, without any plates, as Vol. iii., Part 1. Collotype reproductions of the missing plates were prepared, and these, together with the original uncoloured plates, are now issued as Part 2 of Volume iii. Though from the aesthetic point of view the original coloured drawings would doubtless have been far more desirable, it is, under the circumstances, hardly fair to criticise the appearance of the substituted plates, and students of the Annelida will be grateful to Professor McIntosh and to the Ray Society for their decision to issue the volume so promptly, without waiting for the missing plates. In passing, one may reflect on the apparently inadequate resources of the British Isles in the matter of colour printing.

The present volume deals with a larger and more varied assortment of species than any of its predecessors. Eighty-five species are more or less completely described, and of these fifty have been recorded from Irish waters, some of them being still unknown in Great Britain. The author takes a somewhat liberal view as to what constitutes the British Marine Area, and includes species which have not yet been found nearer than Iceland (*Prionospio Steenstrupi*), Cape Finisterre (*Phyllochaetopterus gracilis*), and Cape Sagres, in the South of Portugal (*Stylarioides Sarsi*). This volume contains descriptions of some of the most interesting of the British Polychaetes, such as the Lugworm (*Arenicola marina*), the grotesque *Chaetopterus variopedatus*, and the aberrant *Magelona papillicornis*; also species of some economic importance, such as *Polydora ciliata*, which bores tunnels in oyster shells. Much interesting and valuable information is given concerning the habits and life-histories of many of the littoral species. A perusal of the text reveals some misprints, and many more weighty matters which are open to criticism. For instance, on p. 253, a species is very inadequately described as "*Cirratulus bioculatus*, McIntosh, 1911." That name has been already used by Keferstein for a species now regarded as synonymous with *Chaetozone viridis*. Nor does McIntosh tell us whether his species is new or whether he refers it to Keferstein's species.

Professor McIntosh is to be congratulated on the approaching completion of his laborious task.

R. S.

NOTES.

ZOOLOGY.

Aromia moschata at Glengariff.

In August, 1915, I received a pair of fine specimens of this handsome longicorn. They had been taken by Dr. and Mrs. Geo. Connor of Warrenpoint, in a wood behind Eccles' Hotel, and Dr. Connor very kindly forwarded them to me. They are rather darker than other specimens in my collection which are mostly from England. Mrs. Connor told me that there were quite a number of the beetles about on the trees where these were taken. On enquiry, Dr. Connor says he is not quite sure but thinks the specimens were taken on Hazel. There is an old record of Mr. Furlong's for this beetle at Glengariff, and it is very interesting to have this recent capture to show that the beetle is still in its old haunts after a lapse of fifty years.

W. F. Johnson.

Poyntzpass.

Frogs Spawning in January.

I was glad to see Dr. Scharff's note on this subject in the March number (p. 52). It is curious that spawning of Frogs in January has not more frequently been recorded from other localities, particularly in the south. The following are the dates on which the first frog-spawn has been observed at Ballyhyland during the years in which any notes on the subject were taken :—1882, Feb. 4th ; 1884, Jan. 12th ; 1896, Jan. 17th ; 1897, Jan. 11th ; 1898, Jan. 21st ; 1901, Jan. 30th ; 1902, Jan. 25th ; 1904, Jan. 28th; 1905, Jan. 31st ; 1906, Jan. 28th ; 1908, Jan. 25th ; 1910, Feb. 4th ; 1912, Jan. 12th ; 1913, Jan. 24th ; 1915, Jan. 15th ; 1916, Jan. 11th. The omitted years, in which no notes were made, probably did not differ in average, and it will be seen that in fourteen out of sixteen seasons, spawning here took place in January, while in the two remaining years it was no later than February 4th. Near Dublin I have never seen it earlier than February 12th, and I believe even that would be thought an exceptional date in almost any part of England. Most of the spawning is done at night, and it is frequently the noise of the croaking that first tells me it has begun—sometimes from a distance of 50 yards. The spawning pool to which Mr. Barrington referred in the note quoted by Dr. Scharff would accommodate a much larger number of Frogs than any of the resorts in which they assemble here.

C. B. Moffat.

Ballyhyland, Co. Wexford.

The Crossbill and its Diet.

Since the publication of my article on this subject in January (*supra*, pp. 1-6), I have had an interesting letter from Mr. Nevin Foster, informing me that the Crossbills which visited Hillsborough in 1909 were observed by him feeding on seeds of the Spruce—and breaking off the cones, as they do those of other coniferous trees—on the 4th of December in that year. In 1901, also, Crossbills remained for a considerable period in a Spruce-wood in the same neighbourhood, where, as Mr. Foster adds, "there are many Spruces, but the Scots Pine only occurs sparingly, whilst the Larch is represented by only a few trees." There can, therefore, be no doubt that in Co. Down the Crossbill must make the Spruce a main article in its diet. As yet, however, I have no information of its doing so in any locality where Larch or Pine is plentiful. Mr. T. A. Coward writes to me that in Cheshire he has seen Crossbills feeding in Pine-trees, though their principal food there is the Larch. He does not mention the Spruce. I should be glad if more local notes on the subject were forthcoming. Mr. J. P. Burkitt kindly writes from Enniskillen that he hopes to look into the matter.

C. B. Moffat.

Ballyhyland, Co. Wexford.

A few Notes on Birds about Kingstown.

One Common Guillemot seems to have stopped about Kingstown all through the past winter. I have seen it on different dates each month generally outside the West Pier, and sometimes in the Harbour.

I saw a specimen of the Black Guillemot in its winter plumage which was shot in the Harbour on the 5th of January last. I saw another one in similar plumage near where the light-ships are moored on the 8th of January.

The first occasion this winter on which I saw a Razorbill about here was on the 21st of January near Seapoint it was in immature plumage. I have seen it on various dates since. It nearly always happens that if you see these birds in the winter months in this country, they are immature specimens. A few years ago I picked up two mature Razorbills dead on the North Bull shore on the 15th of February, after a storm. The first Kittiwake Gull I saw in Kingstown Harbour this winter was on the 26th of January; they have been getting more numerous here since that date.

I noticed two Blackheaded Gulls with their heads becoming distinctly black on the 10th of January, one was near Seapoint and the other near Sandycove. These two seem to have been a good deal earlier than the others about here in changing the colour of their heads.

The Purple Sandpiper stayed in this vicinity from the 25th of November 1915 (the date on which I first noticed it) until the 7th of February (the last date on which I saw it). I saw it frequently between these dates. I saw two of them near the forty-foot hole at Sandycove on the 25th of January, the only occasion on which I saw more than one.

Other birds I may mention as having seen about Kingstown during the past winter are a Brent Goose on the 8th of December outside the West Pier; also Redbreasted Merganser frequently in the same place, and on several occasions the Great Northern Diver, both there and inside of the Harbour. I have also several times seen the Red-throated Diver, there were two of them to be seen outside the West Pier on the 14th of this month.

The Snow-buntings I have seen about here this winter seem to me to be much more white than usual compared with the ones I have seen in previous winters in other parts of Ireland.

Geo. Brown Crawford.

Rathgar, Dublin.

Some Notes on Otters.

One day last February (1915) I had a very interesting experience with Otters. I was out fishing by myself (barring the dog) on Lough Ree. While rowing away from a submerged island I saw something black swimming after the boat, about 150 yards off; the first thought that flashed across my mind was "Did 'Nigger' fall out of the boat without my having noticed it?" But, of course, that was absurd. Then I saw that it was an Otter. Almost immediately it was joined by another. The pair came along pretty fast after me, and soon got alongside, a couple of oars lengths away, playing about, jumping over and diving under each other; a few times I heard a little "mew" like a kitten. Then they swam on ahead of the boat, but presently turned and came back again close to the boat, and without being in the least frightened or in a hurry went back the way they came. They were both full grown animals. A little while afterwards I saw them playing at the end of another island.

The first-mentioned island is a favourite haunt of theirs, and I often see traces of them—remains of Eels, Bream, and Pike. One day last month I landed on it (the lake being low for winter) to look for snipe. At a point at one end my retriever bitch picked up a recently killed Coot; it was warm, with the head and neck bitten off. A little later I saw something floating on the water a few hundreds of yards away, blowing with the wind, and picked it up with the landing net to see what it was, and found it to be the skin of the neck. It was up wind of where the body was discovered, so that the Otter must have gone off with the neck in his mouth and dropped the skin some distance away to the windward.

The following day, at about the same time, I was there again, and saw an Otter dive into the water from that point, and, sure enough, there, in exactly the same place, was another "baldy," just dead and his head bitten off; so it appears as if that Otter has tiffin off a Coot there quite regularly. He put up his head about thirty yards away and watched me for a little while, and then disappeared. I saw him in the water swimming in to the same spot a few days later.

I may say that next day I found the skeleton of the second Coot (I took away the first) neatly picked. All round that island are usually swarms of Coots and other water-fowl—the water black with them in winter as a rule.

On one occasion a few years ago I was walking along the edge of the lake when an object in the water attracted my attention. On hooking it out with the crook of my stick I was surprised to find the upper half of a large Bream, which would have weighed 5 to 6 lbs. when entire ; it was alive, and the lower half had been eaten off as cleanly as if cut off with an axe. I didn't see the Otter. I had a newspaper in my pocket, so, after giving the half fish a couple of knocks on the back of the head, I rolled it in the newspaper and slipped it into the " poacher's " pocket of my shooting coat. On producing it at the house about an hour afterwards it turned out to be still alive, so I thrust the blade of my knife into the back of its neck to sever the spinal cord. However, several hours later when someone went to inspect it there was still life left and the remains flopped about when touched.

J. FFOLLIOTT DARLING.

The Bay, Athlone.

Cuvier's Whale in Irish Waters.

Dr. J. F. Harcuer communicated an interesting report to the Zoological Society of London last year on the discovery of two specimens of Cuvier's Whale (*Ziphius curvirostris*) on the Irish Coast. This account has now been published (*Proc. Zool. Soc.*, 1915, pp. 559–566). The first of the two specimens referred to was stranded at Fethard, Co. Wexford, and proved to be a male, measuring 19 feet in length. The pair of large massive teeth at the anterior end of the lower jaw indicated that the animal was not a Bottle-nosed Whale as was supposed, but a Cuvier's Whale. The specimen previously recorded as a Bottle-nose from Unionhall, Cork (see *Irish Naturalist*, 1915, p. 108) was then re-examined and it likewise proved to belong to the same species. Its length was 20 feet, and it was probably a female.

Cuvier's Whale seems difficult to distinguish externally from the Bottle-nosed Whale. It coloration is very variable and the only definite character which separates it from its near relations is the projection of the lower jaw beyond the upper. The characteristic teeth in the lower jaw do not seem to be visible either in the young or in females, as they do not then cut the gums. But when a whale is noticed to have two strong teeth at the end of the lower jaw and when the forehead is not swollen as in the Bottle-nose, it may be suspected to belong to Cuvier's Whale.

R. F. SCHARFF.

National Museum, Dublin.

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THE CROSSBILL IN CO. TIPPERARY.

BY C. J. CARROLL.

Crossbills (*Loxia c. curvirostra*) were noticed in Ireland more than 200 years ago, but none were recorded from Co. Tipperary until August, 1801, when "vast flights" visited this and other southern counties. They remained about two months, and chiefly frequented orchards, where they fed on apple-pips. Next, in 1838–9, a correspondent of Thompson mentioned a small flock which stayed through two nesting seasons at Ballybrado, South Tipperary, and young were produced. Probably Crossbills bred again after the invasion in 1888, the time they settled down in so many parts of Ireland. A flock which Mr. Ellison met with near Clonmel were actually in Co. Waterford, but Mr. E. Williams noted Crossbills from Tipperary, and Mr. Johnstone informs me of some which occupied a fir grove near Templemore in 1889 and evidently nested there. I can refer to others, which, however, were nomadic, and this brings us to the invasion of 1909. In that year Crossbills arrived in two portions of the Galtee Mountains, Co. Tipperary, and, nesting there the following year, have done so ever since. Others, doubtless attributable to that invasion, were seen wandering around. Thus, early in April, 1910, I met with a pair near Fethard, which is over twenty-five miles from the Galtee colony. Again, on December 20th, 1911, three were outside my demesne wall, and on January 5th, 1912, thirteen were feeding here, some red males amongst them. In each case they only remained a few days, and none were seen here afterwards. But in 1912 a flock were noticed near Bansha, where they remained until timber-felling caused them to disappear.

Now, to return to the main breeding colony. I found on investigation in 1910 that they occupied part of the extensive conifer woods which clothe the lower slopes of the Galtee Mountains. A nest there on March 29th was 55 feet up, at the top of a bare-limbed Scotch Pine standing in a rather open portion of the wood. The four fresh eggs were long and pointed, with a few dark spots clustered around the large ends. Both birds were tame and demonstrative, the cock being particularly

noisy. Five Crossbills were in evidence until February, 1911, when they were lost sight of, and no nest was found that spring. But at the end of May a pair suddenly appeared, and immediately started to build in a large Scotch Pine near the old site. On June 16th the nest, which was 45 feet up, contained four eggs, almost fresh, of an entirely different type to those found the previous season. The ground colour was distinctly green, and light spots were distributed over the surface.

On March 8th, 1912, I climbed to another nest. A tall Scotch Pine had been selected midway in a long "belt," only a short distance from the original haunt and within one hundred and fifty yards of some inhabited houses and farm buildings. The nest was 55 feet from the ground and 14 feet out at the end of a strong bough. It was conspicuous from below because of the amount of white sheep's wool woven into the base. For nearly an hour I stayed in the top of the tree, a few feet from the hen, who sat hatching with her back towards me. She was rather perturbed, and every now and again screwed her head round for an anxious survey, but she did not attempt to get off the nest. The cock was absent the whole time. The four eggs were white with dark brown spots, and were very highly incubated. Five days later another nest was begun in this "belt" in the foliage surrounding the leader of a giant Scotch Pine. By March 24th the clutch was complete—four beautiful white eggs with pale red markings. The hen allowed herself to be handled, while the cock perched in a neighbouring tree. The last nest of the season, examined on April 16th, was in the favourite wood, on a bough ten feet out, near the top of a 50-foot Scotch Pine. It held three eggs, richly marked with two shades of red.

In 1913, eighteen Crossbills wintered there, and on February 26th a nest was begun. In three days it had attained large proportions, and on March 10th three eggs were being incubated. On the 28th the next nest, built in a high tree on the edge of a grove overlooking a rough cartway, contained four fresh eggs; and on April 16th a nest on which the female had been sitting was empty, with the lining "fluffed up," no doubt the work of squirrels. But, back near the old spot, on May 1st, a bird was

hatching five eggs of the greenish type, at a height of nearly 80 feet. When disturbed she became very excited, but her shrill cries failed to attract the male. Two sets of three and four eggs, which I examined ten days later, were probably second layings; but one nest was interesting, as, barely 35 feet up, it was at the end of a bough exactly 30 feet from the bole. All the above were in Scotch Pines.

In 1914 building commenced on March 2nd, and by the 18th three nests contained sets of four, three, and four eggs. These were also in Scotch Pines growing in belts of mixed conifers in the favourite area. The first, 60 feet high on a lateral bough, was in such an exposed position that a recent snow-storm had thoroughly soaked it. The second was 50 feet up the main stem, while the third, which was very near some farm buildings, was only 20 feet from the ground, at the end of a weak bough with a downward slope. I could not induce the bird to stir, although I rustled the foliage around her head with a long bamboo. Later, as I was roping myself to the body of the tree—so that I could reach out to the nest—the cock arrived and began calling from an Alder sapling a short distance away. The sitting bird at once replied with some low sweet twitterings.

On March 31st I examined another nest with four poorly marked eggs, in the umbrella-top of a bare-stemmed Larch, 35 feet high. I was up to two more nests on April 4th; one, which had been deserted, was only 15 feet high at the end of a long Scotch Pine bough, hanging over a lane, within a few feet of an inhabited cottage, and the children had been pelting stones at the birds. The two eggs were stuck to the inside of the nest. The other was also only 15 feet from the ground, in a Spruce growing on the edge of a plantation, beside a gate. While I was stretching out to the nest the bird sat facing me, and as my hand approached she caught and gently nibbled it. I lifted her off, showed her to those below, and then launched her into the air. She flew a couple of feet and, returning swiftly to the branch, settled on the eggs. Again I launched her into space, but she returned instantly. This was repeated several times. The four eggs were unusually large and beautifully scrolled, quite the

handsomest I have seen. The last was laid that morning, though the bird had been on the nest for some days; but Crossbills seem to sit once their first egg is laid. On April 19th and 22nd two more nests near the farm buildings contained three eggs each.

On March 20th, 1915, a Crossbill was sitting on three eggs in the top of a Scotch Pine which was left standing at the end of a newly-felled screen, and on April 5th a nest high up in a Spruce contained four fresh eggs; while on the 26th the third egg was laid in an almost inaccessible nest at the extremity of a Scotch Pine bough. In the middle of May I climbed to another in a large Scotch Pine down in the lowlands, but it had been sacked, probably by Hooded Crows, which bred in the vicinity. Only this and the deserted one by the cottage were at any distance from the favourite area, and even these were hardly a mile away.

It is noticeable that during six seasons these Crossbills were almost unanimous in choosing Scotch Pines, but in the lining of their nests they showed no fixed principles. One nest, the neatest and most compact, was lined with fine roots, black and white horse-hair, dry grass, and a little wool, all beautifully interwoven. A loose, untidy structure was profusely "bedded" with soft feathers, and others were lined with small tufts of fresh green moss mixed with hay and stray feathers; while an exceptionally uncomfortable one was composed internally of hard grey lichens, with the addition of a little black wool and some strips of inner bark. This shredded bark was not constantly used. A piece of briar was once included in the "platform." Otherwise these characteristic foundations were built entirely of Scotch Pine, Spruce, or Larch twigs.

Apropos of Mr. C. B. Moffat's interesting article on the food of the Crossbill,[1] it is well to add that these birds in the Galtees have fed almost exclusively on the cones of the Scotch Pine, and have never touched those of the Spruce.

Rocklow, Fethard, Co. Tipperary.

[1] *Irish Nat.*, 1916, pp. 1-6.

LEPIDOPTERA FROM KILLARNEY.

BY L. H. BONAPARTE-WYSE.

The following notes on some of the more interesting butterflies and moths seen or taken by me while on a visit to Killarney during part of the summer of 1913 and part of 1915 may perhaps be worth recording.

RHOPALOCERA.

Leucophasia sinapis L.—I took a specimen much worn of the Wood White in Muckross demesne on June 7th, 1915.

Gonepteryx rhamni L.—One male in Muckross demesne, on June 6th, 1915. I noticed one or two examples a few days previously whilst sketching in the demesne.

Callophrys rubi L.—A few captured on the road near Lough Guitane on May 30th, 1915. I subsequently met with the Green Hairstreak on the boggy ground adjoining the long stretch of water known as the Long Range.

Cyaniris argiolus L.—One or two seen flying round holly in Muckross demesne early in June.

Vanessa io L.—The great abundance of this species, both in 1913 and 1915, in the larval state is worth mentioning. I noticed the first caterpillars early in June and continued to meet with fresh colonies until the middle of July.

Coenonympha typhon Rott.—This interesting butterfly occurred freely in the boggy ground adjoining the Long Range.

HETEROCERA.

Ino statices L.—One specimen near Killarney in July, 1913, and one at Muckross on June 29th, 1915.

Nudaria mundana L.—This species came freely to light in July, 1913. I also took a few specimens on tree trunks and old walls. Strange to say, I did not meet with it in 1915.

Diacrisia sannio L.—I met with several examples, both male and female, of the Clouded Buff on the boggy ground adjoining the Long Range in June, 1915.

Hepialus lupulinus L.—I took a specimen in good condition near Muckross, on May 29th, 1915, and saw two or three others. Though so common in England, it would seem to be extremely local in Ireland.

Drepana lacertinaria L.—I netted a specimen at dusk in the garden of the Muckross Hotel on June 6th, 1915.

Plusia bractea F.—A few specimens came to light in July, 1913. The window in which the lamp was placed overlooked a large kitchen-garden and a long stretch of grass land sloping down to the edge of Lough Leane, where the River Flesk empties itself into the lake.

Plusia festucae L.—I kicked up a specimen of this pretty moth in some boggy ground near Derricunnihy, on July 1st, 1915.

Plusia interrogationis L.—I took a fine specimen flying over heather near Muckross on July 7th, 1913.

Erastria fasciana L.
Bankia argentula Hb.
Hydrelia uncula Clerck

These three little moths, so characteristic of the fauna of Killarney, occurred on the boggy ground bordering the Long Range, but only the first-mentioned was really common.

Bomolocha fontis Thnb.—A specimen was attracted to the lamp in July, 1913. One or two were beaten out of nut-trees near Muckross in June, 1915.

Venilia macularia L.—A couple of examples were seen on June 10th, 1915, on the west side of L. Guitane, at the foot of Mangerton.

Angeronia prunaria L.—A specimen captured on heathery ground near Muckross on July 7th, 1913.

Ellopia prosapiaria L.—A female specimen came to light on July 15th, 1913.

Boarmia repandata L. var.—I took a remarkable banded form of this species on June 30th, 1913, at dusk on the road which leads from Muckross to Mangerton. The specimen, a male, is very similar to the handsome variety figured in South's "Moths of the British Isles," second series, pl. 134, fig. 8. The dark band is, however, narrower, which gives the moth a much paler aspect.

***Hyria muricata** Hufn.—A specimen of this pretty little moth was netted on the boggy ground near the Long Range.

Panagra (Lozogramma) petraria Hb.—A few examples of this local species occurred in Muckross demesne in June, 1915.

***Bupalus piniaria** L.—One in Muckross demesne fluttering round a large Silver Fir was netted on June 2nd, and a second a few days later near Torc waterfall. Both were males and in good condition.

Abraxas sylvata Scop.—One beaten out of a nut-tree on June 20th, 1915.

***Camptogramma fluviata** Hb.—A female specimen was attracted by the lamp on July 31st, 1913.

***Nomophila noctuella** Schiff.—This species came freely to light in July, 1913. I did not meet with it in 1915.

***Crambus inquinatellus** Schiff.—One specimen in July, 1915.

The species with an asterisk prefixed are, I believe, new records for Kerry.

Ealing Common, London, W.

RAVENS IN COS. WATERFORD AND TIPPERARY.

BY C. J. CARROLL.

The Raven, formerly very common in these counties, is dwindling away before the poison which is laid in the wilder parts for the destruction of Foxes. Six pairs still breed in Co. Waterford, three along the coast, and three amongst the grim precipices of the Comeragh Mountains. In Co. Tipperary it is on the verge of extinction, a pair which breed in the Galtee range being probably the last of the race. Others nested until recently in the Knockmealdown Mountains, but the site is now occupied by the Peregrines. Some Ravens breed extraordinarily early, and a few years ago on our southern coast a nest was nearing completion on January 31st. The foundation of rough sticks and superstructure of fibrous matter was all in place, only the inner lining being absent. On February 9th the female was sitting in it at intervals, and by February 20th she was incubating five eggs.

Even far up in the mountains nidification is seldom delayed; and in a cliff over Coumshingaun, a dark, lonely lake lying in the Comeraghs, the young are hatched in March or early April, and when they emerge from the shells the surrounding rocks are draped in icicles. The building of the vast nest is often leisurely undertaken, but should occasion require it can be speedily constructed. The warm and abundant lining consists of roots, grass, wool, and cows' hair, frequently torn from the backs of the living animals. I have found rags, pieces of ropes, etc., used. Four eggs are frequently laid, usually five or six; but as the bird becomes aged the number declines. Even when sitting hard, the female will leave the nest when she catches sight of you, and often she will slip off before you come into view, for the male, who is always watching, gives the alarm.

Those ravens which dwell in maritime cliffs love to breed beside a colony of Cormorants or Herring Gulls, whose eggs they continually pilfer. It is most amusing to see a Cormorant being driven from its eggs. The Raven alights close by and sidles up

towards the sitting bird, who turns uneasily and, with crest erect, snaps at the intruder. The latter, with ruffled throat feathers, croaks defiance and, advancing nearer, compels the frightened Cormorant to forsake its treasures. Then the Raven is joined by its mate, who has been an interested spectator, and together they demolish the spoils. A Raven is wonderfully graceful on the wing, and I have seen them playing when they twist and tumble in the air like Choughs.

Frequently the Peregrine breeds in close proximity. Then fierce aerial encounters are of common occurrence, but the weaker bird often escapes by its cunning and strategy. On catching sight of its foe, the Peregrine dives from aloft, but the Raven, all alert, turns on its back in the nick of time and deftly wards off the terrific onslaught by rigidly extending the talons. This completely defeats the "stoop," and as the birds pose in mid-air one can hear the piercing scream of the baffled Peregrine, together with the harsh, angry croak of the Raven. In a flash, however, the Raven has righted itself and labours away on noisy pinions, while the Peregrine has shot up into the sky to "stoop" again at the black enemy, which then recovers its former position instantaneously, sparring dexterously with cruel claws. Again the scream and answering croak, and so the fights continue until the aggressor, repeatedly foiled, retires disgusted, or the Raven, bewildered and exhausted, seeks protection in the cliffs. Young Ravens, soon after leaving the nest, are taught how to withstand these dreaded attacks. Their parents, in imitation of the Peregrine, "stoop" at them time after time. At first the youngsters are stupid and clumsy, but they soon learn to avoid the onslaughts by turning over and presenting their claws or by rising high in the air. Indeed, the old birds are most attentive, and take them off daily on long foraging expeditions. Towards nightfall they all return, the young following in a straggling line, sometimes flying very slowly, as if worn out by their long day. As the summer wanes both old and young disappear, but the same pair, when they escape mishap, take up residence again the following year.

Rocklow, Fethard, Co. Tipperary.

REVIEWS.

VEGETABLE TERATOLOGY.

The Principles of Plant Teratology. By Wilson Crosfield Wordsell, F.L.S. Vol. i. London (Ray Society); Dulau & Co., 1915. Pp. xxvi. + 270. Plts. i.-xxv. Price, 25s. net.

The greater part of half a century has elapsed since the Ray Society published Dr. Maxwell Masters' well-known volume on Vegetable Teratology. This pioneer work has long been out of print, and for that reason, as well as because in the interval large additions have been made to our knowledge of teratological phenomena amongst plants, Mr. Wordsell's new and enlarged work is to be welcomed. The present volume deals with the cryptogams and with the root, stem, and leaf of phanerogams. A second volume, in which the flower is to be dealt with, is promised to complete the work.

The work is presented as a contribution towards a knowledge of the evolutionary origin of plant-organs, and not merely as a descriptive catalogue of plant monstrosities; and in his introduction the author emphasises the importance of a correct knowledge of abnormal structures as an aid in the interpretation of problems of normal plant morphology. He insists on the insufficiency of mere physics and chemistry as causative agents in morphological development, and he therefore calls in the aid of a regulative vital force as a necessary factor in this connection.

In dealing with the cryptogams the abnormalities are discussed under such headings as "proliferation," "dichotomy," "fasciation," etc., without having special regard to the particular organs of the plants in which they occur. In the case of the phanerogams, however, the various classes of abnormalities are dealt with separately as they occur in the root, stem, and leaf respectively.

It is impossible in a brief notice of the book to do more than give a general idea of its varied contents, but the following may serve to illustrate the author's method of treatment of his subject. In dealing with the causes of that rather common form of abnormality known as "fasciation," he discusses first the "fusion theory" and then the "expansion theory." Finding neither of these entirely to his satisfaction, he upholds the "pleiotomy theory," and observes, "Fasciation is the imperfect formation of a number of offspring (multiplets) by partition, and is a result of the compromise established between the forces making for unity and fission respectively."

The book is illustrated by a number of text figures, not of strikingly artistic merit, as well as by twenty-five plates. It is well indexed, possesses a useful glossary of terms, and its value is much enhanced by the copious bibliographical references supplied at the ends of its principal sections. Its price is unfortunately high.

G. H. P.

OBITUARY.

SIR CHARLES BALL, BART., M.D.

Scientific circles in Dublin are the poorer for the death of Sir Charles Ball, ex-President of the Royal Zoological Society. It would have been strange if he had not been a lover of nature. The influence of his father, Dr. Robert Ball, on the scientific life of Dublin in his day, and his services to the Royal Zoological Society—as Honorary Secretary from 1837 to 1857—will not soon be forgotten; and at his home Edward Forbes, William Henry Harvey, Sir Richard Owen, William Thompson and Robert Patterson of Belfast—to mention but a few—were frequent guests. J. Reay Green, with his Protozoa and Coelenterata, lived with the Ball family for some years; and from the cheerfully eccentric and enthusiastic "Joe Green," a favourite companion, the boys Robert, Valentine, and Charles imbibed largely the taste for natural science which brought them so much pleasure and distinction in after years.

The association of the family with the Dublin "Zoo" has been worthily maintained. Valentine Ball was Honorary Secretary from 1885 till 1895; Sir Robert was President from 1890 till 1892, when he left Dublin; Sir Charles was President from 1911 till 1916.

Charles Bent Ball was born at No. 3 Granby Row, Dublin, in 1851. He entered Trinity College in 1868, and took his Arts degree with a senior moderatorship in Natural Science in 1871. His entry into the Medical School had, however, given a definite line to his scientific studies, and, after winning a medical scholarship in 1870, he completed his professional course in 1872. The travelling prize which he won in the latter year led him to study surgery in Vienna. Of his career as a surgeon it is not our privilege to write here; it may be briefly mentioned that his affection for his old university was fitly crowned by his appointment to succeed Sir George Porter in the Regius Professorship of Surgery in 1895. He was President of the University Biological Society in 1885.

Holidays were to him golden opportunities for botanical and zoological pursuits. In his college days there were adventures on the south coast of Ireland with one of his contemporaries, trawling and dredging as far off as the Nymph Bank, in craft of doubtful seaworthiness. Out of these, later on, arose his participation in expeditions off the south-west coast organised by the Dredging Committee of the Royal Irish Academy. His share of the work is thus described in the report of the cruise of the "Lord Bandon," in July, 1886:—

"C. B. Ball, M.D., F.R.C.S.I.—To have charge of the purely fishing operations, to examine all fish for parasites, and to eviscerate the fish and preserve their viscera in spirits. . . . The practical experience of Dr. Ball in matters pertaining to yachting and fishing proved most valuable: fortunately, his professional services were not required."

On board the "Flying Falcon," however, a couple of years later, his professional services were very opportunely available to repair a broken rib suffered by the leader of the expedition. It is related that on these voyages Dr. Ball's enjoyment of tobacco, long after circumstances had deprived his colleagues of any taste for it, excited general envy. On another cruise, when with two of his previous companions and a fisherman he shared for some weeks the spacious discomforts of life on the "H. R. L.," a small, half-decked fishing boat, information was collected to form the basis of the report on the sea fisheries of the south and south-west of Ireland published by the Royal Dublin Society.

Always a keen sportsman, it was a grief to Sir Charles when advancing years deprived him of the pleasure of tramping over a mountain with his gun. On such occasions specimens of the local flora were by no means the least considered part of the "bag." He still kept up his interest in sea-fishing and angling, and his garden at Killybegs, in the mild climate of the west coast, bore witness to his botanical enthusiasm.

His connection with the Royal Zoological Society has been mentioned above. He joined the Council in 1895, and when, having held the Presidency for a term of five years, he relinquished it in accordance with the Society's by-law, the Council paid "a hearty and unanimous tribute to his unfailing kindliness to his colleagues, his keen interest in the Society's welfare, and his zealous efforts on its behalf." The hope that he would continue to attend often the meetings of the Council was disappointed, for he died on St. Patrick's Day, 1916.

Kindliness was indeed characteristic of Sir Charles. He was unostentatiously generous, and glad to encourage younger men. His public services and professional devotion were rewarded by a knighthood in 1903, a baronetcy in 1911, and other dignities; but the honours on which he himself set most store are recorded in the hearts of his many friends.

C. G.

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

March 8.—The Club met at Leinster House, D. M'Ardle (President) in the chair.

Prof. G. H. Carpenter showed the mandible and maxilla of a mayfly larva (Ecdyurus). Attention was called to the resemblance of the mandible to that of the Thysanura and of certain Crustacea—also to the fact that the cuticle of the next instar in the life-history was already perfectly formed beneath the old cuticle, so that the larvae, when killed, was clearly ready to undergo a moult.

Dr. G. H. Pethybridge showed a species of Fusarium strongly parasitic on young plants of Chewing's Fescue grass. Six different samples of seed of this grass were sown for a certain purpose rather thickly in pots. In the case of one of them, when the seedlings were a few inches high, a fungus appeared growing on those near the centre of the pot which gradually killed off the plants and spread to and devastated in turn the neighbouring healthy plants, so that the whole growth ultimately became destroyed. The fungus produced no spores or conidia of any kind, but by removing small portions of its mycelium under conditions of asepsis to a suitable, sterile, nutrient medium pure growths were obtained by Mr. H A. Lafferty, in which conidia characteristic of the genus Fusarium developed abundantly. Considerable further study will be necessary before a decision can be reached as to what species the fungus represents or whether, as is very probable, it is one hitherto undescribed. The strongly parasitic nature of the fungus, its luxuriant growth and production of copious aerial mycelium on the young grass plants, and the total absence of conidia except when grown saprophytically in pure culture constitute, perhaps, its most remarkable characteristics. The study of it is being pursued further.

W. F. Gunn showed sections of tufts of hair which are found on the under surface of the leaves of Laurustinus (*Viburnum tinus*). It has been suggested that these tufts of hairs, which are found in the angles formed by the junction of the principal and lateral veins, are galls formed by the irritation set up in the tissues of the leaves by a species of mite. The tufts vary in diameter from $\frac{1}{16}$ to $\frac{1}{8}$ inch, and the individual hairs are hollow, undivided, and unbranched. No mites or eggs could be discovered, and it is exceedingly doubtful if the condition is really due to insect agency. Hairy growths of a similar nature have been recorded in similar positions on the leaves of Hornbeam, Alder, Birch and other trees, and in most cases these are believed to be of normal vegetative structures.

Patrick O'Connor, A.R.C.Sc., showed preparations from a stipe of Laminaria found at Killiney by Professor Johnson, D.Sc., and infected with a fungus which proved to be *Hypoderma laminariae*. The abundant elongated perithecia of the fungus are embedded in the thallus and open at the surface by large pores. The asci are eight-spored, the spores being two-celled. This is the first record of the appearance of the fungus in Ireland, and so far as can be ascertained, it was first described in June, 1915, by G. K. Sutherland (*New Phytologist*, vol. xiv., nos. 6 and 7).

April 12—The Club met at Leinster House, the President in the chair.

Prof. G. H. Carpenter showed *Aleurobius farinae*, a mite closely allied to the common species of Tyroglyphus, but distinguished by the excessively thick and spinose fore-legs in the male. The specimens exhibited had been found in narcissus bulb from Co. Dublin in January, 1913, by the late Thomas R. Hewitt, who preserved and identified them. The species is not included in

J. N. Halbert's recent list of Irish Tyroglyphidae (Clare Island Survey), Acarinda, *Proc. R.I.A.*, vol. xxxi., pt 39, ii.) although A. D. Michael (British Tyroglyphidae, vol. ii.) states that it is common in Great Britain, feeding in grain and other vegetable substances.

D. M'Ardle showed *Lejeunea diversiloba*, Spruce, one of the foliaceous Hepaticae, remarkable in the variable character of the leaves, which are bilobed. In some specimens the postical and antical lobes are almost equal, in others the postical lobe reaches half the size of the antical, and in others this lobe is altogether wanting. This variation was demonstrated under the microscope. The plants are about ½ in. long, the leaves erect ovate-oblong, cells pellucid with firm walls, stems slightly branched rigid, whole plant of a yellowish-green colour, sometimes almost white. It grows epiphytic on the larger Hepaticae, such as Frullania, at Killarney and Anascaul, in Co. Kerry, the only known station. There is one other species, *L. Holtii*, Spruce, the distribution of which is also restricted to the south-west of Ireland. The other eleven species are evenly distributed in Great Britain and the Continent, extending to the tropical and sub-tropical regions. Some of them abound in the Amazon valley, in South America.

DUBLIN NATURALISTS' FIELD CLUB.

February 15.—Professor Cole (Vice-President) in the Chair, exhibited and described mineral phosphates used as fertilizers of the soil. E. J. Sheehy, A.R.C.Sc., showed some larvae of common Irish beetles. Mrs. T. Long (Hon. Secretary) exhibited a set of plants from North Africa.

March 21.—Professor Carpenter (President) in the chair. P. O'Connor, A.R.C.Sc., lectured on "Seed-Dispersal," illustrating his remarks by means of lantern slides and an excellent series of specimens. The well-known adaptations for dispersal by wind, animals, and water-currents were discussed with much freshness of treatment, and particular attention was directed to those species of conifers whose seeds seem to be set free only when the cones expand under the heat resulting from forest fires. In the ensuing discussion Professor Henry contributed some original observations in favour of this last-named explanation.

April 11.—The President in the chair. Rev. Canon F. C. Hayes lectured on "Shrubs and Trees," giving a vivid account of his successful attempts at arboriculture in his garden at Raheny, which he most kindly invited the Club to visit during the summer. The lecture was followed by a discussion, in which R. Ll. Praeger, Professor A. Henry, and A. Williams, R.H.A., took part.

NOTES.

ZOOLOGY.

Some recent Records of Irish Insects.

I have read with much interest Mr. J. N. Halbert's article in the September number of the *Irish Naturalist* (vol. xxiv. pp. 157-165), and beg to make the following remarks. Some years ago a number of specimens of *Gonepteryx rhamni*, together with its food plant, were introduced into the south of Co. Tipperary Up till that time the species had only been recorded from Co. Kerry and the following counties lying west of the Shannon, viz., Clare, Galway, Roscommon, and Mayo. Since the introduction of this alien colony in Co. Tipperary a specimen was captured and another observed at Dunmore, Queen's Co. (see *Irish Nat.*, vol. v., page 87). Now after a lapse of some years Lt.-Col. Mander's capture of a single specimen in Co. Kildare is reported. May not these latter records have originated in the introduction of the species in Co. Tipperary? It is curious that both Dunmore and the Curragh are in a direct line to the north-east of the locality where the insect was formerly introduced.

The capture of *Anthocera trifolli*, if correct, reinstates this species in the Irish list of Lepidoptera, as hitherto *A. lonicerae* was the only representative of the five-spotted group of Burnets known with certainty to occur in Ireland; this latter insect is abundant on the limestone formation in this district, and confluent spotted forms are not very rare, although in Great Britain the case is the reverse.

Thomas Greer.

Stewartstown.

Rare Lepidoptera.

A friend has in his collection of Irish Lepidoptera a specimen of *Laphygma* (*Caradrina*) *exigua*, which he informed me he captured at Ragweed flowers on the shore of Lough Neagh, near Lurgan, Co. Armagh, in 1904; he also met with *Notodonta bicoloria* in a new locality in the south of Ireland. When on a visit in Co. Roscommon, in July, 1904, I observed numerous larvae of *Asphalia flavicornis* on Birch bushes, and have several imagos which I bred from a few of the larvae which I brought home. This insect still appears to be very rare in Ireland, being only recorded from three localities, viz., Derry, Enniskillen, and Clonbrock.

Thomas Greer.

Stewartstown, Co. Tyrone.

Abraxas grossulariata—a new Irish Variety.

The Magpie Moth (*Abraxas grossulariata*) has become in recent years a well-known insect to students of heredity through the researches of Dr. Leonard Doncaster on the results of crossing the type form with the pale variety, *lacticolor*, found among wild insects only in the female sex. Dr. Doncaster's work has furnished a classical example of sex-limited inheritance, and throws much light on Mendelian phenomena as applied to the determination of sex. An interesting supplement to Dr. Doncaster's researches has been lately published (*Journal of Genetics*, March, 1916), by Rev. J. M. Woodlock, of Tullamore, who discovered at Milltown, Co. Dublin, a pale variety resembling *lacticolor*, and has carried on breeding experiments between this and the typical *grossulariata*. The new variety behaves as a simple recessive to the type, uncomplicated by any sex-linking factor, and offering thus a marked contrast to *lacticolor*. The author concludes that the development of the type follows on the presence of two dominant genetic factors, one opposed to the factor for *lacticolor*, the other to that for the new variety, which for the present he designates as "Q."

The Non-Marine Mollusca of the Aran Islands.

Since 1910, when my account of the land and freshwater mollusca of Inishmore was published (*I. N.*, xix., p. 115), the following four species have been added to the list. I visited Inishmore again in August, 1915, and took *Vallonia costata* Müller in several places, and found *Vertigo angustior* Jeffreys as a fossil in the sandhills at Killeany Bay. In May, 1915, the island was visited by Mr. H. C. Huggins, of Gravesend, who found there *Succinea Pfeifferi* Rossm., of which he kindly sent me specimens. *Pisidium casertanum* Poli is recorded for the Aran Islands by Mr. B. B. Woodward in his "Catalogue of British Pisidia," 1913, the specimens being in the National Museum, Dublin.

The record for *Hydrobia Jenkinsi* must be withdrawn, as on my last visit I could not find that species, and subsequent examination of the shells taken in 1908 showed that specimens of *H. ventrosa* encrusted with a black substance were mistaken for *H. Jenkinsi*. Mr. A. W. Stelfox informs me that his specimens recorded in the *Irish Naturalist*, 1907, have also proved to be *H. ventrosa*.

R. A. Phillips.

Cork.

The Record of Paludestrina Jenkinsi Smith for the Aran Islands.—A Correction.

In this Journal (vol. xvi., p. 361) I reported the presence of *P. Jenkinsi* in a brackish lake near Kilronan, on Inishmore, associated with *P. ventrosa* Mont. Of late years I have been doubtful of the correct identification of the former,

and a recent thorough re-examination of all the shells taken on the occasion has convinced me that the supposed *P. Jenkinsi* are referable to an abnormal form of *P. ventrosa*, as, though they resemble the first-mentioned species in outline, they possess the umbilical chink so characteristic of *P. ventrosa*.

A. W. Stelfox.

Ballymagee, Co. Down.

Hedge Sparrow on Migration at Rockabill Light-Station.

At 8.30 a.m. on April 6th I heard the shrill, repeated alarm whistle of a Hedge-Sparrow on Rockabill, and coming out of the dwelling-house I saw the bird searching for food near the foot of the lighthouse tower. It was very tame, and appeared tired. I secured several photographs of it. From what I can gather it seems that the Hedge-Sparrow has seldom been recorded from light-stations (especially island rocks). This is the first time I have seen it.

C. J. Patten.

The University, Sheffield.

Yellow-Bunting on Migration at Rockabill Light-Station.

At 10 a.m. on April 2nd I found a male Yellow-Bunting dead at the foot of the Rockabill light-house tower. The bird was almost hidden from view, being surrounded by loose stones among which it probably crept after having struck the lantern. The specimen was not fresh but preserved by drying, and was in winter plumage; hence it may have lain there since the previous autumnal migration. This species has not been recorded often from light-stations.

C. J. Patten.

The University, Sheffield.

TO OUR READERS.

The Editors, Publishers, and Printers regret the delay in publication of this number, and also the abrupt change in typography and appearance. These are due to the destruction of the type already set for the May number, and of the entire printing plant used for the *Irish Naturalist*, in the fires which followed the rebellion in Dublin during Easter week, 1916. We deeply regret also to record the loss of the whole of the publishers' stock of back numbers for the last five years The June number will probably be about a week late in publication.

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THE SCOTTISH NATURALIST,

A MONTHLY MAGAZINE,

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This Magazine—founded in 1871—is devoted to the publication of Original Matter relating to the Natural History of Scotland, and includes Papers contributing to the elucidation of the Fauna. Observations on Life Histories, etc., and Notes recording the occurrence of uncommon species and other useful and interesting facts.

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BELFAST NATURALISTS' FIELD CLUB,
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
TYRONE NATURALISTS' FIELD CLUB.

EDITED BY

PROF. GEORGE H. CARPENTER, M.Sc., M.R.I.A.
AND
R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.

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FRAGMENTARY REMAINS OF A TREE-PIPIT FOUND ON TUSKAR ROCK.

BY PROFESSOR C. J. PATTEN, M.A., M.D., SC.D.

Introductory.

A few days after I first landed on Tuskar Rock light-station in September, 1911, I discovered that, in addition to collecting on the balcony birds which struck the lantern, it was very important to make a thorough search on the rock for dead, wounded, or exhausted specimens, with a view of obtaining the fullest possible data for my researches in bird-migration. Moreover, I found that it was not by any means sufficient to pick up only fresh and complete specimens lying about the rock on more or less exposed sites ; it was necessary to examine most carefully : (*a*) all nooks, crevices, and outhouses, into which wounded or exhausted birds might have crept and died ; (*b*) masses of sea-weeds and *débris*, carried at intervals by high winds from one part of the rock to the other, and in which dead birds might have become imbedded ; (*c*) rock-pools into which wounded birds might have fallen and subsequently have been drowned, or into which dead birds falling from the lantern might have dropped or have been washed in by the wind ; (*d*) the roofs of the dwelling-house and other elevated sites above the rock but below the balcony of the tower, on which birds which had struck the lantern might have fallen, and lastly (*e*) the dome of the lantern on which might have fallen birds which had collided with the most elevated structures, such as the weather-cock, fog-explosive apparatus, or the lightning conductor.[1] The results of such a thorough and systematic search soon revealed to me the fact that, in addition to good, fresh, and complete specimens, one could find numbers of birds in all sorts of conditions, such as : (*a*) mummies, that is to say birds which had fallen on dry places, and which, escaping

(1) These are all situated above the roof or dome of the lantern.

the ravages of worms, insects, etc., had become dried and preserved after a fashion by sun and wind; (*b*) skeletons, in similar sites, the soft parts having been devoured by insects, etc., such skeletons were often in a good state of preservation; (*c*) birds in varying stages of decomposition, such were generally in dampish spots, sometimes exposed, sometimes imbedded in rotting sea-weed or other decaying matter, and showing the carcase swarming with insect-larvæ, etc. These decomposing specimens had to be handled with the utmost care, lest they should fall to pieces and some of the most valuable parts become lost, before being transferred to spirit for preservation and subsequent analysis. It was highly satisfactory to find that in cases where the remains were of even a most fragmentary character identification of the species was possible. The data obtained were most interesting, for, in addition to enriching the collection of common birds (which on migration frequent Tuskar light-station), for the purposes of studying variation, racial forms, and other points which it would be out of place to detail here, I welcomed by this method of securing material the objective evidence obtained of the presence of several species whose visits were far less noticeable. Furthermore, the only evidence of the presence at Tuskar during migration of certain species was founded on an examination of fragmentary remains.[1] Statistics have proved to me that immense numbers of birds pass Tuskar light-station on migration, numbers are killed or disabled by striking the lantern; a significant proportion of these fall on the rock. Then again, apart from the question of vigorous birds which, winging their way in their normal migration flights, may alight only for a short time on the rock, there are also considerable numbers which arrive through stress of weather, and may become storm-bound, while others, already exhausted from having lost their way, may also reach the rock. In both cases many of these migrants end their days in nooks or crevices. At times

(1) As an interesting example I may say that the only objective evidence I have heretofore of the Bramble-Finch on migration at this Light-station has been obtained from an inspection of a wet decomposing bird, collected on the dome of the lantern.

during active migrations the rock becomes studded with dead and wounded birds ; many of the latter also creep out of sight to die in shelter and quietude. I soon learned to locate these avian sepulchres,[1] and having pointed them out to the lightkeepers I asked them to examine their contents regularly, impressing them with the fact that fragmentary remains of birds ought not to be overlooked or cast aside, but should be exhumed, preserved, and forwarded to me for investigation, for from such specimens much light could be shed on the migratory movements of the birds, and the manner in which their fate was sealed at the light-station. I owe a debt of gratitude to the lightkeepers for their ready response in this direction, and in particular, to Mr. Glanville, who has interested himself immensely in seeking out every morsel of avian material in the most zealous manner. I have conserved quite a quantity of fragmentary remains of migrants from Tuskar light-station ; these are of considerable value in helping me to elucidate important points in my migration work, as I hope to show in future writings on the subject.

Description of the Specimen.

The fragmentary remains of a Tree-Pipit, the particulars of which form the textual part of this paper, were discovered by Mr. Glanville on October 16th, 1915, on Tuskar Rock. They were handled and packed in a most careful manner and forwarded to me for analysis. They were fairly dry when I received them, but in his letter the donor states that " the bird was nearly all eaten by worms, and was lying in wet sludge." This made the specimen all the more fragile and difficult to remove from the ground. He managed, however, to save the feet, the skull, and the wings ; the latter were still clothed with feathers, the primaries, secondaries, tertials (inner secondaries), and coverts being nearly complete on the left wing, though some of the secondaries, tertials, and coverts had become detached from the right wing. The feet were

(1) Birds in hiding seemed to exercise a certain amount of choice of site ; during active migrations some recesses about the rock very seldom contained dead or dying birds, others were seldom empty.

in a tolerably good state of preservation, and only the distal phalanx and nail of the middle-toe of the left foot were missing. All the other digits were complete, although the nail (claw) of the hind-toe of the left foot had become detached; most fortunately, however, it was picked up and preserved, it being a most distinguishing and diagnostic character in the case of the Tree-Pipit.[1] Most of the scaly epidermis of the feet was still adherent, and the horny encasements of the nails were intact; accurate measurements of the nails of the hind-toes could therefore be made, a most essential point in the case of this species when distinguishing it from the Meadow-Pipit. The bones of the feet were but slightly bleached, the whitish colour being chiefly due to the presence of the epidermal scales. It was very fortunate that the feet were so complete, for it was only by examining them in conjunction with the wings that is was possible to determine the species beyond the vestige of a doubt. The well-preserved plumage pattern of the wings seen when the feathers were dried and arranged, at once disclosed the fact that the bird to which they belonged was either a Meadow- or a Tree-Pipit; but to make a differential diagnosis between the two species by an examination of the wing-plumage *alone*, is not altogether easy. Most of the points of distinction are relative rather than absolute. For instance, the length of the wing (measured from carpal joint to tip of longest primary) in the Tree-Pipit is longer than that in the Meadow-Pipit, but this only holds good for averages, the measurements overlapping by several millimetres in extreme cases.[2] Again,

(1) Of course the hind-toe of the opposite foot would have been sufficient to work out the identification; all the same it was more satisfactory to see the pair, in the event of one being an abnormality or a variation in length from the normal.

(2) The average length of wing in the Meadow-Pipit is about 7.6 cm., that of the Tree-Pipit 8.4 cm. In other words the wing of the Tree-Pipit is usually some 8 mm. longer than that of the Meadow-Pipit. In the case of inverse variations where there is increase from the normal in the Meadow-Pipit's wing and decrease in the Tree-Pipit's, the mean length for both is about 8 cm. In extreme cases I have found the wing of the Meadow-Pipit to reach 8.3 cm. This measurement, however, happens to fall short of the length of the wing in the Tree-Pipit above described. *Vide* measurements of the specimen p. 92). In one of eleven Irish Tree-Pipits investigated the wing measurement dropped to 7.9 cm.

though the tertials are usually proportionally longer in the wing of the Tree-Pipit (extending as far back as the tip of the longest primaries), it is by no means uncommon to find this condition in the wing of the Meadow-Pipit; in fact having had an opportunity of examining a very large series of the latter species I have seen several specimens in which the tertials even extended back beyond the longest primaries. And no doubt were one afforded the opportunity of examining a large series of Tree-Pipits' wings, the reverse condition would be found in a small percentage of specimens. Hence all one can say is that it is more usual for the tertials in the wing of the Tree-Pipit to extend as far back as, and in the wing of the Meadow-Pipit to fall short of, the tip of the longest primaries. It would appear, however, that the tertials of the Tree-Pipit are rather more pointed than those of the Meadow-Pipit, but the number of Tree-Pipits' wings which I have examined has been too small for me to speak authoritatively on the subject. In regard to the pattern of the plumage, it is so very similar that mistakes in the identity of the two pipits might very readily arise. In shade so many variations manifest themselves even in the individual species that identification might present difficulties.

But having determined that the wing in question at least belonged to either a Tree-Pipit or a Meadow-Pipit, it was quite an easy matter, on examining the foot and seeing the short and *strongly curved hind-nail*, to exclude the latter species. No Meadow-Pipit, in the large series which I have examined, showed a hind-claw, not only so short but so strongly curved. The hind-claw of the Tree-Pipit compared with that of the Meadow-Pipit is unmistakable, it has none of the attenuated spur-like character found in the claw of the latter species,[1] in fact it much more closely resembles in length and curvature the hind-claw of a typical *sylvan* bird, *i.e.*, a warbler. For this reason were one to examine the foot alone of a Tree-Pipit it might not be so easy to arrive at a correct diagnosis of the species.

(1) Vide *Irish Naturalist*, 1912 (Fig. B., Plate 4), facing p. 209.

The skull was complete, both segments of the beak being intact. The measurements of the latter fall into line with those which I have determined from ten other specimens procured at the same locality. The more robust nature of the beak compared with the same in the Meadow-Pipit is perceptible, but here again in the Meadow-Pipit variations in the contour of this structure present themselves when series are examined. The lower segment (mandible) was a little protruded and deflected to the right, a displacement commonly found in birds which come with great force against the lantern glass. The tongue usually shares the same displacement but was missing in this specimen, probably having been partially devoured, while the horny distal part, becoming free, dropped off.

The entire vault of the skull was flattened and in the centre indented over an area of 7 mm. in diameter. Two brick-coloured patches, somewhat circular in outline, each with a diameter of about 6 mm., and situated on the frontal area, indicate the site in the recent state of two extensive sub-cranial hæmorrhages: these while almost meeting at the sagittal suture did not coalesce. Two short fractures extended backwards from the upper orbital margins.

Migratory Movements and Fate of the Bird.

The state of the skull tells the story of how the bird met its end; it collided forcibly and head foremost with the lantern, and death undoubtedly was instantaneous. The bird then fell on the rock, where it lay until discovered by Mr. Glanville. It is somewhat questionable as to when it arrived at the lantern; however, as birds of a given species are prone to migrate in the plural rather than in the singular number it is fair to argue *á priori* that the bird accompanied the Tree-Pipit which struck the lantern at 2 a.m. on the night of September 9th, 1915, and which Mr. Glanville collected and forwarded to me.[1] This hypothesis is strengthened by the fact that at 11 p.m. on that same night Mr. Glanville beheld a large pipit strike the lantern glass and glide off disabled.[2] He strongly suspected that it was

(1) Vide *Irish Naturalist*, November, 1915, p. 208.
(2) J. Glanville *in litt.*

a Tree-Pipit. Probably on striking it was killed outright, or descended to the rock mortally wounded, where it expired shortly, and having lain five weeks (its carcase affording food for voracious invertebrates), it may, for aught we know, have been this self same bird which Mr. Glanville discovered in such a fragmentary state, and which forms the subject of this paper.[1] The creatures which devoured the major part, left a sufficient amount of the skeleton and feathers intact to enable me to identify the species beyond doubt.

Conclusions.

The identification of another Tree-Pipit from Tuskar light-station is *per se* interesting, but particularly so in this case as it affords us objective evidence of the presence of the species *in the plural number in the same season, in the same phase of migration, i.e., autumnal, and probably in the company of others of its own kind on the same night.* All these points go to show that it was not a migratory waif,[2] wafted by storm or other adverse factor from its customary route, but that it was pursuing its regular migration. Nor was it travelling in solitude, for in addition to the company of its own species already mentioned, I learn from Mr. Glanville[3] that the following were identified by him at the lantern on the night that we have supposed it met its fate :—A Tern, many Wheatears, Spotted Flycatchers, Sedge-Warblers, Willow-Warblers, Chiffchaffs, Greater Whitethroats, and Meadow-Pipits.

(1) It is sometimes difficult to say whether a bird which strikes the lantern forcibly, but goes off, has been killed outright or only disabled. For unless the spinal cord or medulla of the brain has been injured, the reflexes would not necessarily come to a standstill, consequently instead of the bird falling like a stone it might descend obliquely with quivering wings. Therefore this bird in question which Mr. Glanville saw striking and going off "disabled" may have been killed outright, thereby corroborating the evidence of instantaneous death as indicated by the condition of the skull in the bird found five weeks later. As a matter of fact the nature of the lesions on that skull, while sufficiently severe to cause instant death by brain compression and hæmorrhage, was nevertheless not in the region of that part of the brain or spinal cord which if injured would put a stop immediately to all muscular movements.

(2) Vide my articles on "Aquatic Warbler on Migration obtained on Tuskar Rock," *Zoologist*, March, 1915, pp. 82-92, and on "Icterine Warbler on Migration obtained on Tuskar Rock," *ibid*, February, 1916, pp. 41-53, where I make special allusion to the question of migratory waifs.

(3) J. Glanville *in litt.*

With the exception of the Tern, examples of each species were sent to me, and without exception they were in most excellent condition, with an abundance of fatty tissue present, a sure sign that they were affecting a regular migration. And probably the Tree-Pipit, whose fragmentary remains I have now written about, was, when it collided with the lantern, in like fat condition. Obesity is the rule with migrating birds ; only storm-driven waifs, those which have been prevented from obtaining food through being crippled, and those suffering from definite disease, show signs of emaciation on rock-stations. It may be well here to mention the meteorological register for the night on which the above migrants visited the lantern : Weather calm ; wind blowing from the S.S.E. with the force of a gentle breeze according to Beaufort's scale ; sky clear overhead, with detached open clouds ; hazy on the horizon. The question of high winds driving the pipits or other birds out of their course that night can be put out of court, while the absence of dense fog allowed them to make such headway as they are wont to do when travelling by night to their intended destination.

Let me conclude by saying that all records of the occurrence of the Tree-Pipit—a species but recently discovered in Ireland, and now placed on the Irish List—will, for many seasons to come, be eagerly sought for, in order to enable ornithologists to form some idea of the status of the bird as far as Ireland is concerned.

Measurements.

The following are the measurements which I made on the fragmentary remains of the Tree-Pipit above described :

Right wing, 8.5 c.m.
Left wing, 8.42 c.m.
Beak, 1.1 c.m.
Feet, 2 c.m. (Both same in length).
Hind-toe, 7.5 m.m. (Both same in length).

N.B.—Plumage of the wings, bright and fresh.

The University, Sheffield.

EXPLANATION OF PLATE I.

1. Left wing; the reference number is placed in the space between the primaries to the left and the tertials to the right. The longest of the latter extend back as far as the tip of the longest primaries. The secondaries are hidden from view by the overlapping tertials.

2. Right wing, many feathers missing.

3. Two detached secondaries of the right wing.

4. A long tertial, ditto.

5—5. Greater coverts, ditto.

6. Left Foot: The detached claw of the hind-toe has been placed in position. The distal phalanx and claw of the middle-toe are missing.

7. Right Foot with digits complete. Immediately above the toes on each foot the naked bone is displayed where the scaly epidermis has disappeared.

8. Skull showing extensive flattening and indentation of the vault; dark coloured hæmorrhagic patches; fractures of upper orbital rims; and deflected mandible.

N.B.—The wings, including the detached feathers, also the skull, are viewed from the upper aspect, the feet are viewed in profile.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Badger from Dr. Hearn, a pair of Parrakeets from Mrs. Lee, a Madagascar Love-bird from Mrs. Cusack, and a Herring Gull from Miss Blood-Smyth.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 18.—The President (R. LLOYD PRAEGER) in the chair. Professor R. H. YAPP, M.A., lectured on "The Building of a Salt Marsh." Professor Yapp said salt marshes occur in river estuaries and sheltered arms of the sea. They are liable to frequent inundations by sea water, especially during spring tides. The marsh is built up by an accumulation of mud or silt brought down by the river, the mobile silt being bound together and rendered stable by the plants which soon begin to clothe its surface. New silt is deposited by each high tide, and is incorporated with the soil of the marsh by the continuous upward growth of the covering of vegetation. Thus salt marshes, like sand dunes, tend to be gradually built up to higher and higher levels by the frequent addition

of fresh mineral particles. In both cases the part played by the living plants is that of binders or stabilisers. Each succeeding stage in this upward extension is overflowed by fewer tides than the preceding one. In consequence each stage is, on the whole, characterised by different species of plants, such as Marsh Samphire, Sea Pink, and various Grasses. Thus in the marshes chiefly dealt with in the lecture, *i.e.*, those of the Dovey Estuary in Cardiganshire, five distinct altitudinal zones of vegetation can be distinguished. The lower zones are occupied by plants able to endure longer and more frequent submergence in salt water than those living in the higher and drier zones. In many localities the vegetation covering the greater part of the marshes is a compact sward. This affords excellent sheep pasturage, highly valued by farmers not only on account of its feeding properties but also because of its freedom from the liver-fluke parasite. The sward is intersected by numerous natural drainage channels and curious bare drainage hollows known as " pans." The origin and fate of both channels and " pans " was described, and it was shown that, as in the analogous case of sand dunes, there is a constant struggle between the agents of deposition and stabilisation on the one hand, and the agents of erosion and destruction on the other. Tides not only deposit additional sediment but also erode and wear away the edges of the marsh, and scour out and enlarge the " pans." Indeed, large " compound pans " are frequently formed by the coalescence of systems of smaller ones. Sooner or later, however, if the chief river currents and channels remain constant, a kind of balance is struck, the marsh reforming as rapidly as it is destroyed. It may also be stated that while some of the bare " pans " increase in size by erosion others become filled up and overgrown by vegetation owing to the establishment of natural drainage outlets. By suitable methods of encouraging the deposition of silt and the growth of salt marsh plants upon it, it is possible to so favour the forces of progression (as opposed to those of retrogression) that land reclamation can be effected. This is regularly carried out on a considerable scale in such areas as the Wash of the east of England.

The lecture was illustrated by a large number of lantern slides from photos, mainly taken by the lecturer. In the discussion which followed, the following members took part :—The President, Rev. C. H. Waddell, Dr. J. K. Charlesworth, J. E. Hamilton and A. McI. Cleland. Professor Yapp replied to the questions asked by these speakers. After the election of Miss Gibb and Miss S. Lees to membership the proceedings concluded.

February 15.—John M. Dickson presided. Charles Bulla gave a paper on " Ancient Man and the Implements he used."

The lecturer illustrated his subject with a large number of specimens of flint implements of various ages, as being connected with the presence of ancient man—as tools for fashioning, and as implements for the chase, defence or offence. Through the courtesy of Mr. Deane of the Municipal Museum some cases of implements and a series of lantern slides were shown by A. R. Hogg.

The Chairman and several members spoke on the paper, and the election to membership of Miss Masterson and Miss Bradley brought the proceedings to a close.

March 21.—The President (R. Lloyd Praeger), in the chair. J. A. Sidney Stendall read a paper on "Spiders." The lecturer treated his subject in a general manner, not entering into any of the specific differences which distinguish the five hundred or so different species of spiders inhabiting the British Isles. The structure and life history of many of our commoner British spiders were fully explained, together with an interesting account of the manner in which the common Garden Spider constructs its web—that marvel of animal architecture where stresses and strains are all taken into account. The method of dispersal in young spiders was explained in detail, also a rather reassuring account of the poisonous properties of the spider's bite was given, the lecturer stating that nobody need ever be afraid of handling any species of British spider, its bite being practically harmless to man. The habits in courtship and nest-making, as observed in various species, came in for consideration, and the lecturer concluded by giving an interesting account of the many dangers besetting a spider throughout its whole life. The lecture was illustrated by a series of specially-prepared lantern slides, which added considerably to its interest.

The paper was discussed by the President, A. W. Stelfox, and N. H. Foster. Mr. Stendall having replied to one or two questions raised, a new member of the Junior Section, Mr. Samuel Simms, was thereafter elected.

April 4.—Annual Meeting.—The President (R. Lloyd Praeger) in the chair. The reports submitted to the meeting showed that the Club's membership had increased during the year and that its finances were in a flourishing state. In the several departments of its sphere of labour good work continues to be accomplished. The reports were adopted, on the motion of the President, seconded by Joseph Maxwell. The following office-bearers were then elected for the Club's fifty-fourth year (1916-17):—President, Captain A. R. Dwerryhouse; Vice-President, Joseph Maxwell; Treasurer, Nevin H. Foster; Librarian, Sylvanus Wear; Secretaries, Miss M. W. Rea and Dr. Charlesworth; Sectional Secretaries:—Botanical, S. A. Bennett; Geological, Miss E. L. Andrews; Zoological, C. G. Robertson; Archæological, Robert May; Junior, J. A. Sidney Stendall. To fill the places on the Committee of three members who retired by rotation, N. Carrothers, A. M'I. Cleland, and R. Lloyd Praeger were elected. Pursuant to notice of motion, A. Deane moved, and J. A. S. Stendall seconded, that Rule 3 be amended so as to constitute members between the ages of seventeen and twenty-one associates and members under seventeen as junior members, and after some discussion the motion was passed. Three new members having been elected the proceedings concluded.

THE BIRDS OF LOUGH CARRA.

BY ROBERT F. RUTTLEDGE.

For some time I had been anxious to visit the islands and shores of Carra in search of birds. I decided therefore to spend a day on the northern and eastern shores on April 25th. The first interesting birds I saw were in a bay below Moore Hall ; they were a pair of Great Crested Grebes (these birds are not uncommon on the lake), which were diving near a reed-bed quite close to the shore. Further out a pair of Tufted Duck were resting on the water.

From here I proceeded to Derrinrush, a long thickly wooded peninsula jutting out nearly half way down the lake. The dense natural covert was alive with small birds, especially Willow Wrens and Chiff-chaffs. After spending some time here I returned to go along the eastern shore. The first bird I came across was a duck with about ten young swimming up a river. When their mother left them the little ones dived and floated alternately down to the lake. I observed the first Swift I had seen this year here (April 25th).

In another reedy inlet were more Tufted Duck, Coots, and on the shore a pair of Water-rails. Mallard were very numerous all day. From the shore I saw a great many Black-headed Gulls on an island where they breed, some of them sitting.

On April 29th my brother and I hired a boat which met us at Cloonee House and we started from there at about ten o'clock. The first islands we searched were two long low ones off Brownstown House. At one end of the first we found a colony of Common Gulls, there were many empty nests, and we found one with three eggs and three with one. Common Sandpipers were about nearly all the islands and the shores, and we saw two pairs of Arctic Terns. On the second island, where I had previously seen the Black-headed Gulls sitting, we found all the nests robbed,

the cause of which we did not then know. On several of the islands we found a great number of Common Gulls' wings, which we concluded were the remains left by Otters, which abound.

Continuing up the lake we found two ducks' nests, one containing eleven eggs and the other five. We saw only one Cormorant of the large number which breed on an island with a ruined castle on it. The majority spend their day about Lough Mask. The boatman also told me that four or five years ago they numbered some six hundred or more on the one island, nesting on the trees, castle, and ground, and although so crowded never went to a similar island close by. Under Moore Hall I again saw the Great Crested Grebes.

Returning down the far side of the lake we landed on one island which was strewn with the sucked eggs of Common Gulls, Black-headed Gulls, Duck, a Lapwing, and a Pigeon. This was the work of the Grey Crows; the eggs numbered well over a hundred I am sure. This told the tale of the destruction of the Black-headed Gulls' colony. The island where the Grey Crows themselves nest is just beside, and landing on it we found no traces of sucked eggs.

This island had a duck's nest with twelve eggs. The Grey Crows had built on trees in the centre of the island. After this we visited several more islands but found nothing.

It was of course early in the season for the nests of some species, such as the Red-breasted Merganser, Terns and Sandpipers, all of which, however, breed on the islands. Other birds we saw were Reed-buntings; these were on most of the islands, and on the wooded ones there were Warblers. Large and small flocks of Wild Duck (all Mallards) were everywhere, and we saw a good few pairs of Tufted Duck. Six White-fronted Geese were seen passing over at one time, the last I saw this spring.

Hollymount, Co. Mayo.

OBITUARY.

LIEUT. R. L. VALENTINE.

One of the saddest aspects of the war is the drain it effects on the coming life and spirit of the nation. The death of Lieutenant R. L. Valentine on April 30th from wounds received in an attack on the British lines near Loos, adds another to the list of scientists who have given away their youth and promise for a national ideal. When the war broke out he had only just entered upon his scientific career, and so had but little opportunity of earning a reputation for himself. That he would, however, have done so in time was abundantly clear to those who were intimately acquainted with him in his college life and during his first efforts at geological work. He possessed that readiness and adaptability under difficult circumstances which is a sure earnest of ultimate success.

Robert L. Valentine was born in 1890 at Enniskillen, and was the son of W. J. M. Valentine, classical master at Portora. He was educated at the High School, Dublin, and thence obtained a scholarship in the Royal College of Science for Ireland, where he applied himself to the study of natural history and geology. After obtaining the Associateship of the College, he devoted much of his time to a study of the Carboniferous strata of Hook Head, Co. Waterford, endeavouring to apply to these beds the principles of zoning which have recently been employed with such success by Dr. Vaughan and other investigators in England. While carrying on this work he obtained by competition the post of Geologist on the Geological Survey of Ireland, but had not yet entered upon his duties when the war broke out. He was among the earliest of those who rallied to the colours, and being impatient of the delays attendant upon obtaining a commission he enlisted, in August, 1914, in the 7th Battalion, Royal Dublin Fusiliers. Shortly after, however, he was offered, and accepted, a commission, being transferred to the 8th Battalion. In his subsequent activities as a trainer of scouts and a machine-gun officer at Aldershot he showed marked ability, and devised a method of increasing the efficiency of the Lewis machine gun. He is said to have been extremely popular, both with his men and with his brother officers, and those who knew his ready wit and youthful enthusiasm will understand that this is no idle praise.

The peculiar type of ability which goes to the making of a successful geologist is of no common occurrence. It is largely a matter of energy and adaptability, and these qualities Valentine possessed in a marked degree. That he would have been eminently successful in the profession he had chosen, those who knew him can have little doubt.

W. B. W.

NOTES.

BOTANY.

Andromeda polifolia in Co. Antrim.

The occurrence of *Andromeda polifolia*, Linn., in County Antrim, is a discovery of interest to local botanists. On Saturday, May 27th, I and a few botanical friends were piloted to the bog where it grows by the finder, the Rev. W. R. Megaw, B.A. The bog in question is known as Sharvogues peat bog, and is adjacent to Kellswater railway station, near Ballymena. It lies about 150 feet above Ordnance datum. In its centre is a small lakelet; and the Andromeda grows somewhat profusely on the wet Sphagnum of the area immediately surrounding the lake. A great deal of peat (of the "flow" type) has been cut in the bog for years past, but a considerable central area about the lake is as yet in its virgin condition. The typical heath plants growing on the bog are *Calluna vulgaris*, *Erica Tetralix*, and *E. cinerea*. *Empetrum nigrum* and *Myrica Gale* also occur. Closely associated with the Andromeda we noticed some other locally rare species, including *Drosera anglica*, *Oxycoccus quadripetala*, *Listera cordata*, *Carex limosa*, and *C. curta*.

Mr. Megaw's find is most welcome to northern botanists. By it an important addition is made to the known Antrim flora. My pleasure, however, in making the announcement is tinged with forebodings as to the plant's lease of life at Sharvogues. Quite recently the bog attracted the attention of a commercial syndicate, and the latter are about to start working it for the usual marketable products. Already the whole surface has been trenched by a rectangular network of drains, and Mr. Megaw assured me that as a consequence the level of the lake had fallen considerably from the date of his previous visit a month earlier.

W. J. C. Tomlinson.

Belfast.

Spring Flowers in 1916.

The abnormal weather of the first three months of the present year is accountable for some curious phenomena in connection with the date of flowering of some of our spring plants. January was four or five degrees warmer than the average, and March four or five degrees colder. This seems to have thrown the normal sequence of spring flowers completely out of gear. At Aughrim at Easter (say April 23) while Wild Cherry was already in bloom, much of the Blackthorn (usually quite six weeks ahead of Cherry) had not yet opened its flowers. In my own garden some plants of Lesser Celendine in a shady place are only now (May 19) beginning to blossom.

R. Lloyd Praeger.

Dublin.

ZOOLOGY.

Strophosomus coryli on Larch.

This common weevil is well known to entomologists in all parts of Ireland as a haunter of various kinds of dicotyledonous trees and shrubs. My friend Mr. A. H. Forbes, of Avondale, Co. Wicklow, tells me that there and in Co. Antrim he noticed the species on Larch in the early summer of 1914 and 1915 respectively. The beetles were present in such great numbers that they were causing appreciable damage to the young foliage of their unusual food-plant.

G. H. Carpenter.

Royal College of Science, Dublin.

Black-eared Wheatear at the Tuskar. A New Bird for the Irish List.

At 7.15 p.m., on May 16th, 1916, Mr. Glanville collected a Black-Eared Wheatear (*Oenanthe hispanica*) on Tuskar Rock. I am much indebted to him for so kindly forwarding the specimen to me in the flesh for identification and investigation.

This bird is new to Ireland. I hope to publish details a little later on, and give the racial form to which the bird belongs.

C. J. Patten

The University, Sheffield.

Carrion Crow at Ireland's Eye.

On the 15th June I saw at Ireland's Eye, a bird, which, I think, was certainly a black Carrion Crow. I identified it, by the short feathers round the base of the bill, seen distinctly through a pair of strong glasses, by its flight, by the wide separation of the primary feathers of its wings, when in flight, and most of all, by the harsh guttural note it made, when mobbed by Herring Gulls. Two years ago I saw a Crow at the same place, and recorded the occurrence in the *Irish Naturalist*, vol. xxiii., p. 124.

George C. May.

Dublin.

June, 1916.

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A Monthly Journal

ON

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PROF. GEORGE H. CARPENTER, M.Sc., M.R.I.A.
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ON TWO SPECIES OF PISIDIUM (FOSSIL) NEW TO IRELAND.

BY R. A. PHILLIPS, M.R.I.A.

(PLATE II.).

ALONG the courses of the greater rivers of the south of Ireland there occur large deposits of sand and clay, forming islands in mid-stream and banks by the river sides. They consist of material swept, through many ages, from the lands through which these rivers and their tributaries flow, with here and there a mixture of shells and other river rejectamenta. These accumulations are at intervals eaten into by heavy floods and swept further down towards the estuaries, mingling on their way with the more recent debris of the river, the heavier materials, such as sand and shells, being left in places where the currents from various causes are weak, often filling up holes and depressions in the river-bed, while the lighter clay and vegetable matter drift off still further towards the sea. Thus new deposits containing a mixture of recent and fossil shells and sand are formed.

Along the rivers Shannon, Suir, Barrow and Nore where some of these deposits occur near large towns and industrial centres they become valuable and numbers of men get constant employment dredging or shovelling the material which they bring in boatloads to the quays where it is sold for building and other purposes.

With the object of examining their shell contents I have at various times during the past few years taken samples of these sands at Limerick, Waterford and New Ross, and have obtained from them interesting collections of land and freshwater shells which illustrate the past and present faunas of the rivers and their banks.

Among these shells were found two species of Pisidium, one, *P. supinum*, being new to Ireland and the other, *P. parvulum*, a species not previously noticed in the British Islands. Both species were identified by Mr. A. W. Stelfox, M.R.I.A., who detected them in gatherings, which I sent him last January, of Pisidia taken in May, 1913, from a deposit in the Suir near Fiddown, about fifteen miles above Waterford where that river separates the counties Waterford and Kilkenny.

Pisidium supinum A. Schmidt

(Plate II., figs. 1 to 6.)

Numerous examples of this species were found in the Suir deposit. The shell is triangular in outline, though somewhat more rounded than specimens I have seen from the Thames, with very strong hinge and prominent umbones which are capped by appendiculae. In proportion to its size it is one of the heaviest and most solid of our freshwater bivalves. It is described in detail with copious illustrations by Mr. B. B. Woodward in his Catalogue.[1]

In the Suir sands it is accompanied by a thickened triangular form of *P. casertanum* which superficially resembles it closely, and by a similar heavy triangular form of *P. amnicum*. The presence of these peculiar forms in the Suir is remarkable, as the occurrence of a corresponding group in the Pleistocene deposits of the Thames Valley has been recorded by Mr. Woodward, and recently Mr. J. E. Cooper has sent me living examples of the three taken together in the Thames at Hampton Wick, Middlesex.

It is not always easy to separate these triangular specimens of *P. casertanum* from *P. supinum*, especially if, as it is stated sometimes happens, though I have not seen it, the appendiculae are absent from the latter, but a good test, pointed out by Mr. Stelfox, is the ligament pit which in *P. casertanum* is broad and curved, in *P. supinum* narrow and straight and possesses a strongly-marked ridge running along its ventral edge.

So far, *P. supinum* has been found only in the Suir deposit, all the specimens being separate valves. The state of preservation of some of these valves looks as if they were not long dead, so it is quite probable that the species will be found living in some part of the river when looked for. These Irish specimens are undoubtedly native.

P. supinum was first noticed in the British Islands in 1901 when dead shells were found on the foreshore of the Thames near Kew Gardens, later it was recognized as a fossil in many Pleistocene and Holocene deposits in England, and

[1] B. B. Woodward, F.L.S., &c., "Catalogue of the British species of Pisidium (Recent and Fossil) in the British Museum (Natural History) with notes on those of Western Europe." London, 1913.

finally living specimens were taken in the Thames and other English rivers. It is widely distributed in Europe.

PISIDIUM PARVULUM Clessin.

(Plate II., figs. 7 to 14).

This species is more widely distributed in the Irish rivers than *P. supinum*, having been found in deposits of the Shannon, Suir and Barrow.

The shell was originally well described in Swedish by Westerlund who adopted Clessin's MS. name.[1]

Dr. R. F. Scharff has kindly translated this for me, and it reads as follows :—

> " *Shell* very small, of a rounded egg-shape, very ventricose, finely striated, rather glossy, very thin, horn-coloured ; umbones pretty close to the centre of the shell, pointed and somewhat projecting ; *hinge* short, narrow and covered in (lit. ' built over ') ; *ligament* slender ; periphery : edge much curved, anterior edge roundly pointed, posterior edge rounded, lower edge much curved ; teeth in *left-hand valve* 2, short, outer one very slender, thin, sharp, low, half covered by inner one which is short, slightly curved, fairly high ; groove very short and narrow ; lateral teeth simple, rather pointed, the anterior more pointed and higher than the posterior ; tooth in the *right-hand valve* slender, a little curved, the posterior portion slightly thickened ; lateral teeth double, the outer ones very slender, short and very low, inner ones rather pointed but lower than the corresponding ones in the left-hand valve ; groove short and fairly narrow."

To this I may add that the umbones frequently, but not always, possess appendiculae which are ridge-like along the lower edge of the nepionic shell. Most of the specimens I have seen could be described as solid rather than thin, and they vary slightly in outline in each locality.

It is the smallest European species, average specimens measuring 1·75 × 1·5 × 1·2 mm. A large valve from the Shannon and some from Grays, Essex, are 2 × 1·75 mm.

The hinge characters are described in detail by Mr. Woodward in his Catalogue (p. 106). A description compiled by Mr. Stelfox and myself before we were certain that the shell was *P. parvulum* differs slightly from that of Mr. Woodward. We find that in the left valve the base of the lower cardinal tooth (c. 2) is not continuous

[1] Fauna Moll. Terr. et Fluv. Sveciæ, Norvegiæ et Daniæ," p. 553. Stockholm, 1873.

with that of the anterior lateral (a. II.) but runs at an angle across the top of it and tapers off to near the shell-margin. In the right valve the outer laterals (a. III. and p. III.) are much curved at both ends towards the interior of the shell and are separated from the shell-margin by a wide, deep groove.

This species has, in England, been confused with and mistaken for the young of *P. supinum*, but the two may be distinguished by the following points of difference :—

(*a*.) The ligament pit of even the youngest *P. supinum* seen possesses a strongly-marked ridge along its ventral edge. The pit of *P. parvulum* is only a faint hollow without a distinct ridge.

(*b*.) The cardinal tooth in the right valve of *P. supinum* is thicker and more curved than that of *P. parvulum*.

(*c*.) In *P. supinum* the outside lateral teeth of the right valve lie very close to and almost parallel to the shell-margin ; in old specimens of the very thickened form they are almost completely merged into the shell wall. In *P. parvulum* they are distinctly separated from the shell-margin and are much curved inwardly, especially at their lower extremities.

P. parvulum was first detected last January among shells obtained in sand brought in 1913 from a deposit in the Suir near Fiddown ; samples of material taken from the same locality at various times in subsequent years have yielded additional specimens. The very perfect pair shown on Plate II., figs. 7-10, were taken by scoop with living examples of other species in the Suir near Clonmel in April, 1916. It is abundant in the Barrow deposits above and below New Ross and near Graiguenamanagh.

In sand obtained this year from the Shannon near Plassy about two miles above Limerick it is fairly plentiful.

It also occurs as a fossil in the Pleistocene deposits of the Thames valley, as Mr. Stelfox discovered numerous specimens of a very thickened form mixed with young

P. supinum in a box of shells from Grays, Essex, sent him by Mr. A. S. Kennard, and I have found it in a mixed lot of fossil Pisidia from Crayford, Kent, lately received from Mr. J. E. Cooper.

On the Continent it lives in Denmark and Sweden. Danish specimens kindly sent by Mr. Woodward to Mr. Stelfox resemble closely the Irish shells, but appear to belong to a lacustrine rather than a river form.

The New Ross specimens are mostly of a reddish or chocolate colour and look as if washed out of a very old deposit. Some of those from the Suir are very much thickened and thus correspond with the heavy *P. casertanum* and *P. amnicum* with which they are associated. Many from the Shannon and Suir are very perfect, having all the appearance of drift-shells only recently killed; it is, therefore, very likely that the species will be found living in some of, if not all, the rivers mentioned.

For assistance and suggestions in the preparation of this paper, as well as for the accurate and artistic drawings which constitute the plate, my sincere thanks are due to Mr. A. W. Stelfox.

DESCRIPTION OF PLATE II.

Pisidium supinum A. Schmidt.

Fig. 1. Right valve from the Suir near Fiddown, about two-thirds full-grown.

Fig. 2. Left valve from the Suir near Fiddown, about two-thirds full-grown.

Fig. 3. Posterior view of No. 5 duplicated.

Fig. 4. Right valve from the Suir near Fiddown, about half full-grown.

Fig. 5. Left valve from the Suir near Fiddown, about one-fourth full-grown.

Fig. 6. Exterior view of No. 2.

Pisidium parvulum Clessin.

Figs. 7, 8, 9, 10. Exterior and interior views of pair of valves from the Suir near Clonmel.

Figs. 11, 12, 13, 14. Exterior and interior views of pair of valves from the Shannon near Limerick.

Ashburton, Cork.

ON THE IRISH NAMES OF REPTILES, AMPHIBIANS AND FISHES

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

In the March number of the *Irish Naturalist* for 1915[1] I published a list of the Beasts or Mammals of Ireland with their Gaelic or Irish names. This was followed in July[2] by a list of the Irish names of Birds. I now submit a short list of the Irish names of Reptiles, Amphibians and Fishes inhabiting Ireland or the seas surrounding the country. I have encountered great difficulties in compiling this list. Even in the English language the same fish is called by different names in several parts of the British and Irish coasts and one name is often applied to several distinct species. Except in the case of a few common species, it is doubtful whether the names of the fishes I give can be considered as final, and it must be left to future researches which names should be used. There are still a number of Irish fish-names which in the present state of our knowledge cannot be identified with any of the existing species living in Ireland. As regards the Frog the existence of several Irish names strengthens the belief which I expressed long ago[3] that it is indigenous to this country.

I shall be most grateful to Irish scholars for any criticism or any identifications of Irish names of Fishes. In my researches I received the greatest assistance in many ways from Mr. L. S. Gogan. He not only prepared a manuscript list of Fishes for me from Father Dinneen's Irish Dictionary, but he indicated to me the correct pronunciation of the first name given for every species. He also suggested a few Irish names which might be used for such common Fishes which possess no satisfactory Irish name. I am also indebted to Mr. E. W. L. Holt for some valuable hints and criticisms and a list of Irish names of Fishes. Mr. Charles Green and Mr. F. W. L. Keane likewise supplied me with some Irish names.

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[1] Vol. xxiv., pp. 45-53.
[2] *Ib.*, pp. 109-129.
[3] *Irish Naturalist*, vol. ii., 1893,

As in the case of the Irish names of Birds, I have placed the name first which appeared to have the best claim to be used on a descriptive label in a public museum. At Mr. Gogan's suggestion I have employed certain symbols to indicate the correct pronunciation of the first Irish name in my list. For instance an inverted e " ə " is equivalent to the sound of the English i in the word " sir." The sound of ch approximates that in the Scotch word " loch " or the German " kirche." The j is equal to the consonantal i or y (as in young) The ā is pronounced somewhat like the " a " in " father " or in " was," the ē as the " ee " in " meet," the ū as " oo " in " moon," and the ôw as in the English " how."

In my next and final article I propose to deal with the Irish Invertebrates, including those popularly known as " Shell-fish," as well as the Insects, Spiders and other groups of animals.

LIST OF NAMES.

(The numbers in brackets refer to the Bibliography, p. 119.)

REPTILES.

The only kind of Reptile native to Ireland is the Lizard. Snakes and Tortoises are often imported and may live for a few years in the country, but they are not indigenous. Turtles are known to have been stranded on the Irish coasts. They are only to be looked on as accidental visitors.

Although the scaly Lizard is so very distinct from the Newt, which belongs to an entirely different group of animals and spends part of its existence in the water, Gaelic-speaking races seem to find a peculiar difficulty in discriminating between these two animals and often apply the same name to both.

LIZARD (ărk).

eaṗc (7), ṽeṗc (12), aiṗc, aṗc (6).

The first word has also been translated by Trout, Wasp and Salmon. (Compare Newt.)

TURTLE (tur-tur.)

ṫuṗṫuiṗ (6).

AMPHIBIANS.

Frog (fljŭk-ān).

ꝼluiċán (used in Derry 7) cnaŏán (6) loꝼgán (6) loꝼcán (10) liꝼꝼín (used in Sligo 7), ꝼꝛog (used in Meath 7).

Tadpole (=young Frog) oglaꝼcán (7), ŏaiꝛbeog (6); ꝼolocaꝛn (7).

Some Irish words are translated by Salamander, but this animal does not inhabit Ireland.

Newt or Eft (ărk-lūkrə)

eaꝛcluaiġa (10), aiꝛc luaiġa (6), eaꝛcluaiġaċ (6), alꝑ luaiġa (7), ŏeaꝛcluaiġaċ (6).

There is a widespread but quite unwarranted belief in Ireland that the inoffensive "dark-looker" or "man-eater," as it is often called, enters people's mouth when asleep and thus finds its way into the sleepers' body with dire consequences.

Toad (būf).

buaꝼ (6), maġán (6), maigín (6), bioꝛbuaꝼan (6).

The last word has been translated in Scotch-Gaelic by Water-serpent or Conger-Eel.

Toads of the species called "Natterjack" are only found in Kerry, where they are locally known as "Black Frogs."

FISHES.

Angel-fish, Fiddle-fish or Monk-fish (brā-hor)

bꝛáċaiꝛ (9), (Recte bꝛáčaiꝛ, Gogan), manaċ (6).

The meaning of these words is friar or monk.

Angler, Manafloyd, Fishing Frog or Mulligadoon (ana-flōd).

? anaꝼlóiŏ (7), ? ŏealġín ŏeaṁain (2).

This first word is stated by Dinneen to be applied to a fish with a cloven breast which description agrees with the Angler. (Compare Weever). The term Manafloyd is used according to Holt in Munster.

Bass or Wolf-fish (dhing-ən)

ŏoiṁġean (7).

BLENNY, SHANNY, PARROT FISH or SHAW (snŏg).

? rnaʒ (7).

This may possibly be the correct name for the Blennies, of which there are several kinds. (Compare Goby).

BREAM or BRIME.

Lake Bream (brain)—bréan, bran, bréantaŏ (7).

Sea Bream or Gunner (djarəg-ān)—deargán (2), rugaċ (7), rmuiʒeall (7), mucruaŏ (9), bran (3).

The Sea Bream is often mistaken for one of the Wrasses (see Wrasse), and fishermen apply the term "Murran Roe" (corruption of moirín ruaŏ) and Gunner to both.

BRILL or BRITT (brit).

? broit (7).

Dinneen heard this name on Tory island and describes it as a small flat-fish. The fish he saw may have been a young Brill, as the latter is called Britt on the west coast, thus having the same sound as the Irish broit.

BULLHEAD or COBBLER (grai-sē ən fŭkān).

ʒriaraiŏe an pocáin (Green) ? ʒeabar (7) ? ʒrealraċ (6).

Dinneen tells us that the second word means a little fish with a big head found in pools by the sea, which is a fairly good description of the Cobbler.

Armed Bullhead (sjăr-ōg)—? rearróʒ (7). This may be the brown fish with claws on both sides of its mouth, as described by Dinneen. (See Gunnel).

BUTTERFISH (see Gunnel)

CARP (kăr-wān-ək ish-kə).

carbánaċ uirge (6).

This fish, which inhabits lakes and ponds, was probably introduced into Ireland many centuries ago by monks from the Continent. In Scotch-Gaelic the words "carbhanach" or "carmhanach uisge" are used (recté: corr-manaċ? Gogan).

CAT-FISH (see Wolf-fish, Weever or Torsk).

CHAR (ruə vrăk).

ruaraŏ-breac (7).

Dinneen translates this term by a "red trout such as is found in lakes," which evidently means the Char, which is dark brown above, and red underneath, and is confined to deep lakes. It is closely related to the Trout.

Coalfish, Black Pollack or Glasson (glăs-ān).

glasán (7), glasóg (9), mongać (9).

Dinneen identifies the first word by "Whiting," but Holt has shown that a corruption (glasson or glassogue) is still commonly used for the Coalfish on the west coast of Ireland. The last of the three Irish words has also been translated by Pollack and Whiting.

Young Coalfish. Holt has heard the following words: killig (West Coast) = cileać, pluvogue (Connemara) = plubóg, bullygoure (Antrim) = ballaćuaime? faoideán piocaig (7).

The word suggested by Dinneen probably refers to some kind of Dogfish.

Cobbler (see Bullhead).

Cod (trŭsk).

trosg (1 and 2), bodać muad (7), féiliteóg (6).

The second word is translated as "Rock-Cod" by Dinneen, but that is not a species distinct from the Cod.

Codling or Tamlin Cod—bodać (6), faoideán truirc (7), troircín (7).

Conger Eel (see Eel).

Conner (see Wrasse).

Corkwing (see Wrasse).

Craig Herring (see Mackerel).

Dab.

Common Dab (ljă-hōg ganĭv-ĕ)—leaćóg gaimme. This word has been suggested by Gogan, as leaćóg is evidently a general term for flatfish.

Lemon Dab or Slippery Dab (ljă-hōg kărĭg-ĕ)—leaćóg, ćarraige (Gogan). This term (meaning rock-flatfish), was suggested by Gogan.

Rough Dab or Smeareen (smair-ēn)—fméirín (Gogan) This term was suggested by Gogan as an equivalent of the popular word "smeareen."

Pole Dab or White Sole (ljă-hōg wān)—? leaćóg bán (7). Dinneen translated the last term merely by Sole, but it is evi-

dently the fish which is so frequently sold in Ireland under the false name of "White Sole."

DEVIL-FISH (see Weever).

DOG-FISH (ljăr-wădə).

leaṙ-ṁaḋaḋ (7), léaṙṁaḋaḋ (6), ṙleaṅgaċ (7), ṡobóṡ (7), ? palmaiṙc (7).

These are all apparently general terms applicable to the whole tribe of Dog-fishes. Three of the commoner species have been identified as follows:—

Piked Dog or Spur Dog (fēogh-ŭk)—ṙíaḋaċ (Gogan), ṙíoṡaḋ (1 and 7), ṙioṡaċ (3).

Spotted Dog or Rough Hound (mădă garv)—maḋaḋ (recte maḋa, Gogan) ṡaṙú (7), maḋṙa bṙeac (2), cailleaċ bṙeac (2), cailleaċ bṙeac (7), ṙleaṅgaċ (3).

Smooth Dog or Smooth Hound (mădă gŭrəm)—maḋṙa (recte maḋa, Gogan) ṡoṙm (2), maḋaḋ ṡlaṙ (7)? maḋṙa ṡlaṙ (2).

DORY.

(dunəkə nə sūl mōr).

Ḋoṅċaḋ na ṙúl móṙ (2), ḋeoṙaiḋe (7).

DRAGONET or SKULPIN (skŭləbēn), ṙcoilḃín (Gogan) ṙcailṗín? (Waterford)

EARL (see Pipe-fish).

EEL.

Common Eel (ăs-kū)—eaṙcú (2 and 6), aṙcú (7), eaṙcún (W. Cork, Gogan) eaṙcom (9), eaṙcon (7), eaṙṡa (6), eaṙṡán (6).

Conger Eel (kăr-ān krĕg-ĕ)—caṙán cṙeiṡe (7), caṙan cṙeiṡe (6), cṙeiṡeoṡ (7), eaṙcú ṙaiṙṙṡe (7), eaṙcon (3), cṙeaṡaṡ (6).

Young Eel—lóṡ (log).

FIDDLE-FISH (see Angel-fish).

FISHING FROG (see Angler).

FLOUNDER or FLUKE (ljā-hog fēr-ishkĕ).

leaṫóṡ ṙíoṙ uiṙce (7), leaṫóṡ (7), liaḋḃóṡ (7)? leaṫóṡ ḋeaṙṡ (7).

As the Flounder is the only flatfish which enters rivers and is able to live in freshwater, the first Irish word (meaning freshwater flatfish) can be correctly identified with this species. For Spotted Fluke see Plaice.

GLASSON (see Coalfish).

GOBY (brēdjog).

bruiġdeóg (Holt), blaċán (13), ? rnaġ (7)

(Compare Blenny).

GOLDSINNY (see Wrasse).

GUDGEON (găsh-tjūn).

ġairtiún (7) from English, ġairdum ġuda (6), ġuda (10) ġuirdum (6), baoċaire (10) (recté baoċaire—native word) bronnaġ (6), ? bronnad (7).

GUNNEL, NINE EYES, TWELVE EYES, or BUTTERFISH (ghā-hūl-djaig).

dá fúil déaġ (Gogan). ? reapróġ (7)

Mr. Keane first put me on the track of this name by giving me approximately the sound of a word meaning twelve eyes, which he had heard from fishermen at Ardmore.

GURNARD.

cruadán (7), ġoirnéad (7), ġuirnéad (6), ġoirn (7).

There are several kinds of Gurnards, but only the two principal forms need be considered.

Grey Gurnard or Knowd (knūd-ān)—cnúdán (2), cruidán (9), cruadán (3), cruadán ġlar (3).

Red Gurnard or Latchet (knūd-ān djărək)—cnúdán dearġ (2), cruadán dearġ (3).

HADDOCK (kăd-ōg).

cadóġ (2), cudóġ (7).

HAKE (kŏləm-ōr).

colmóir (2), colamóir (9), ġalaċ (7 Mayo).

The first two Irish words are derived from the Scandinavian "Kollemor," meaning "black-mouth."

HALIBUT (skăla-fŭrt).

? realaforc (7).

Dinneen defines the Irish word as meaning a large flat-fish, but this description might apply to a dozen different kinds of fish. It occurred to me that the English word Halibut might possibly be derived from the Gaelic realaforc (cf. calaḋforc, shore, pier, with prefixed r).

HERRING (skăd-ān).

readán (7), rġadán (2), capall cainneaċ (a very large herring).

Rock Herring or Shad (skăd-ān kărĕg-ĕ)—readán carraige (7), readán ġairḃ (7), ġorbar (6).

The last word might perhaps be more approximately applied to the Scad (see Mackerel).

HORNEEL (see Stickleback).

HOUNDFISH (see Dogfish).

KNOWD (see Gurnard).

SEA LAMPREY (bŭrək nə bwēhə).

buaiṙaċ na baoiṫe (6), naid (7), laimpṙe (7), baṫnaid (12), beiṫaid (6), langeṙlaċ (6).

The second word also means adder or snake. Two kinds of Lamprey inhabit Ireland, viz., the Sea Lamprey and the River Lamprey.

River Lamprey (paisht an dā-hūl-djaig)—péiṙc an ṫá ṡúil ṫéag (7).

LATCHET (see Gurnard).

LING (lŭng-ə).

longa (9), long (6), ṫeaṙgaleaṙ longa (2), laṁang (7).

The first Irish word seems to be derived from the Norse "längan."

LOACH (kal-jək-ruə)

cailleaċ ṙuaṫ (7) ? bṙeac beiṫ (6). (Compare Roach).

MACKERAL (rŭn-ək).

ṙonnaċ (9), ṙunnaċ (3), ṙionnaċ (6), ṙangá (7), macṙael (2), máṙcṙeil (6), muilṙuṙ (13).

Horse Mackerel, Scad or Craig Herring (bŭləm-ān)—bolamán (9), gabaṙ (2). The first word is used in Mayo, while the second seems to be current in Kerry.

MANAFLOYD (see Angler).

MINNOW (bŭd-ər-lēn).

boṫaiṙlin (7), ṙeilṫoiṁne (6), ṙceilṫoiṁne (6), gilidín (7), líbín (7), (recte luṫbín).

It has been suggested that the Minnow is not a native species, but has recently been introduced from England, although it is now widely spread in Ireland. The fourth word seems to be applied to any small freshwater fish such as Salmon or Trout fry, while the last also denotes fish-fry generally, as well as Sprat, &c.

MULLET.

Grey Mullet (blai-hək)—bléiċeaċ (7), bléiṫeaċ (7), lannaċ (9), lánaċ (7), milléad (7), muilléid (6).

Red Mullet (blai-hək dŭrok)—bléiċeaċ deaṁs or bléiṫeaċ deaṁs (7).

MULLIGADOON (see Angler).

NEEDLE-FISH (see Spearling).

NINE EYES (see Gurnard).

PARROT-FISH (see Shanny).

PERCH (pair-shĕ).

péirse (7), cleasaṁ uirge (10), úċaire deilgneaċ (7), proparc (6).

PIKE (găl-ēsk).

gaill-iarg (10), gaillíarg (6), gaill iarc (7), geadar (6), geadúr (7), luir (3).

PILCHARD (pĭl-shair).

pilpéar (7), pilpéir (6), péirsín (7), geilmín (7), pmugaire póm (2).

The last word is incorrectly identified. According to Colgan it means a "Jelly-fish," and is a very expressive term for this invertebrate which will be alluded to in a subsequent article.

PINKEEN (see Stickleback).

PIPE-FISH or EARL (cŭrə-vĭnĕ).

copaimne (3).

PLAICE or SPOTTED FLUKE (ljă-hōg vrak).

leaṫóg bpeac (1), leaṫóg (2), liṫéog (2), leaṫóg (7), leiṫ (9) plárín (7).

(Compare Flounder or Fluke).

POLLOCK (pŭl-ōg).

pollóg (7), pullóg (6), palóg (2), tullóg (6), cpoṫóg (7), tullog (7), máġaċ (7), maṁgaċ (7 Mayo), moṁgaċ (7), monaċ (3) mulpur (7).

The last term seems to be applied to a large Pollock, whereas deapġóg is said to mean a Red Pollock (Dinneen).

Black Pollock (see Coalfish).

POLLAN (pŭl-ān).

poll án.

This word was suggested by Gogan from the popular term "Pollan," of this peculiarly Irish fish.

RAY (lĭp-rŭhə).

liop ṁóċa (2), liopa ṁóda (7).

Gogan suggests that liop is a corruption of leaḋb. Dinneen gives ṁaiġe ṁín for Smooth Ray and ṁaiġe ġarḃ for Rough Ray. I cannot identify either of these.

Maiden Ray or Spotted Ray (skētĕ)—? ṙéīte (7). I am doubtful about the correctness of this identification. Perhaps it is the word for Skate.

Numb Ray or Torpedo (cramp-ēsk)—cṙaimpiarg (6), cṙaimpiarc (7), oṁc-iarc (6). The last word has also been translated by pig, whale, &c.

Sand Ray or Shagreen Rad (ljāib ganĭvə)—leaḋb ġainne (suggested by Gogan).

Thornback or Maiden Ray (rŭhə)—ṁúċa (7), leaḋb ḋeilgneaċ (suggested by Gogan).

ROACH = RUDD (tal-ōg).

talóg (7), bṙeac beḋi (6), ṁóirteaċ (6), ṁóirte (6), bṙeac (12), bṙeac maṙa (6).

I think the two last words are quite incorrectly applied to this fish, while the second also is probably wrong since the Scotch "breac beachdaigh" means a loach. Finally the English word "Roach" is wrongly applied to the Irish fish. It should be Rudd. The true Roach does not occur in Ireland.

ROCKLING (dŭnōg).

ḋonnóg (7), ḋonnánaċ (3).

There are several kinds of Rockling, a couple of them being very common in rock-pools near the shore. Holt gives "ronst devrone" that he had heard, while Keane mentions "shlaunoge," which may possibly be a corruption of ḋonnóg.

RUDD (see Roach).

SAIL-FISH (See Shark).

SALMON (brad-ān).

bradán (10), bratán (12), mogha (6), maighe (7), mear (6), eithe (7), éigne (7), toineamh (7), eo (6), aillíubar (6), colgán (6).

Salmon fry—gilroin (7).

Salmon peal—ramhnacán (7), colgán (7), ramhán (13).

Salmon grilse—maighe léan (7) liathóg.

Salmon trout—breac-geal (6), liacóg (7), máisheleun (6).

Salmon (male spring)—gruanach (7).

Salmon (after spawning)—gabhlune (7).

(Compare Trout).

SANDEEL or SNEDDEN (gjăr-ān găn-ĭvĕ).

geamhán gainmhe (7), sgadán gainmhe (2), corr (7), cor (9), corr gobach (7), gobóg (7), snádadán (7).

The Northern word "Snedden" is probably a corruption of the last word. (Compare also Sandsmelt).

SANDSMELT (skăd-ān găn-ĭvĕ)

? scadán gainmhe (2).

This fish has evidently been confounded with the Sandeel by many people, and the two are often found together. The Irish word meaning "Sandherring" is much more appropriate for the Sandsmelt, which is somewhat herring-like in appearance.

SCAD (see Mackerel).

SEA-HORSE.

I do not believe that there is a real Irish word for this very rare fish. The terms capall mhe (Aran) and capall fairrge (Kerry), which Dinneen translated by Sea-horse, may originally have been applied to the Pipe-fish or even to a Whale or Seal.

SHAD (see Herring).

SHARK (pēsk-ān shōl).

? pearcán reoil (2), maoil? (Holt).

Basking Shark, Sunfish or Sailfish (lēb-ān grain-jĕ)—liabán gréine (3), liomán gréine (7), leadhbh (2), cairbean (6).

SKATE (rŭk).

ruc (9), roc (7), román (7 Kerry), sgat (6).

(Compare Ray).

SKULPIN (see Dragonet).

SMEAREEN (see Dab).

SMELT (see Sandsmelt).

SOLE.

Black Sole (ljaib-ōg)—leábóg (7) = leadóbóg (Gogan), póll (2), teanga ċait (9), leabóg-ċeapp (6).

Lemon Sole (see Dab).

White Sole (see Dab).

SPEARLING, HORNEEL, NEEDLE-FISH or SWORDFISH (lan-ēsk).

lann-larc (7), bhard larc (7), snáčad mara (7), seabhaltóg léaran lice (2), sgiaplint (2), cos gobaċ (9), gaiċleang (7), gobaċ (7 Tory), ponnaċ Spáinneaċ (Holt).

The word coigán is given by Dinneen for several kinds of fishes such as Salmon peal, Swordfish and Stickleback. It is very doubtful whether some of the other names are really applicable to this fish or the Sea-Stickleback. The term Swordfish has been used for two entirely different fishes, the true Swordfish being extremely rare in Ireland and not likely to be known to fishermen.

SPOUTFISH.

This term refers to a shellfish or mollusk, which will be dealt with in another article.

SPRAT (sprĭt).

sgrint (2), líbín (recte leróbín, Gogan) (7), ralán (7).

STICKLEBACK, PINKEEN or THORNBACK.

River Stickleback (pĭnk-ēn)—pincín probably English (Gogan), coigán (7).

Sea-Stickleback or Horneel (bĭg lodĭn)—bhag-lodam (6). ? gobaċ, ? cos gobaċ. O'Reilly translates the first word by "bandstickle," which is an old English word for Stickleback.

STURGEON (stĭr-ain).

sdéan (7), sdean (6), sdrun (6), bradán féorna (2).
The last word is in use in the Blasket islands.

SUNFISH (see Shark).

THORNBACK (see Ray or Stickleback).

TORPEDO (see Ray).

TORSK, CAT-LING OR CATFISH.
? mulluŭr (13).

According to Marstrander this word is applied to the Scandinavian "Lubb," which is our Torsk, although the word seems to be derived from the French "merluche," which means Hake or possibly maol-mor (Gogan).

TROUT (brăk).
breac (10), breec (12), coblacán (7), ala (7), dúileacán (6).

Brown Trout—breac donn (7), breac deargˇ (1), breac geal (13).
White Trout—breac bán (7), gealóg (7).
Gillaroo Trout—giolla-muadh (Gogan).
Black Trout—dub-breac (6).
Lake Trout—donnacán (1), púileacán (1), bodach.
Trout Fry—gilroin (7).
Little Trout (bricín (6).

TUNNY (tinjēn).
tuinnín (7).

TURBOT OR TAIRBERT (ljă-hōg Mwĭr-ĕ)
leathóg muice (7), teorbait (2), tuirbait (7).

TWELVE EYES (see Gunnel).

WEEVER, CAT-FISH OR DEVIL-FISH (djĕlg-ēn djăwn).
? deilgin deamhan (7), ? dealgán deamhan (7), ? filibín (7).

The last word, according to Dinneen, means a small poisonous fish found among sandeels, which agrees in some respects with the Weever. (Compare Angler).

WHITING (ſwēt-ēn).
faoitín (7), dúillacán (7), glasán (7) (7), glasóg (7), mongach (1), feannóg (6).

(Compare Coalfish and Pollock).

WITCH, WHIFF, WHITE SOLE or LEMON SOLE (ljă-hōg jăl).
leabóg ġeal, suggested by Gogan (compare Dab and Sole).

WOLF-FISH, CAT-FISH or PERCH (See Bass).

WRASSE or CONNER (mōr-ēn rūə).
moiṙín ṙuaḋ, moiṙín (7), balaċ (2), ballaċ (3).

There are half a dozen kinds of Wrasse which are known by the following names: Ballan Wrasse, Conner, Rock Bream, Gregagh, Bavin, Morrion Roe, Bolagh, Bulloch, Cook Wrasse, Livery fish, Striped Wrasse, Goldsinny.

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National Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include three Patas Monkeys, a Pig-tailed Monkey, two Bonnet Monkeys, eight Rhesus, a Macacque and, a White-fronted Capuchin from the Lister Institute, a Titi Monkey from Capt. Henderson (who has also sent on deposit a Woolly Monkey), a Bornean Zebu Bull with two Cows from the Zoological Society of London, two Tree Porcupines from Mr. T. K. Laidlaw, a Hooded Crow from Mr. W. W. Despard, a Grey-breasted Conure from Dr. Taaffe, a Ring-necked Parrakeet from Mr. A. M. Drennan, two Kestrels from Mr. Howard Guinness, a Sparrow-hawk from Mr. W. Crawford, a pair of Californian Ducks from Rev. Canon Dudley and a Cobra from Mr. Edward B. Creasy, jun.

DUBLIN NATURALISTS' FIELD CLUB.

May 19.—Excursion to Raheny.—A party of twenty left Nelson's Pillar at 2 p.m. by tram for Watermill Bridge. Here a short time was spent in examining and collecting the salt-marsh flora, after which the journey to Raheny was resumed. In the disused quarry just west of Raheny the conductor, J. de W. Hinch, gave an account of the origin of the Lower Carboniferous limestone and its capping of Glacial drift. The pools and marshy ground in the quarry having been worked over the party proceeded to Raheny rectory, where the Rev. Canon Hayes showed the members a number of interesting exotic shrubs. After tea the party returned to Dollymount through St. Anne's. Miss Gibson and Miss Ellen Denning were elected members of the Club.

NOTE.

ZOOLOGY.

Roseate Tern on Migration at Tuskar Rock.

At 6.30 a.m. on May 7th last, Mr. Glanville picked up a dead Roseate Tern on Tuskar Rock, which he kindly forwarded to me. On dissection I found the bird to be an adult female. She was in splendid nuptial dress, displaying the beautiful rosy "blush" on the breast, from which character this tern is named. I am not aware whether the Roseate Tern has been found at an island-rock light station prior to this record, though an adult male was killed striking Hook Tower, Co. Wexford, on April 30th, 1897 (Barrington). My bird may have been hurt at the lantern; but I doubt it, as there was no mark of injury whatsoever, and the body was thin, rather indicating exhaustion from a diseased state before arriving on the rock, where she died. As a matter of fact the digestive tract was very congested, while the gizzard and stomach were quite empty.

C. J. Patten.

The University, Sheffield.

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This Magazine—founded in 1871—is devoted to the publication of Original Matter relating to the Natural History of Scotland, and includes Papers contributing to the elucidation of the Fauna, Observations on Life Histories, etc., and Notes recording the occurrence of uncommon species and other useful and interesting facts.

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NOTES ON MYRIAPODA, III[1].

TWO IRISH CHILOPODS:

Lithobius Dubosqui Brölemann and Lithobius lapidicola Meinert.

BY HILDA K. BRADE, M.SC., AND THE REV. S. GRAHAM BIRKS, M.SC.

We have not hesitated, in the present paper, to use every available source of information for the compilation of our notes upon the two species with which it deals. The small circle of workers in the British Isles especially interested in the Chilopoda will understand readily that in our aim to present a clear account of these two animals it has been necessary to draw upon the results of the labours of eminent zoologists whose work has already been published elsewhere, principally in other languages, but even, in some instances, in English too.

Where we are indebted in these notes to other workers for literal quotations our translations and extracts are printed in small type.

Among the material left in our hands by Dr. A. Randell Jackson when he took up military service were several tubes containing Lithobiids from Ireland, collected by the Misses Foster and Mr. Nevin H. Foster of Hillsborough, Co. Down. This material, together with two other tubes containing specimens of Lithobius belonging to the National Museum of Ireland, was sent to Dr. Henry W. Brölemann of Pau, who examined and identified it with his customary kindness.

The tubes examined were as follows:—

155 (181 National Museum), Glengariff. Probably collected by Dr. Scharff in May, 1891. This is presumably the specimen examined by Mr. R. I. Pocock,[2] although there was nothing on the label to indicate that it was he who named the specimen as *Lithobius microps* Meinert.

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(1) The authors' former Notes of this series appeared in the *Lancashire and Cheshire Naturalist*, 1916.

(2) Vide *Irish Naturalist*, vol. ii., pp. 309-312.

156 (230 National Museum), labelled "*Lithobius microps*?" collected by J. N. Halbert in 1905 south of the Devil's Punchbowl, Kerry.
157 Rockingham, Co. Roscommon. Miss A. B Foster, coll. 15, 9, 15.
158 Whitepark Bay, Co. Antrim. N. H. Foster, coll. 12, 7, 15.
159 Boyle, Co. Roscommon. Miss M. L. Foster, coll. 15, 9, 15.

Dr. Brölemann reported that Nos. 155 (Dublin 181), 158, and 159 are undoubtedly *Lithobius Duboscqui*, and that 157 is probably the same. Dr. Brölemann was certain 156 (Dublin 230) was not this species, but was unable to identify it, as it is an immature specimen and fresh from moulting. The specimen in 155 was a male, those in 157 females, the one in 158 was a male.

In 1894 Dr. Brölemann published a paper on the Myriapods of the Forest of Andaine (Orne)[1] in which he gave a list of material collected; this included the name "*Lithobius microps* Meinert" and three specimens were recorded. In the following year Dr. Brölemann published another paper on the Myriapods of the marshes of La Ferté-Milon (Aisne)[2]; in this four examples of the same species were recorded. In 1896 Dr. Brölemann published another study,[3] which included an account of researches into the validity of certain characters upon which Dr. Meinert had founded his species. Citing his previous papers, to which we have just referred, Dr. Brölemann pointed out the paucity of the material which they recorded, and explained that having collected Lithobiid material in abundance, in both summer and autumn, at Sannois and Asnières-sur-Oise (Seine-et-Oise), which agreed with that obtained in the Forest of Andaine, and having received, from M. Duboscq of Grenoble, the same species from Coutances (Manche) where is was common in summer, he was enabled to make a detailed study of the species recorded in 1894 as *L. microps* Meinert. Dr. Brölemann found that certain constant characters in his material fitted in badly with Dr. Meinert's description, and he also pointed out that there were good reasons for believing that the original description of *L. microps* was based on differing forms distinct from one

(1) *Feuille des Jeunes Naturalistes*, No. 290, Dec., 1894.
(2) *Feuille des Jeunes Naturalistes*, No. 298, Aug., 1895.
(3) *Ibid*, No. 306, Apr., 1896.

another; the number of antennal segments varies in *L. microps*, according to Meinert, from 29 to 40; in small species with short antennae such variability is unusual. In the armature of the inferior surface of the anal limbs the formula varies, according to the original description, from 0, 1, 0, 0, 0 to 0, 1, 3, 2, 0, whereas in small forms with incrassate anal appendages the armature is generally poor. The material collected by Dr. Brölemann exhibited the incrassate nature and low armature of the anal limbs, and so he concluded that the formula 0, 1, 3, 2, 0 applied to another species and established his *Lithobius Duboscqui* on the strength of his own material. At the same time he pointed out the resemblance between the young of *Lithobius crassipes* L. Koch and his own new species. He distinguished the former from *L. Duboscqui* by the antennal segments, which are generally smaller in number in *L. crassipes*; by the single claw at the end of the anal limbs in that species; and by its armature of these same limbs (0, 1, 3, 2, 0, below). Dr. Brölemann points out that these differences are not always very clear and that he was mistaken himself in his record of Meinert's species in his list of La Ferté-Milon material, where the three specimens recorded were really referable to *L. crassipes*. The Forest of Andaine specimens were *L. Duboscqui*.

When the Dublin Museum specimen (181) was named *L. microps* a parallel case was established because this animal turned out to be *L. Duboscqui*.

In England Dr. Brölemann's species has been recorded from several localities. In 1913 Mr. R. S. Bagnall recorded it [1] from the Durham banks of the Derwent near Blanchland, and also from the neighbourhoods of Oxford and Manchester. Dr. A. Randell Jackson recorded it in his Chester list [2] and said that Mr. Pack-Beresford also sent it to him from Bagenalstown, County Carlow.

It would not appear that the true *L. microps* has occurred in Britain although specimens with larger numbers of antennal segments than those given in Dr. Brölemann's original description may be expected. Dr. Brölemann

(1) *Zoologist*, Aug., 1913.

(2) *Lancs. Naturalist*, March, 1914.

informs us, *in litt.* that he has often seen specimens with 28 antennal segments on both sides. As far as he has been able to make out Meinert's *L. microps* is a southern species, and he did not recollect having secured a true *L. microps* except on the French Riviera (Cannes) where it is seldom found. Meinert's specimens probably originated from Spain and Algeria. Dr. Brölemann adds that *L. Duboscqui* and its near relative *L. crassipes* are common all over France.

Mr. R. S. Bagnall gave a rough translation of the greater part of Dr. Brölemann's description when he recorded *L. Duboscqui* as new to Britain,[1] but we think it will be of some interest and value to Irish naturalists to have the full description.

LITHOBIUS DUBOSCQUI Brölemann.

(1896. *Feuille des Jeunes Naturalistes*, No. 306).

Body very convex, smooth, shiny, almost parallel-sided or more or less narrowed in front and constricted behind the head, widest about the 8th segment.

Of a tawny colour, with the head inclining to reddish-brown and the limbs light-coloured, especially the two posterior pairs which are yellow-ochre or straw-yellow.

Length of body from om0055 to om007. Width from om0006 to om0008.

Cephalic shield subcordiform, with rounded posterior angles, and with a marginated posterior border. Antennae very short, composed of 23 to 28 segments wider than long, the distal segment about the length of the two preceding ones taken together. The number of segments is fairly constantly 25 on an average (24 to 26), the only exceptions, noticed on 5 individuals, were: 16/18, 19/26, 23/?—28/28, 28/? Ocelli regular, three in number, disposed in a horizontal row, the posterior ocellus being the smallest and the next one the largest.

Coxae of the maxillipedes as long as broad with median sulcus very distinct, the anterior borders forming a very re-entrant angle, armed with 2+2 small teeth which are however well formed and sharp.

All the shields are laterally marginated, all the posterior corners are rectangular or rounded off.

The two last pairs of limbs are short, very incrassate without grooves or apophyses in the male. Coxae entirely unarmed.

Armature of the 14th pair: $\frac{0,0,1,0,0.}{0,1,2\text{-}1,1\text{-}0,0.}$, double claw.

" " 15th pair: $\frac{0,0,1,0,0.}{0,1,1,1,0.}$, double claw.

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(1) *Op. cit.*

The only exception which it has fallen to my lot to examine consisted in two spines on the inferior surface of the 3rd joint.

Coxal pores small, circular ; I generally found the following dispositions : 1, 2, 2, 2, or 2, 2, 3, 2 ; exceptionally, on one individual : 2, 3, 3, 3 and on another 1, 2, 2 3, 2.

The external genital organs of the female are armed with 2+2 spines, fairly robust and long, especially the external pair, which is at times a little curved outwards.

Claw broad, divided into three parts, of which the two internal ones are much more developed than the third, which is often reduced to a sharp spine.[1]

It has happened most unfortunately that of the three specimens from Ireland reported by Dr. Brölemann to be certainly *Lithobius Duboscqui* only one has been available for the present study. Tubes 155 (Dublin 181) and 158 were smashed in the post ; leaving only 159, one specimen, a male, for the purposes of the present paper. On it—an apparently abnormal specimen (at any rate as far as the ocelli were concerned) and at the same time a very much damaged individual—the following notes are made :—

Body convex dorsally, spindle-shaped and constricted behind the head, widest about the 7th and 8th segments, shiny, the surface very finely granulated.

Length of body, 6.9mm.

Width of the 8th segment, 0.89mm.

Cephalic shield subcordiform, marginated behind.

2+2 teeth on the coxae of the maxillipedes. The coxae are not separated between the teeth by a very deep cleft. There is a marked median sulcus between the lateral borders of the coxae. All the dorsal shields are more or less marginated, and all are rounded or rectangularly bordered posteriorly. (Antennae and 1st pair of limbs broken away).

The 14th and 15th pairs of limbs are incrassate ;

Armatures : 14th, $\frac{0,0,1,0,0.}{0,1,1,1,0.}$ 15th, $\frac{0,0,1,0,0}{0,1,1,1,0.}$ double claw.

The ocelli did not agree in this specimen with Dr. Brölemann's original description, but were arranged thus :—

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(1) Original in French.

Right: five ocelli in two rows in the following disposition :—

D.

A. oo o**O**o P.

V.

Left : four ocelli in a single row with a large circular space anteriorly ventral to the row. Disposed :

D.

A. oo**O**o P.
X.

V.

EXPLANATION OF THE LETTERING.

A., anterior; P., posterior; D., dorsal; V., ventral; **O**,o., ocelli; X., position of the large circular space.

It should be noted that the posterior ocellus is small and that the one next to it is large in both cases.

We hope that further Irish examples of this interesting animal will soon be available for examination, and we urge upon collectors the advisability of looking out for it.

During a recent visit to Dublin (Jan., 1916), one of the writers of this paper (H.K.B.) was enabled, owing to the kindness of Dr. Scharff, to collect on Sugarloaf, Co. Wicklow, and in the surrounding neighbourhood. Amongst the material collected were several Lithobiids which we

were not able to identify. Dr. Brölemann kindly examined this material also, and identified it as *Lithobius lapidicola* Meinert.

The specimens of *L. lapidicola* were collected near the summit of Sugarloaf and were all found under stones from which they quickly ran when disturbed. Other Myriapods collected at the same time were: *Lithobius variegatus, L. forficatus, Geophilus carpophagus, G. proximus, G. truncorum,* and *Scutigerella immaculata* (the last kindly identified for us by Mr. R. S. Bagnall).

They were taken in well drained dry localities with sparse vegetation.

During the same visit to Ireland the following species were taken in the grounds and Master's garden at Rotunda Hospital, Dublin:—*Lithobius forficatus, Stigmatogaster subterraneus,* and *Trichoblaniulus guttulatus* (syn. *Blaniulus guttulatus* of some writers).

As *Lithobius lapidicola* seems to be new to the Irish fauna we give here a translation of Dr. Latzel's notes[1] on the species.

LITHOBIUS LAPIDICOLA Meinert.

1872, (*Naturh. Tidsskr.* viii., p. 328.)

Fairly small, rather smooth, brownish or yellowish brown, with the anterior portion of the head, the antennae, and the margins of the dorsal plates, and occasionally also the middle of the back, darker. Antennae certainly shorter than half the body, 29-40 jointed. Ocelli on each side 9-12, disposed in 2-3 rows. Coxal elements of the maxillipedes armed with four teeth. Dorsal plates with posterior edges straight or almost straight. Coxal pores round: 2, 3, 3, 2, -3, 4, 4, 4. Anal legs with double claw, lower armature 0, 1, (3) 4, 1, 0,- 0, 1, 4, 3, 0. The lateral margin of the 1st article unarmed. Claws of the female genitalia tripartite; two pairs of spurs. Length 8-13.5mm., width 1.2-1.8mm.[2]

Body more or less spindle shaped, sometimes nearly parallel-sided, sparingly haired, 8-13.5mm. long, 1.2-1·8mm. broad, chestnut coloured to brownish yellow; cephalic shield generaly darker and the middle and edges of the dorsal plates often the same. Ventral plates and legs brownish yellow to pale yellow. Antennae brown.

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(1) "Die Myriopoden der österreichisch-ungarischen Monarchie," i, pp. 106, ff.

(2) Original in Latin.

Head fairly small, quite smooth. Antennae short to very short, composed of from 29-36 (according to Meinert up to 40) very short segments. Ocelli 9-12, large in proportion, in straight rows generally appearing to be arranged in the following manner : 1+5, 4, 2 ;—1+4, 5, 2 ;—1+4, 4, 3 ; —1+4, 3, 2 ;—1+3, 3, 2 ;—1+4, 3, 1.

Coxae of the maxillipedes armed near the deep median cleft with 2+2 small and pointed teeth. Dorsal plates from almost smooth to slightly wrinkled or granulated and uneven, the 9th, 11th and 13th bounded behind almost rectangularly ; the 11th and 13th however sometimes produced into little angular projections, which really only arise because the posterior border is somewhat excavated on both sides. Sculpture of the ventral plates indistinct.

Armature of the first pair of legs : $\frac{0,0,1,1,1}{0,0,1,2,1}$; $\frac{0,0,0,1,1}{0,0,0,0,1}$; less usually $\frac{0,0,2,0,1}{0,0,0,1\text{-}2,1}$. The last two pairs of legs are short and moderately incrassate. Armature of the 14th pair : $\frac{1,0,3,1,1}{0,1,3,3,1}$; less usually $\frac{0,0,3,1,1}{0,1,3,3,2}$; of the anal legs : $\frac{1,0,3,1,0,}{0,1,4,1,0}$; less usually $\frac{0,0,3,1,0}{0,1,4,2\text{-}3,0}$ $\left(\text{or } \frac{1,0,3,1,0,}{0,1,3,1,0.}\right)$

Coxa of the last always unarmed at the side. Claw always double. Male without special characteristics.

Coxal pores small, circular, in a single row :

3, 4, 4, 4 ; 3, 4, 4, 3 ; 3, 3, 4, 3 ; 3, 3, 3, 3 ; 3, 3, 3, 2. Female genital appendages armed with 2+2 spurs (abnormal example with 2+3) of which the outer pair is somewhat more strongly developed than the inner. Claw distinct and deeply tripartite.

Juvenis :—

Body 6.5-8mm. long ; 1mm. broad. Antennae composed of from 25-33 very crowded segments. Ocelli 7-9, thus :—1+3, 3, 2 ;—1+4, 3 ;— 1+3, 3, 1 ;—1+3, 3 ;—1+3, 2. Armature of the 14th pair of legs as in adult forms ; of the anal legs : $\frac{0,0,3,0,0}{0,1,4,1,0}$; but also $\frac{1,0,3,0\text{-}1,0.}{0,1,3,1,0.}$

Coxal pores very small, thus : 2, 3, 3, 2.

Female genital-appendages furnished with 2+2 or 1+1 spurs, in the former case the inner pair very small and slender. Claw more or less distinctly three-pointed.

Immaturus :—

Body 4-5mm. long ; 0.7mm. broad. Antennae 24-jointed. Ocelli 1+2,2.

Armature of the 14th pair of legs : $\frac{0,0,2,1,0}{0,1,3,1,1}$; of the anal limbs : $\frac{0,0,2,0,0}{0,1,3,1,0.}$

Coxal pores : 1, 2, 2, 1.

Pullus unknown.

The number of individuals examined amounted to:—of the adult form: 40; fairly mature: 10; immature: 1.

Most are from Bohemia, Moravia and Silesia; I have also taken the animal in the Austrian highlands, especially in the southern Tyrol, where it was also found by Meinert.

Observation 1.—On the under side of the 3rd joint of the anal leg: The fourth spine which Meinert does not mention, is inserted in the same transverse row as the three normal spines, but more on the innerside. Indeed it could even be counted with the spines of the dorsal surface, but I think that the formula given is the more correct. This latter is very seldom too low for adult animals, indeed it may even become 2 above the stated number, by the addition of inwardly directed spines on the above-named joint.

Observation 2. I sent some of the individuals upon which this description is based to Dr. Meinert, who referred the same to his *Lithobius lapidicola*, although I had thought to put them down to his *Lithobius borealis*. At all events the latter is nearly related to *L. lapidicola*.[1]

There were seven specimens of *Lithobius lapidicola* in the material collected on Sugarloaf, and a consideration of these enables us to offer some notes which may be of service to other workers. Our specimens agree in the main with the details given in Latzel's study, but even in the small number of examples at our disposal many individual peculiarities occur. These will be noticed in the following account:—

Body fairly flat, with the whole of the surface and that of the appendages finely granulated, spindle-shaped, widest about the 10th segment. Spirit specimens show great variation of colour in different parts of the body from dark brown to pale yellow; the anterior portion of the cephalic shield, the mid-dorsal line, and the edges of the dorsal plates tend to be darkest, while there is often a light patch in the case of the dorsal plates on either side of the mid-dorsal line.

The ventral plates are light yellow, the posterior appendages are darkest, the anterior ones are pale yellow.

The general proportions of the Irish specimens seem to be in agreement with those Latzel notes. The dimensions which follow are those of a male: length, 11mm.; width of the 8th dorsal plate, 1.3mm.; length of antennae: left (32 segments): 4.5mm.; right (29 segments): 4.4mm.

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(1) Original in German.

The dorsal plates 1-8, inclusive, are rounded at the posterior corners, but the posterior border of the 9th is more or less excavated towards the lateral extremities, tending to give the corners the effect of angular projections.

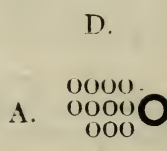
These projections are much more developed in the case of the 11th dorsal plate, and are even more marked still in the case of the 13th; the other posterior dorsal plates are all more or less rectangular or rounded posteriorly. In some cases the 7th dorsal plate may exhibit a tendency towards the same lateral excavation of the posterior border as that here noted in the case of the 9th, 11th, and 13th. All the dorsal plates are more or less completely marginated.

Antennal segments varied in number from 28 to 34; the distal segment is generally about $1\frac{1}{2}$ times the length of the penultimate one, but in one case it was noted that the last segment was of greater length than the two previous ones taken together in the following proportion :—

The 32nd segment : 30th + 31st :: 19 : 15

The antennae are markedly more hairy distally than proximally. The colour of the segments varies from yellow to dark brown, the last joint being the lightest.

Ocelli 9-12 appearing to be arranged as follows :— 1+4, 4, 3 ;—1+4, 4, 2 ;—1+4, 3, 3 or 1+4, 3, 2 ;—1+4, 4, 1 ;—1+3, 3, 3 ;—1+3, 4, 1 or 1+3, 3, 2. The single ocellus is the posterior one and is elliptical in shape. The first disposition given above may be graphically expressed by the following diagram :—



EXPLANATION OF LETTERING.

o,o : small ocelli ;—O : posterior ocellus ;—A. : anterior direction ;—P. : posterior direction ;—D. : dorsal surface ;—V. : ventral surface.

The coxae of the maxillipedes form a sharp re-entrant angle, and they are armed near it with 2 + 2 small pointed dark-coloured teeth. There is a marked median sulcus between the lateral borders of the coxae.

The armature of the first pair of limbs varies very considerably, appearing, in the specimens examined, to be as follows :—

$$\frac{0,0,0,1,1.}{0,0,0,\ 0 \text{ or } 1,1.}\ ;\ \frac{0,0,1,1,1.}{0,0,0,0,1.}\ ;\ \frac{0,0,1,1,1.}{0,0,1,1,1.}\ ;\ \frac{0,0,2,1,1.}{0,0,0,1,1.}\ ;\ \frac{0,0,2,1,1.}{0,0,0,2.1.}\ ;$$

The tarsi of the first, 14th, and the 15th pairs of limbs are armed with double claws.

The limb-armatures of the last two pairs appear to be as follows :—

Of the 14th pair :

$\frac{1,0,3,1,0.}{0,1,3,3,1.}$ and in one individual : $\frac{1,0,3,1,1.}{0,1,3,3,1.}$ in this last case the single dorsal spine of the 5th joint was very markedly internal in position.

Of the 15th pair :

$\frac{1,0,3,0,0.}{0,1,3+1,1,0.}$ in one case $\frac{0,0,3,0,0}{0,1,3+1,1,0.}$ and in one other $\frac{1,0,2 \text{ or } 3,0,0.}{0,1,3+1,3,0.}$ In the case of the ventral armature of the 15th pair we have divided the spines of the third joint by the plus sign to emphasise the presence of the typical, apical, inwardly-directed, lateral spine in that position. In the dorsal armature of the same limb the innermost spine of the 3rd segment projects inwardly and, although it is definitely dorsal, it is to be noticed that it may be seen in profile from below, together with the typical apical spine of the same joint, which is reckoned with the ventral armature. The single dorsal spines of the fourth segment of the penultimate limbs are also on the inner side and project inwardly too.

The coxal pores, round, in a single row, appear to be disposed (on the last four pairs of limbs) :—12th : 2 ; 13th : 3 ; 14th : 3 ; 15th : 2 (*i.e.*, 2, 3, 3, 2) ;—2, 3, 3, 3 ;—3, 3, 3, 3 ;—3, 3, 4, 3 ;—2 ?, 4, 4, 3 ;—3, 4, 4, 3 ;—3, 4, 5, 4.

Female genitalia armed with 2+2 spurs, the inner pair being rather less developed than the outer.

The claw is distinctly tripartite.

[LATE NOTE.—Mr. Nevin H. Foster has sent us a female of *L. lapidicola* taken by him in Murray's Wood, Coalisland, Co. Tyrone, 3-6-1916.]

It is our pleasant duty to express our indebetdness to M. le docteur Brölemann for his help, and we would also acknowledge here the kindness of Mr. Nevin H. Foster who has rendered us all the help within his power to further our study of Irish material. To them and to all our Irish correspondents and other helpers we tender our best thanks.

APPENDIX I.

Lithobius microps Meinert, and *Lithobius borealis* Meinert.

It may be an advantage to some workers to have descriptions of *Lithobius microps* and *L. borealis* at hand. Dr. Brölemann very kindly sent us a copy of the original of the former and we are indebted to Mrs. Barritt and Mrs. Thompson, of Darwen, for substantial help with the rough translation of the Danish part of it. The latter is taken from Dr. Latzel's study.[1]

Lithobius microps Meinert.

(1868. *Naturh. Tidsskr*, v. p. 265).

Yellow, anteriorly and posteriorly slightly darker, ventral plates lighter, with earth-coloured legs; fairly slender, smooth and hairless, with subcordiform head slightly broader than long. Antennae very short composed of 29-40 segments.

Ocelli 1-3 arranged in a transverse row.

Coxae of the maxillipedes armed with 4 teeth.

Coxal pores, 2, 2, 2, 2, -2, 3, 3, 2 circular.

Armature of the first pair of legs 0,0,0,-0,1,1, of the anal pair 1, 0, 0, 0 1, 3, 2, 0.

Last pair of legs short, fairly incrassate.

The genital claw of the female clearly tripartite.

Length 5.5-8.5mm.[2]

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(1) *Op. cit.*, pp. 90, ff.

(2) Original in Latin.

Lithobius microps Meinert, *Naturh. Tidsskr.* v. p. 265.

Apart from other collections in Copenhagen (Rosenberg Collection, Dr. Bergsoe, and the Botanical Collection) the Museum also contains this form from several places in Spain : Menjibar, Seville, and Granada.

The colour is a fine yellow, but anteriorly and posteriorly the dorsal plates are darker in many cases. The ventral plates are lighter and the legs pale yellow.

Sculpture and hairiness wanting.

The segments of the antennae are for the most part very short, but these short segments are irregularly distributed among the others. The last segment is usually very long and equal in length to the three previous ones.

Ocelli are always very small and lie so closely together in one straight line that it is impossible to separate them ; the hindermost ocellus is often smaller than the others, the exact opposite of the usual arrangement in Lithobiids.

The two terminal claws of the anal-limbs are often completely wanting.

Limb-armatures are very variable, so that one individual may only have one very short spine on the last joint of one anal-limb while the anal-limb of the other side may have single spines on the two following joints as well ; the same individual may have absolutely no spines on the penultimate limb.

The female genital claws are very broad, deeply divided into three parts. The spines are very distinct, generally bristle-like, the inner ones are more than half the size of the outer ones.[1]

Lithobius borealis Meinert.

(1868. *Naturh. Tidsskr.*, v.p. 265).

Brown or chestnut, with ventral plates and limbs lighter, not very robust, anteriorly fairly smooth, posteriorly weakly rugose, very sparsely haired, with a subcordiform head slightly broader than long. Antennae short or fairly long 32-33 jointed. Ocelli 6-8 arranged in 2-3 rows. Coxae of the maxillipedes armed with 4 teeth.[2] Dorsal plates 11 & 13 with produced angles. Coxal pores 3, 3, 3, 2-3, 4, 4, 3, small or very small, circular. Armature of the first pair of limbs 1, 1, 1 ; —1, 2, 1. Anal limbs with double claw, armature 1, 3, 1, 0 ;—1, 3, 2, 0. The first article of the anal limbs unarmed. Last limbs short, fairly incrassate. Female genitalia with a tripartite claw. Length 10mm. (Mein., 1872.)[3]

Syn. 1872 : *Lithobius borealis*, Mein., *Nat. Tidsskr.*, viii., p. 322.
1875 : *Lithobius borealis*, Stuxb., *Oefvers. Vet. Ak. Forh.*, p. 73.
1877 : *Lithobius borealis*, Fedrizzi, *Atti d. Soc.-Ven.-Trent.* v. p. 223.

(1) Rough translation from the Danish original.
(2) (*i.e.*, 2+2—H.K.B. et S.G.B.)
(3) Original in Latin.

I have not found the genuine *Lithobius borealis* Meinert. But since Fedrizzi (loc. cit. p. 224) says: "Rinvenni questa bellissima specie, unica representante del genere (!) in Italia (sic !), tra le erbe in luoghi umidi nella valle di Non (Trentino) ad un'altezza di 1300 metri sopra il livello del mare"; I thought I should quote Meinert's diagnosis here although I am not fully convinced that Fedrizzi's specimens actually belong to Meinert's *L. borealis*.

Fedrizzi describes his *L. borealis* as follows:—

> "Antenne composte di 31-33 articoli. Denti 2+2 robusti. Ocelli 6 in tre serie verticali, due per ciascheduna (Tab. IV., 33). Pori 3, 3, 3, 2-3, 4, 4, 3.—Colore azzurro. Lunghezza del corpo mill. 7."
>
> "Caratteristica è la forma e disposizione degli ocelli, sono cioè tutti di egual sviluppo e disposti in tre serie verticali oblique, o in due orizzontali, tre per ciascheduna. I pori delle coscie presentano una forma rotonda e sono disposti in serie semplici. I piedi sono armati di spine ed il loro ultimo articolo tarsale è munito di un'unghia quasi diritta. L'unghia delle appendici copulative della femina è triloba."
>
> "Il colore azzurro del corpo si distribuisce uniformemente sulle antenne, sulla porzione ventrale e sulle zampe, e per questo la specie in discorso anche a prima vista si distingue dalle affini."

This blue colouring as well as the circumstance that Fedrizzi describes the limbs as ending in a single claw, without any accessory claw, is somewhat suspicious.[1]

Appendix II.

Bibliography of the Irish Myriapoda.

Mr. Nevin H. Foster has provided us with a bibliography of the Irish Myriapods, and as we feel sure that this will be welcomed by Irish naturalists we append it here:—

1836. Templeton, R.—List of Irish Myriapoda selected from the papers of the late John Templeton. *Loudon's Mag. of Nat. Hist.*, pp. 12, 13.

1893. Pocock, R. I.—Notes on Some Irish Myriapoda. *Irish Naturalist*, vol. II., pp. 309-12.

1895. Carpenter, G. H.—Myriapoda (of Galway I.F.C.U. Excursion). *Ibid*, vol. iv., p. 256.

1896. Brölemann, H. W.—Lithobius variegatus Leach. *Ibid*, vol. v., pp. 12-15.

1907. Carpenter, G. H.—Myriapods (of Lambay). *Ibid*, vol. xvi., p. 57.

(1) Original in German and Italian.

1908. CARPENTER, G. H.—Handbook to the Dublin District: British Association Guide, p. 176, Chilopoda Symphyla and Diplopoda.

1912. SELBIE, C. M.—Some new Irish Myriapods, *Irish Naturalist*, vol. xxi., pp. 113-115.

1912. JOHNSON, W. F.—Chilopoda and Diplopoda. Clare Is. Survey, *R.I.A. Proc.*, vol. xxxi., part 33.

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1913. JOHNSON, W. F.—Notes on Irish Myriapoda. *Irish Naturalist*, vol. xxii., pp. 128-130.

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(On page 134 of this article the record of *Polydesmus denticulatus* from "Slane, Co. Meath," should read from "Corry's Glen, Hillsborough, Co. Down.")

1914. *Belfast Naturalists' Field Club*—(Myriapods collected). *Proc.* (2), vol. vii., pt. 1. pp. 91, 92.

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1915. FOSTER, N. H.—Natural History Notes from Carlingford. *Irish Naturalist*, vol. xxiv., pp. 101-104.

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Victoria University of Manchester.

IRISH SOCIETIES.

DUBLIN NATURALISTS' FIELD CLUB.

JULY 1.—EXCURSION TO MALAHIDE ESTUARY.—In spite of heavy rain a small party left Amiens Street by the 10.45 train. On arrival at Malahide the weather was so bad that members had to remain under shelter for some hours. In the afternoon the excursion proceeded to Robbswall Castle, where J. de W. Hinch pointed out the fossils in this fine section of Lower Carboniferous Limestone. Return was then made to the biological station, established in the hut bequeathed to the Royal Irish Academy by the late R. J. Ussher. Here R. Southern, B.Sc., one of the naturalists in charge, showed a number of animals illustrating the fauna of the shore between tide-marks. A visit was afterwards made to Malahide rectory, where the Rev. Canon Lindsay showed the members his beautiful rock-garden and an extensive collection of trees and shrubs Members returned to town by the 6.10 train.

NOTES.

ZOOLOGY.

Reed Bunting on Migration at Rockabill.

On the night of May 2nd last a Reed Bunting (female) killed itself by striking the lantern of Rockabill lighthouse. Like the Yellow Bunting the records of its migratory movements at light stations are very meagre. I have so far obtained only one other specimen, and that from the Tuskar. I am much indebted to Mr. Hammond for sending me the bird.

C. J. PATTEN.

The University, Sheffield.

Squirrel eating Melanogaster ambiguus.

On the 26th June last, I watched a squirrel for some time digging in the grass on the lawn here, and greedily eating what it had found. After a time, I went out and investigated and discovered a half-eaten fungus, which was growing about three inches underground. It had the most awful smell, and I wondered how any animal could possibly eat such a disgusting thing. I sent it up to Miss Knowles of the National Museum, and she very kindly informed me that it was *Melanogaster ambiguus*, and that it had not hitherto been reported from Ireland.

CHARLES LANGHAM.

Tempo Manor, Co. Fermanagh.

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COLIN M. SELBIE.

To face p. 137]

COLIN M. SELBIE.

Second Lieut. Colin M. Selbie was killed in an engagement on the Somme on the 14th July last. As one who had the pleasure of sharing both official and field work with him, I am privileged to express the sincere regret which has been caused amongst Irish friends and colleagues by the death of this able young naturalist.

Selbie was born at Aberdeen in 1890, received his early training at the Aberdeen Grammar School and afterwards at Aberdeen University where he graduated with distinction, especially on the science side, and received the B.Sc. degree in 1910. In the following year he was appointed assistant naturalist in the Irish National Museum, having obtained first place in the examination for the vacant post.

Shortly after the war broke out in August, 1914, he enlisted as a private in the Royal Scots Regiment, and a few months later he received a commission in the Scottish Rifles, a fitting reward for his enthusiasm and merit. In his letters home he records many narrow escapes; he was slightly wounded early in the present year, and he returned to meet his death in the recent fighting.

At the National Museum Selbie was chiefly engaged in work on the Crustacea, and most of the Irish cases of these animals were rearranged by him. Eventually this proved a very fortunate experience as it enabled him to accept a request from the Irish Fisheries authorities to report on the valuable collections of crustacea made during the cruises of the fisheries s.s. "Helga." This was an exceptional opportunity for a young biologist to show his aptitude for zoological work. The collections to be examined were nearly all dredged by the scientific staff of the Irish Fisheries during the last fifteen years mostly in deep water off the west coast of Ireland. The critical examination of such collections of crustacea is an exacting piece of work chiefly on account of the scarcity of many of these deep-sea animals and the imperfect knowledge of their life-histories, not to mention the extensive literature to be consulted on the subject.

There can be no doubt that these difficulties were most successfully overcome, and the resulting report on three

groups of the crustacea has been published[1] in the *Scientific Investigations* of the Irish Fisheries. Selbie was an excellent draughtsman, and the fifteen beautifully drawn plates illustrating the new and rare species are deserving of great praise. Perhaps the most remarkable species brought to light during this work is a new "Spiny Lobster" (*Palinurus Thomsoni*) captured in more than 200 fathoms off the south-west coast and named "in honour of my first instructor in Zoology, Professor J. Arthur Thomson, of Aberdeen." The report contains an account of the interesting little crabs called Eryonicus, the proper classifying of which caused him much perturbation of spirit. On the completion of this piece of work he also wrote a descriptive account of the Hermit Crabs of Irish waters, which has not yet been published.

At Dr. Scharff's suggestion Selbie gave some time to the study of the myriapoda (centipedes and millipedes) and he published[2] three papers throwing light on these little-known animals. He had also a general list of the Irish myriapoda in preparation, and has left MS. notes and maps of the occurrence in Ireland of the various species.

With regard to personal qualities he was in every way an exceedingly pleasant companion, of courteous manners, and one who might be implicitly relied upon in any circumstances. It was only on long acquaintance that one discovered his strongly marked likes and dislikes, the latter qualified in expression by a droll humour. He was an excellent golfer carrying off a well-contested prize shortly before entering the army. Had his life been spared, there can be no doubt this promising young naturalist would have excelled in the work so well begun.

J. N. Halbert.

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[1]The Decapoda Reptantia of the coasts of Ireland. Part 1., Palmura, Astacura and Anomura (except Paguridea). *Fisheries, Ireland, Sci. Invest.*, 1914, 1 (1914).

[2]Some New Irish Myriapods. *Irish Naturalist*, xxi., 1912. New Records of Irish Myriapods. *Irish Naturalist*, xxii., 1913. A New Variety of Polydesmus coriaceus, Porat, and Note on a Centipede monstrosity. *Ann. Mag. Nat. Hist.* (8) xxii., 1913.

SOME UNCOMMON LEPIDOPTERA TAKEN IN SOUTH MAYO.

BY W. RUTTLEDGE.

I have, during the last few years, taken several specimens in this district, which appear, on reference to Mr. Richard South's "Moths of the British Isles" to be unrecorded or rare in this county, and in one or two cases in Ireland; the following notes may therefore prove of interest:—

Smerinthus populi.—A gynandrous specimen was bred a year ago (1915), the left side being male.

Sphinx convolvuli.—Several specimens believed to have been seen in the autumn of 1915 hovering over *Nicotiana affinis*. One small larva was taken the same year, but unfortunately died.

Polyploca flavicornis.—One specimen taken at rest on a bramble stem, April 14th, 1915. "In Ireland it appears to be very rare." (South).

Atolmis rubricollis.—One specimen taken in 1910. Several "ichneumoned" chrysalids found in the winter of 1914. Two hatched (one deformed) from pupae taken April, 1916.

Cybosia mesomella.—One specimen taken in 1910. "It appears to be absent from Ireland." (South).

Acryonycta leporina.—1915, one specimen bred from larva found feeding on dwarf sallow August, 1914, 1916. Two bred from larvae feeding in birch and alder taken August, 1915.

Acryonycta megacephala.—Quite a number of larvae have been taken in the last few years.

Acryonycta menyanthidis.—Larvae abundant in August and September. Much subject to the attacks of parasites.

Mamestra persicariae.—Larvae not uncommon. To be found feeding in the flowers of Dahlia in August and September.

Phothedes captiuncula.—One imago taken near Lough Carra, 1911.

Ennomos quercinaria.—Not uncommon.

Pachys strataria.—Three specimens taken April and May, 1916.

Thamnonoma vauaria.—One specimen taken August, 1915.

Ino statices.—One specimen taken in 1910.

Trochilium apiformis.—Several larvae and empty pupae found in a poplar tree, but the former were not bred.

Hollymount, Co. Mayo.

ON THE IRISH NAMES OF INVERTEBRATE ANIMALS.

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

This is the final article on the Irish names of animals which I have collected and thought useful for publication in view of the difficulty of identifying the various species by the Irish-speaking members of the community. I trust all these notes which have appeared in the *Irish Naturalist* will also throw light on the question of the indigenousness to Ireland of certain animals.

The first two articles were published last year in March and July, the third in July, 1916. When we are dealing with smaller creatures such as those referred to in this fourth article, it becomes increasingly difficult to know what particular species an Irish word is applicable to, yet even among the smaller beetles we can find some correct English equivalents for Irish names. None of these lists, as I mentioned before, can be considered complete or final in any way, and I shall be glad of assistance from any one interested in the subject in order to amplify the lists and make them more complete.

I have particularly to acknowledge with thanks the assistance I received from Mr. R. I. Best, who gave me the correct pronunciation of the Irish words. Mr. L. G. Gogan as heretofore also helped me, whereas Mr. J. N. Halbert and Mr. E. W. L. Holt supplied me with manuscript lists of Irish names of invertebrates. As regards the correct pronunciation of the first Irish name placed after each species and the symbols used it is scarcely necessary to repeat the full explanation on this subject given in my last article in the July number of the *Irish Naturalist*.

ANT (shang-ān).

seangán (7), sionsán (3), sinnán (4), dídeach (9).
The last word has also been applied to the wasp.

BARNACLE (gē-rān).

giúdrean (6), giodrán (7), corcan (6).

BEE (bǎch).

beach (7), beachán (6), beachman (6), seillean (6).
Drone Bee—aindeach (6).
Humble Bee—seillean mór (Scotch-Gaelic 8).

BEETLE OR CHAFER (dael).

dáol (7), ciarán (9), cornabán (7), deg-á (9), leirirg (6), dubdam (9), ailire (7), cuilbúb (6), farcha (6), trompallán (7), primpeallán (7), prompollán (7), dubchúil (7), dubdaol (6).

Black-beetle or Cockroach (kēərōg)—ciaróg (9), darb dá'l (9).

According to Colgan the first word is applied to any kind of black beetle, of which there are many species, and this corresponds with the meaning of the word which is "little black one."

Click-beetle (mārjēn smach)—máirín smeach (11). The "wire-worm" (caoch-ruad 7) is the grub of this beetle. It is most injurious to crops.

Death-watch Beetle—farcha (6). Although O'Reilly translated this word merely by beetle, Forbes (8) states that in Scotland the equivalent "fairche" is applied particularly to this species.

Devil's Coach-horse Beetle (dăra dael)—dara daol or deairg daol (3), darb daol (7 Munster), deairga daol (7 Conn.).

Dung-beetle (primpallān)—prompallán (3), primpeallán (3). This is the large beetle which flies about at dusk making a booming noise. Its grub or larva may be the torán; believed by Dinneen to be destructive to potatoes, etc., although it is quite harmless.

Lady-bird Beetle (daelōg-vjrak)—daológ-breac (6), breacdeairg (8). This is one of our most useful insects for it lives entirely on destructive green-fly (aphis).

Long-horn Beetle—? ceannabán (10).

Maybug or Cockchafer (faeljacān)—feiliocan (6), féileacán (7). The same word is current in Scotch-Gaelic. This large brown beetle has occasionally been injurious to Irish plantations. (See Butterfly).

Whirligig Beetle ? (mēəl-mōna)—miol-monad (6). The Irish word means a small animal swimming on the surface of standing water. Although this description applies to many kinds of invertebrates, the whirligig beetle is the commonest and the most conspicuous of that class, possessing the habit referred to.

BLUE-BOTTLE (see **Fly**).

BORING SHELL OR SHIPWORM (Teredo and others) (? mwirōg).
? moiɾeoɡ (6).

O'Reilly gives " small shell " as the meaning of the Irish word, but in Scotch-Gaelic it is applied especially to those mollusks which bore into logs of wood or even stones in the sea. Another word, bóiɾeál, used in the 'same' sense in Scotch-Gaelic is expressive, as it means an augur.

BUG (shkartān).
ɾceaɾtán (7).

There are many kinds of plant-bugs in Ireland, but there does not seem to be any distinct name for the bed-bug. (See Louse).

BUTTERFLY (faeljacān).
ɾeiɫeacán (7), peiɔɫeacán (7), ɔealan-ɔé (6), ɔalán-ɔé (7).

The different kinds of butterflies are only distinguished in Irish by adding the names of their colours, thus ɾeiɫeacán bán is the Cabbage White butterfly. There is an Irish word for the caterpillar of the Tortoise-shell butterfly. (See Caterpillar and Maybug.)

CADDIS-WORM (? durrōg).
? ɔuɾɾóɡ (6).

This Irish word may possibly be applicable to the caddis-worm, which is the curious larva of the caddis-fly, as the Scotch equivalent " durrag (8) " is often applied to it.

CATERPILLAR (dil-vēəl).

ɔuiɫɫ-ṁíoɫ (7), aiɫɫɾeoɡ (6), aoiɫɾeóɡ (6), bɾatóɡ (6), bɾatcaɔ (6), buɾɾaiɾ (6), ɫuiɔ-ɾiáɾc (7), ɫuɾċuaċ (6), ɫuɾċuineoɡ (6), máiɾín cluṁain (4).

Rough Caterpillar (? hairy C.) (kadjōg)—caiɔeoɡ (7).

Caterpillar living in timber (raedān)—ɾeaɔan (7), (recte ɾéaɔán) ɾéuɔán (6).

Nettle-worm (Caterpillar feeding on nettles—Tortoise-shell butterfly) (spirrid njantōg)—ɾɾioɾaiɔ neannóɡ (7), or ɾ. neannca (7).

Potato Maggot (perhaps Caterpillar of)—(tŏrān)—ɔoɾán (7).

Murrain Caterpillar (kŏnach)—conaċ (7). The caterpillar of a large moth was formerly believed to cause murrain or pestilence among cattle.

CENTIPEDE ? anaḃiorać (6).

Centipede is translated by "ana-bhiorach" in Scotch-Gaelic (8). I am giving the equivalent Irish word, meaning "pointed or sharp," though I am not aware of its having been used in Ireland to denote a centipede.

CHAFER (see Beetle).

CHEESE-MITE (see Mite).

CLAM SHELL (bjrallān bwē).
? bṙeallán buiḋe (7).

CLICK-BEETLE (see Beetle).

COCKCHAFER (see Beetle).

COCKROACH (see Beetle).

COCKLE SHELL (rūəkān).

ṙuacán (7), ceaṙca ɡeala (Conn. 7), ṙṙuḃán (7), coilleóɡ (6), ɡṙúmáin (4).

Prickly Cockle—(rūəkān garəv). ṙuacán ɡaṙḋ (3).

Queen Cockle, Purr or Clovisse (braljach) bṙailleaċ (3), ? bṙail leán (7), ? bṙeallán (7).

This is the shell known to zoologists as *Tapes virgineus*.

CRAB (pŏrtān).

poṙtán (7), paṙtán (3), tarṙán (7), cṙiṙnóɡ (3), cṙúḃán (7), cloiḋeán (7), míol ɪnɡneaċ (6).

Edible or Great Crab—(partān) paṙtán (3), cṙubóɡ (7).

Iron Crab—(partān ēərin) paṙtán ɪaṙaɪnn (3).

She Crab—(krāin) cṙáɪn (7), ṙaoɪṙceán (7).

Shore or Green Crab—(pŏrtān glas) poṙtán ɡlaṙ (7), paṙtán ɡlaṙ (3).

Small Crab—(dōnilēn) ḋoṁnaɪllín (7), ṙaoɪṙne (7).

Soft-shelled Crab—(fwishkān) fuirceán (7), maoitearcán (3).

Soldier Crab—(pŏrtān shlēriəch) portán rligreac (7).

Spider Crab—(partān mwēlan) partán maoileann (3), portán capuill (6), portán faoile (Holt).

Swimmer Crab—(partān shēlə) partán rile (3).

CRAB-LOUSE (see Louse).

CRANE-FLY (see Fly).

CRAYFISH or CRAWFISH (baerdōg).
béarróg (Kerry 7), mearróg (7).

Dinneen states that these two words mean Crayfish, but I do not know whether he is aware that the English word is only applicable to the crustacean resembling a small lobster which is quite confined to lakes and small streams.

CRICKET (krikōd).
criocóid (7), criogar (3), gligear (7), grillán (6).

The word "uircuil" is translated by O'Reilly by salamander, cricket or fire-fly.

Balm-cricket or Cicad is an insect living in the South of Europe and does not concern us here.

CUCKOO'S SPITTLE (smug-na-gūach).
rmug na gcuac (7).

The Irish word has the same meaning as the English. Although the Cuckoo Spittle is not an insect, it is the foam produced by one and protecting it from drought and enemies.

CUTTLE-FISH, SQUID or PEN-FISH (kutjal).
cuiteal (Kerry 7), grealrac (7), roccrail.

DEATH-WATCH BEETLE (see Beetle).

DEVIL'S COACH-HORSE BEETLE (see Beetle).

DOG-WHELK (see Whelk).

DOG-WINKLE (see Periwinkle).

DUNG-BEETLE (see Beetle).

DRAGONFLY (see Fly).

EARTHWORM (see Worm).

EARWIG (galshach).

ʒaillʃeaċ (6), ʒoilʃeaċ (4), coillaʒ-lion (6), ʃiʒle pice (7), ʒeaʃʃa-ʒaḃlán (3), ḋeaʃʒ ʒaḃlóʒ (3).

The third word is identical with the one in Scotch-Gaelic.

FLEA (darnit).

ḋeaʃʒnaiṫ, ḋeaʃnaiṫ, ḋeaʃnaiḋ (Conn. 7), ḋeaʃʒunṫ (6), (recte ḋeaʃʒnaiṫ) ḋeiʃʒnaṫ (9), ḋʃeancaiḋ (7), conarʃaċ (6).

FLESHWORM (see Worm).

FLY (kil).

cuil (7), cuileoʒ (7).

Black-fly (kil dŭv)—cuil ḋuḃ (7).

Crane-fly or Daddy-longlegs (kŏr-chil) ?—coʃʃ-ċuil (9).

Dragon-fly (snāhad vōr)—ʃnáṫaḋ mór (11),

Blue-bottle fly (gorəmān)—ʒoʃmán (7).

Gadfly or Breeze-fly (? glĕ-hērə)—ʒleiċiʃe (6), cʃóiḋeoʒ (6), ʒuiḃán (6), cʃeaḃaʃ (10), cʃebaʃ (9), cʃeaḃaʃ caoċ (7), ṫaḃul (6). The Gadfly is often confounded with the Warble-fly, whose larvae produce those very injurious lumps and sores on the back of cattle. Although these two flies are quite distinct, and their habits are different, both may be included under some of the names given here.

Horse Botfly (băchān kăpil)—beaċán capaill (7), cleoḋ (7), cleoṫaʃ (Meath 7), cʃeaḃaʃ caoċ (2). The disease caused by this fly is known as ʃóṫaċ (7).

Gnat or Midge (minchiljōg)—mionċuileoʒ (6), meanḃċuileoʒ (6), coiʃ míol (7), coiʃʃ míoltoʒ (9), ʒuiḃán (7).

Warblefly—The name of this fly is uncertain, but there is an Irish word (ḃiaʃʃuil 7) for the lumps or warbles on cattle caused by the maggot of the Warblefly. The maggot is called ḋaiʃḃ (7). See Gadfly above.

GLOW-WORM.

cuileag-fionnachain (6), lampróg (6).

The real Glow-worm is a beetle not found in Ireland, but it is possible that the Irish names given (probably Scotch-Gaelic) may have been applied to a centipede or earthworm, some of which are slightly luminous.

GRASSHOPPER (dŏrsān).

dorrán (7), finnín feoir (6) corrachaogall (6), bruchán (6), fiobaire fraoich (11), criogar féir (3), dreolán tearbuig (7), tearbuide (7), léumnach uaine (6).

HORNET.

? garrdam (6).

The Hornet is not an Irish insect, and it is possible that the Giant Wood Wasp has been mistaken for it.

HORSE-FLY (see Fly).

HORSE-LEECH (see Leech).

HORSE-WINKLE (see Periwinkle).

INSECT (krĭhav).

croiteam (6).

Small black insect—doimte (6). I cannot identify this insect.

Corn Insect—torain (6). Some beetles and flies are injurious to corn, and it is doubtful to which of these the Irish word applies.

JELLY-FISH (? smugirlə rōn).

smugairleide róin (3), beochaán (6).

The first term heard by Mr. Colgan in Clare island is very expressive. It means seal's spit.

LADY-BIRD BEETLE (see Beetle).

LEECH (dălōg).

dallóg (6), daoil (6), deala (6), gaod (6), criodar (6), rumaire (6), leoman (6).

The last two words have several other meanings.

Horse-leech—gearr-gaimid (7), gearrgum (6), gealagur (6), gealltoll (6), crub-capaill (3), derg-liag (9), del fola (9).

Sea-leech—daoil-mara (Scotch-Gaelic 8).

LIMPET (bārnjach).

báirneać (7), bárnać (1), carbairneać (6), sciopadán (7).
Large smooth limpet—fiadh bairneać (3).
The word sciopadán has also been used to denote periwinkle.

LOBSTER (gĭmach).

sciomać (7), sliomać (3), ballóirseach (6), sulamać slamać (4).
Spiny Lobster—sliomać mara (3).
Norway Lobster (so-called Dublin Prawn)? béarradóg (7).

LOCUST (bjracnat).

breccnat (9).

The Locust has only occurred in Ireland as a very rare accidental visitor.

LUG-WORM (see Worm).

LOUSE (mēəl).

míol (6), míol cinn (7), ceannbháil (6), cnapaire (6), cú cnáma (9), rabóg (6), míol cneir (7), readh (7), rnarán (7).

Body-louse—míol cneir (7).

Crab-louse—ceapc (9), rceapc or rceapcán (7).

Head-louse—míol cinn (7).

Pig-louse—rap (7), rapán (7), rop (7), ropán (7).

Sheep-louse—míolcaorach (6), reilibha (6), reilionn (6), rap (7).

Small-louse—(tick?) crabhán (7), croigeabhán (7). (Compare Bug.)

MAGGOT (kriv.)

cruimh, cruimh (7), cruim (9), cnuimh (7), cnuimheog (7), bhorróg (6), frig (7), manchnuimh (7).
(Compare Caddis-worm, Worm and Mite).

The maggot causing swellings in cattle is known as bairbh (7)—see Warble-fly.

MAW-WORM (see Worm).

MAY-BUG (see Beetle).

MIDGE (see Fly).

MILLIPEDE.

rcıatarran (6), ? cailleć-ċorać (6), corrracorać (6).

The Scotch-Gaelic words are cailleach-chaosach and corra-chosach, according to Forbes.

MITE (fēnjōg).

fíneóg (6), cnuiṁ (7), cnuiṁeog (7), frıg (7), manċnuṁ (6).

The last word has been translated by "Cheese-mite," but it probably means "Cheese-maggot." The word frıg has been used for Mite, Maggot, and Fleshworm. (Compare Maggot).

MOTH (ljo-an).

leaṁan (1), leaḋm or leaḋman (7), caunna (9), ca.oa, canna, cana (6), mīol cíon (6), mīol cíonna (7) luín (4), deaḋmann or deaḋ-mon (6), cú-finda (6).

Clothes-moth—doıoċ (6).

MURRAIN-WORM (see Caterpillar).

MUSSEL (dūljikēn).

dúilicín (7), dubhlicín (3), fliogán dub (7), fenfgán (6), iarcán (7).

River or Pearl Mussel (shligān njaevin)—fliogán néaṁainn (7).

OCTOPUS (see Cuttle-fish).

OYSTER (eshirə).

oirre (7), oirire (6), eirir (6), uirire (6), eirtir (7).

PARASITE ON CATTLE (buləgadān bō).

boigadán bó (7).

I cannot ascertain what particular parasite this word refers to.

PEARL MUSSEL (see Mussel).

PEN-FISH (see Cuttlefish).

PERIWINKLE (faechān).

faoċán (3), faoċán dub (3), faoċ (7), faoċóg (7), fíoċóg (1), daoċog (6), fíoċán (4), giopadán (7), giartán (7), girtán (6), daoċ (6), meangán (7), miongán (7), miongóg (7), carbáirneaċ (Kerry 7).

The Periwinkle having since remote times been used extensively as food in Ireland, it is not surprising that there should be so many Irish words for this shell.

Horse or Dog-winkle (Purpurea) (faechōg chĭrən). ꝑaoċó�herring (7), ꝑíoċo�herring ċoꝼn (1), ꝑaoċó�herring ṁaꝺꝼa (7), ꝑaoċó�herring maꝺaiꝺ (3), ꝑaoċán ċapaill (3), �herring illeaċaꝑionn (6), �herring illeꝑionnꝺꝼuin (6).

PHOSPHORESENCE OF THE SEA (tĭnə jalāin).
ꝺeime �herringealáin (3).

This is due to a minute protozoan called Noctiluca.

PRAWN (klĭhān).
cloiċeán (7), cloiꝺeo�herring (7), min-herringiomaċ (7), ꝼíꝺe ꝼunán (3).

The true Prawn is often called Shrimp in Ireland, whereas the Norway Lobster is known as Prawn in Dublin. (Compare Lobster and Shrimp.)

PURPLE SHELL (murex)—(mŭrach).
muꝼaċ (7).

RAZOR SHELL, SPOUTFISH or HOSEFISH (shkēən vara).
ꝼcian ṁaꝼa (7), ꝼherringeana muꝼú (4), muꝼherrinǵ (6), ? bꝼeallán buiꝺe (7), muiꝼꝼcionn (6).

RING-WORM.

Not dealt with here as it is a disease due to a fungus.

SCOLLOP or SCALLOP (mūshkēn).
míuꝼcín (7), mac muiꝼherringeaċ (7), muiꝼíneaċ (3), cluaiꝼín (3), cꝼeaċ (6), cꝼeaċán (6), ꝼlioherrinǵn cꝼeaċaimn (7), ꝼlioherrinǵn maꝼa (Kerry 7), ꝼlioherrinǵn muiꝼeaꝺaċ (7).

SCORPION (sgarp).
ꝼherringaiꝼꝼ (6).

The Scorpion does not inhabit Ireland. It is found in the South of Europe and warm countries generally.

SEA-SNAIL (see Snail).

SEA-URCHIN (grānjōg ărigə).
herrinǵmaoherring (7), cuan ṁaꝼa (3), ? herringaꝺóg ċloiċe (7).

SHIPWORM (see Boring Shell).

SHRIMP (ribə-rōvash).
ꝼuiꝺe ꝺóiꝺéiꝼ (7), ꝼiꝺe ꝺóin (7), ꝼuꝺ ꝼúnáin (7), ꝺéaclꝺ (7), ıaꝼc meanmnaċ (7), cloiċeán (7), cloiꝺeo�herring (7). (Compare Prawn.)

SLATER (see Wood-louse).

SLUG (see Snail).

It is doubtful whether the Slug has an Irish name distinct from that of the Snail.

SNAIL (shelhĭdə).

seilcide (7), seilmide (7), seiligide (6), séimide (6), selide (6), slíocide (4), seilceog (7),

Sea-snail (turkar mără)—cuscar mara (6), daocán (7), gnamhan (7).

SPIDER (rūān ălə).

rubán allaid (7), ruadán balla (2), damhain allaid (6), dúbán alla (3), brandubán (6), cuideog (6).

Water-spider or Water-bug (tjĭpəl)—ciopal (7).

SQUID (see Cuttlefish).

STAR-FISH (raeltjēn).

réiltín (7), réultiarg (6), méaran (Mayo 7), ladar na mban (3)

STOMACH-WORM (see Worm).

TAPE-WORM (see Worm).

TEREDO (see Boring Shell).

TICK (kărtān).

cartán (7), sceartán (7).

Sheep-tick (kărtān kaerăch)—cartán caorach (7), sor caorach (7).

It will be noticed that the same word is used to denote Crab-louse and Tick.

TOP-SHELL (Trochus) faocán muire (3).

WALL-LOUSE (see Wood-louse).

WASP (ark văch).

earc beach (7), eirc beach (6), eirbeach (6), beach gabair (7), beachán (7), beachán cairil (6), conspeach (6), gairpeadán (7), seanánach (7), earc (7).

The last word has also been applied to other insects as well as to the Lizard.

WHELK.

Common Whelk (faechān ēərin) ꝼaoċán ıaꝼaınn (3), ꝼaoċóꝝ ıaꝼaınn (3), ꝼtaıgin (3).

Dog Whelk (faechōg chăpil) ꝼaoċóꝝ ċapaıll (7).

WINKLE (see Periwinkle).

WIRE-WORM (see Worm).

WOOD-LOUSE, WALL-LOUSE or SLATER (kjrēn-vēəl).

cꝼın-ṁıoꝉ (7), mıoꝉ ċoıllꝉe (6), mıoꝉċꝼaınn (6), mıoꝉa cꝼıonꝛa (Conn. 7 plural), mıoꝉ ꝺalla (6), ꝼeaꝺán (7), ꝼcıáꝉuıꝺe (7).

WORM (kriv).

There is no distinct word in Irish denoting Worm. All the words used are also applicable to other animals, such as mites, caterpillars, reptiles, insects.

cꝼuıṁ (7), cnuṁ (6), c uıṁeoꝝ (6), ꝺꝼaꝉóꝝ (6), ꝺꝼaꝉꝉaꝺ (6), ꝺaꝼꝺ (6), cꝼuıṁ (6, 7), ꝺıaꝼꝺóꝝ (6), ꝺıaꝼ (6), ꝺıaꝼꝺ (6).

Earthworm (kadjōg)—caꝛoeóꝝ (6).

Large Earthworm (kaljach na vjlă) caıllıeaċ na ꝺꝼleaꝺ (7).

Fleshworm (falān)—ꝼeaıán (6).

Glowworm (see Glowworm).

Lugworm (log)—ıoꝝ (7).

Maw-worm or Stomach-worm (mēəl gāiljə)—mıoꝉ ꝝaıle (6), mıoꝉ ꝝoıle (7).

Wireworm (see Beetle).

Tapeworm (gjărəbəchān)—ꝝeaꝼꝼboċán (6), ꝺaċaꝝ (Scotch-Gaelic) (6).

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National Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two Patas Monkeys from Dr. Bate, a Badger from Mr. W. J. McDowell, two Siamese Cats from Miss Burt, two Foxes from Mr. E. Rotheram, Rabbits from Messrs. K. W. Rogerson and H. Wright, Cardinals and Finches from Capt. Quin, Rosella Parrakeets from Professor C. J. Patten, and Mallards from Mr. W. Goff Evans. A Black Bear, two Tree Porcupines and two Beavers have been received in exchange from the Riverdale Zoological Gardens, Toronto, Canada. Two Lion cubs have been born in the Gardens "Red Hugh" and "Fiona" being the parents. A Bison calf and a Zebu calf have also been born in the Gardens.

CORK NATURALISTS' FIELD CLUB.

February 16.—The Club met in the Biological Institute, University College, Professor Swain, President, in the Chair. Rev. Professor P. Power delivered a short lecture on "Irish Archæology." Mrs. L. Porter, M.Sc., followed with a lecture on "Lichens," dealing, among other things, with their uses as dyes. Both lectures were illustrated by lantern slides. The President exhibited a series of views showing polarisation effects. Numerous exhibits were shown, including geological specimens and photographs, plants from the College herbarium, rare old works on geography and natural history, &c. Some of the Club members contributed to the exhibition.

May 15.—Annual General Meeting.—Mr. T. Farrington, M.A., Vice-President, in the Chair. J. Noonan, Hon. Secretary, submitted his report for the session. It included reports of the excursions carried out which have already appeared in the *Irish Naturalist*. Regret was expressed at the death of the late Mr. Robert Warren, Monkstown. Attention was drawn to the work of the Sphagnum Department, Royal College of Science, Dublin, in the preparation of Sphagnum Moss dressings for wounds (made from *S. cuspidaium* and *S. cymbifotium*) supplied to the War Office, and to the appeal made for voluntary helpers to aid in collecting the moss. The report was adopted. W. B. Lacy, Hon. Treasurer, read his report, which was also adopted. Five new members were elected. The following Officers and Committee, for ensuing session, were elected :— President, Professor I. Swain ; Vice-Presidents, Professor M. Hartog, T. Farrington, H. Lund, W. H. Johnson, R. A. Phillips ; Hon. Secretary, J. Noonan ; Hon. Treasurer,W. B. Lacy ; Committee, Miss M. E. Bergin, Miss B. E. Duke, Mrs. L. Porter, M. Holland, D. J. O'Mahony, J. C. Rowe.

May 31.—Excursion to Little Island.—A large party, comprising a number of students from University College as well as members of the Club, walked from the station to the quarries east of the golf links. Here the conductor, Professor Swain, after giving a general account of some of the more striking features in the geology of the neighbourhood, proceeded to describe some of the fossils likely to be found in the limestone. Many of the party succeeded in obtaining specimens of Polyzoa, Brachiopoda, and Corals. Among the finds may be included the following genera :— Fenestella, Rhynchonella, Spirifera, Productus, Amplexus, and Lithostrotion. The weathering of the limestone by solution was seen to give rise to fantastic forms in the upper beds of the quarries. Proceeding westward the party examined a quarry out of which considerable quantities of red marble had been raised for architectural work in Cork and in Great Britain.

June 7.—Visit to University College.—A large party of members and friends assembled at 3.30 p.m. in the Biological Institute, where they were received by Professor Hartog, who, after explaining the equipment of the Institute, acted as guide through the Plant-houses, and the Geological, Zoological, and Ethnological Museums. Many of the visitors learned with surprise that the Orange trees in the Plant-houses once flourished in the old Cork Botanic Gardens (now St. Joseph's Cemetery). In the Zoological Museum much interest was taken in the Harvey Collection of Irish Birds and Mammals, where was seen the Western Rufous Warbler, shot at the Old Head of Kinsale, in 1876, by Mr. F. R. Rohu, who presented it to the College. This bird was long believed to be a Nightingale, but was correctly identified in 1899 by Mr. Howard Saunders.

NOTES.

BOTANY.

Orobanche rubra in Leitrim.

On July 29, while we were climbing the cliff-bound humpy hill lying just east of Ke logyboy, in Co. Leitrim, my wife found two specimens of *Orobanche rubra*. This is t e second record from the Ben Bulben district, a single specimen having been found at Rosses Point, Co. Sligo, in 1905, by M s. W. F. Johnson (*I.N.*, xiv., 222). The locality lies three miles n rth of the east end of Lough Gill.

R. Lloyd Praeger.

Dublin.

Tall Plants.

No doubt the frequent rain of early summer is the cause of the unusual vigour of many herbaceous plants this season. In the Lough Gill neighbourhood in July I measured Foxglove 9 feet 8 inches in height, Cow Parsn p 10 feet, *Agrimonia odorata* 7 feet, and *Habenaria viridis* 1 foot 2 inches.

R. Lloyd Praeger.

Dublin.

Plants of Co. Tyrone.

I send some notes of plants which are local or rare in Tyrone.

Aquilegia vulgaris—: aturalised on a small area of limestone rocks accompanied by *Origanum vulgare* near the village of Tullyhogue. *Lychnis vespertina*—near Artrea. *L. diurna*—Abundant in Killymo n demesne. *Peucedanum Ostruthium*—frequent, naturalised on roadside and around ruins. *Centranthus ruber*—naturalised on an old wall, Ballyclog. *Petasites officinalis*—'n several stations in this locality; Ballyclog, Killymoon, Tullyhogue. *Lithospermum officinale*—Tullyhogue. *Neottia Nidus-avis*.—Loughry Demesne near Cookstown.

Thomas Greer.

Stewartstown.

ZOOLOGY.

Grammoptera ruficornis at Poyntzpass.

A number of these beetles occurred in the beginning of July on a large plant of Giant Spiraca in my garden. I had seen a single specimen on the same plant last year but failed to capture it. The curious thing about it is that for the past twenty years I have constantly searched this plant for insects and till now never met with this beetle. I don't know any means by which it could have been introduced artificially, so it must have travelled here by its own powers. Its appearance here is analogous to that of *Hydroporus dorsalis* F. at Armagh in 1909. The var. *pallipes* Steph. occurred along with the type.

W. F. Johnson.

Poyntzpass.

Triphaena ianthina feeding on Ivy.

Last April I took a caterpillar feeding on the Ivy on the gable of this house. I looked up all the ivy-feeding caterpillars but none of them corresponded with mine. In a few days it pupated and on July 13, emerged a beautiful specimen of this handsome moth. I do not find Ivy mentioned as its food plant, but it seems to be omnivorous.

W. F. Johnson.

Poyntzpass.

Hipparchus papilionarius in Donegal.

It may, I think, be worth recording the capture by Mrs. H. C. Young, of the Large Emerald Moth (*Hipparchus papilionarius*), a female, somewhat worn. A small number of ova have been deposited, which I shall try to rear. The only previous example of which I have heard from this immediate district was taken here by Mr. D. C. Campbell, about twelve years ago.

W. E. Hart.

Kilderry, Co. Donegal.

Dummy Nests of Whitethroat and Garden Warbler.

I do not know whether I am travelling over known ground in the following. Quite the majority of my nests of the Greater Whitethroat have never been occupied. These blank nests are nearly complete, but seem to want a further bottom lining of finer grass. They are thus deeper than the bona-fide nest. They also have more willowdown and white petals about them; one extreme example having a mass of down piled on side of nest, half as big as the nest. If I find the nest in the side of a hedge or at all easily exposed, or if the builder freely exposes itself carrying long straws, the nest is nearly sure to be blank; the real one being very low down and thoroughly concealed, even approaching in the after growth the concealment of a Grasshopper Warbler, and the building operations are most secretive.

My Garden Warbler nests are invariably surrounded at distances up to twenty yards by up to half a dozen foundations of nests, varying from a usual thin platform about two inches diameter to as much as half a nest. They are unmistakeable. They are frequently in laurel and small bushes as well as in the almost universal nest site—the briar. I once saw one of these being built.

J. P. Burkitt.

Enniskillen.

Blackcap in Co. Fermanagh.

Though the Blackcap has been identified in this county (Fermanagh) on the best authority, including one last year, I regret I have never seen it, not have I ever heard of the nest being found. I have identified scores of Garden Warblers in the search for a Blackcap. From early spring this year I carefully watched a number of likely localities, including islands where they had been seen. The Garden Warblers came in a rush rather late about 16th May. I think I identified all the Garden Warblers on the above islands (10 pair) including many others—not an easy job, but no Blackcap.

J. P. Burkitt.

Enniskillen.

Fulmars on the Skelligs.

Mrs. Barrington has kindly allowed me to see an interesting letter written to her on the 15th of April last, by Mr. P. J. MacGinley, light-keeper at the Skelligs, reporting a further and evidently considerable increase in the numbers of the colony of Fulmar Petrels nesting at that station. "Perhaps," Mr. MacGinley writes, "it may be of some interest to know the Fulmars are here again this season, in larger numbers than previous years, having taken up a nesting site on a different aspect of rock. There are now three colonies of birds nesting, and if with each successive season they keep on increasing as they have been doing since they first visited Skelligs, they will soon be as numerous as the Gannets." It will be remembered that the first settlement of the Fulmar as a nesting species on the Great Skellig took place in 1913, and that since that year the late Mr. Barrington made annual communications to the *Irish Naturalist* (vols xxiii., p. 133, and xxiv., p. 91) embodying the information supplied him by Mr. MacGinley as to the rate at which the birds were increasing. In 1913 there were only 11 or 12 pairs; in 1914 the number of birds was estimated at about 70, and in 1915 at about 100. The rapid increase of this bird, both at the Skelligs and elsewhere, is of the greater interest from its being such a slow-breeding species, laying only one egg per annum.

C. B. Moffat.

Ballyhyland, Enniscorthy.

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This Magazine—founded in 1871—is devoted to the publication of Original Matter relating to the Natural History of Scotland, and includes Papers contributing to the elucidation of the Fauna, Observations on Life Histories, etc., and Notes recording the occurrence of uncommon species and other useful and interesting facts.

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DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
TYRONE NATURALISTS' FIELD CLUB.

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THE NIGHTJAR.

BY JAS. P. BURKITT, A.M.I.C.E., B.A.

My writing on this queer bird would be impertinent as this is my first season's acquaintance with it, were it not that over forty visits to a bird not easily visited or observed may perhaps justify the recording of the result of careful notes. I have no desire to commit the sin of generalising; but what I note here consistently applies to my own observations.

I first heard the bird on May 22nd. When it really arrived I do not know. The site is a large bog about a mile long by one-third mile broad with turf cutting round all the border, bounded on most of one side by a belt of more or less thin timber.

The border of bog next the timber is "cut away" ground covered mostly with deep heather and bushes for about 120 yards out, the next 120 yards being turf banks and semi-drained bog, and then undrained bog. Part of the timber belt is nearly cut away, leaving a line of Bracken bordered by some trees. The favourite feeding ground for at least the first hour of the night is the scrubby border and "cut away," though occasional flights over the bog are also taken. After the first hour there is very little sound emitted and hence one cannot locate them so well.

The various notes are as follows: (1) The whistle, a strong peremptory *kree*, generally a single one, but also three or four at intervals of about a second. This is the first note starting from roost and the general note by *both* parents. It is made flying, perching or standing. (2) The well-known song like a reaping machine is made on a perch—a turf clamp or bush. It frequently ends off in a kind of gurgle on leaving the perch if the mate is near. I am conclusively satisfied that the female makes this note also, though not often, and it appears to be only in answer to the male and as it were an echo and not so strong. The song is very varied in strength and both it and the whistle can be heard up to nearly half a mile under suitable conditions. (3) The next note is the wing clap made upwards in flight. This is done only in company, the mate not

being far away and generally both birds doing it together. It does not carry far. (4) Then there is the repeated *chuck chuck* which is used both as an alarm to the young and a call to them. In the latter case it is very low; in the former it may at times be stronger but not nearly as strong as the Snipe's similar call. On flushing the bird at any place it seems to make one such low *chuck*. It appears to be naturally the female which uses this note most, but both parents use it. (5) Finally there is a low bubbling note of the same nature as the song, audible perhaps 50 yards away. This note has been used by both birds within a few feet of me. It has been made by the parents near the young, and by the male (perched or lying) making his first call or visit to the sitting mate. *Thus no note is peculiar to one parent.*

The male roosts either in trees or on the bog—it seemed mostly the latter—on a dry bare spot well indicated by a foot circle dotted with many-coiled whitish spherical excrement about $\frac{3}{8}$-inch diameter. In the cases observed, the bird roosted any distance up to 200 yards or even more from the nest, but when chicks came out it appeared to roost closer for a while; on a couple of occasions in the first fortnight being right beside the female.

Nearly all the observations which I made are confined to about the first hour of the evening: in May to the first ten minutes, and in early August to the first half-hour. I cannot vouch for the early hours of the morning. The bird leaves its roost from 9.50 p.m. (summer time) in end of May to 10.25 early in July and back to 9.30 early in August. It begins by flying very low, skimming the lowest ground along the shadows or low bog banks. It can thus in quite fair light leave its nest in short heather within 25 yards of a crouching observer without being noticed, unless one is well situated for a sky line. It is puzzling to hear the whistles and see nothing. After five minutes or so they fly more freely. The flight may on the whole be described as tern-like, there being much hovering and diving with wings pointed up. I have on occasion seen them soar up for a few seconds like a Snipe. Walking appears foreign to the bird. I have never seen it done. Even for a yard it flies; and the nestling seems to do the same (see below, p. 160). It perched and sang several times

on a quarter-inch branch. It seems to have little or no scent judging by its repeatedly singing and making all the other notes within a few feet (even two feet only) from me and returning again.

While the female was hatching the consistent evening practice was as follows :—The male leaves the roost with a whistle (except when roosting at nest) and flies—not straight—towards the nest making intermittent whistles, the last ones being close to the nest. Then he goes out over the bog silently, I suppose to spy round, and in about a minute returns to near the nest and whistles there, and alights. The female then slips off to him, or in the early sitting he goes right to the nest and escorts her off. They together then fly with whistling and wing clapping to some low dry turf bank or clamp which is a good distance away—about 150 yards, and there she preens herself and he will sing near. Later they return to nearer the nest ground and he will sing at favourite perches while she hunts. This habit of the pair alighting early at a distant spot misled me altogether as to the nesting site. In this case the nest was consistently located as at the end of the first set of whistles and the beginning of the second set. The same general practice of the male whistling up to the nest is followed after young are hatched.

As to the usual nesting ground I am no authority. There were two pairs on this bog (just possibly three) and I got the two nests. The one I almost entirely watched was on uncut bog partly drained, within 20 yards of the undrained bog and within 25 yards of turf spreading. It was on a bare two-foot spot in thin heather and Bog Myrtle. After a wet evening the eggs were in water ; the bird must have been sitting in water.

The other nest was on the dry peat thrown up along the edge of a pioneer drain on the fringe of an undrained bog and 70 yards from turf cutters. Before finding the nests, I wasted a lot of time looking for them amongst scrub belt and tall Bracken. To an early nesting bird on or near turf banks the turf cutting must upset its plans as turf may be spread on fresh ground till July 1st, er even a month later. The nest I watched was not laid up till July 1st—the other was earlier. The farmers remembered a nest laid on a turf path, but of course deserted when traffic commenced.

Normally the bird seems to allow one within 5 or 6 yards. As to a bird on eggs, I avoided trying to go closer for fear of upsetting its regular course. If flushed off its nest it flits about the ground to lead one after it. The sitting bird in day time watches one with eyes nearly closed like slits, or with the shaded eye open. When one is close to the eggs at night and the parents off, my experience is that they generally keep dead silent ; and when young are out they are more likely to *chuck* at one when 50 or 100 yards away than when closer. They may silently circle round you up to 200 yards away.

For a few days after hatching out, the male replaces the female on the nest, when he has called her off, as described above. My nestling had first a dull grey down with a brown spot at each wing and at tail. On the 5th day it was mostly dark brown with little of the down left, on the 8th no down left. It had not moved its position in the slightest up to the 8th day, on the 10th it had turned, on the 12th it was well feathered and had a tail, and I found it three yards from the nest.

This was the start of a regular practice to make a short flight of a yard or two after the parents left it at dusk. But I always found it back at the original site next day. On the 14th it could hide ; on the 16th it made two flights of 20 yards when disturbed by me ; on the 18th it was still back at the original site, and on the 21st it was only a yard away ; on the 26th I could not find it. In my other case the birds long hankered after the nest neighbourhood by night and day. I flushed a bird on August 15th on that old nest site itself and after two more flushes it returned to the same spot.

The site of a nest is well marked, as above described for roost, by similar excrement, only that as the young shift their ground the marks extend. Thus in my second case their shifting 10 yards along the dry edge of the drain was clearly marked. A number of $\frac{1}{4}$-inch quartz pebbles are also brought by the bird.

When handling the half-grown young I noticed that no matter how quickly I turned the body, the flat head kept dead level, as if quite unconnected with the body, even to almost a complete turn.

Enniskillen.

NOTES ON LEPIDOPTERA FROM EAST TYRONE IN 1916.

BY THOMAS GREER.

THE spring of 1916 was unusually cold and backward, and the wind most of the time in the north or east; and the early sallows were all spoiled by the frost. Towards the middle of April the weather showed some improvement and insects began to appear in some numbers at the sallows; *Taeniocampa gracilis* being very abundant and the var. *rosea* not uncommon, and I secured a single fine ab. *rufescens*, a few also of the silver grey-banded form of *T. incerta* occurred.

At the end of the month I spent an evening on the mountains, where in a small ravine I took a few *T. gothica* var. *gothicina* at dwarf sallow bloom; this spot is about 1,000 feet above sea level, and most of the var. *gothicina* that I have met with have been captured here. Later in the year *Hydriomena ruberata* is often common flying about this sallow scrub.

Hemaris tityus (*bombyliformis*) appeared early, considering the cold weather, about the middle of May, and was more abundant than usual; I counted no less than six on the wing at the same time, in a marshy meadow where Pedicularis, which was the attraction, grows in plenty.

At the end of the month another local insect was common in the same meadow, viz., *Melitaea aurinia*. I also found it flying in numbers in several marshy localities where it is usually rare or absent.

This species is supposed to be universally but locally distributed throughout Ireland, but in Ulster it appears to be absent from the north-eastern counties of Antrim, Down, and Armagh, and is very rare in Co. Derry, only two or three specimens having been captured; the only Ulster counties where it is locally abundant are Donegal and Fermanagh.

A visit to a locality where Spindle-tree (*Euonymus europaeus*) grows in plenty gave me several *Ligidia adustata*, which were beaten out of the bushes in the daylight; at the same time *Lozogramma petraria* was abundant among the

bracken and *Eurymene dolabraria* occurred at dusk among the hazel scrub. Early in June I collected a number of the larvae of *Dasychira fascelina*, but all were infested with parasites, and under natural conditions few must reach the imago state, judging by its scarcity compared with the abundance of larvae; and later I secured in the same locality two larvae of **Polyploca flavicornis*.

Dianthoecia conspersa and *cucubali* were common at dusk, at Ragged Robin (*Lychnis flos-cuculi*) but *D. capsincola* and *Hecatera serena* in some numbers frequented Bladder Campion (*Silene inflata*), the latter species being of the dark suffused type.

Early in July *Zygaena lonicerae* appeared, but was much less common than usual; a large number of the cocoons being found torn open and the contents gone; *Z. filipendulae* was not effected in this way, as the cocoon is placed low down among the herbage. To make up for the scarcity of the former insect, I discovered a locality where both occurred, and captured seven interesting hybrids; these vary from steel blue to bronzy green, are six-spotted with the outer spot small or almost absent, and a broad border to the hind wings. I also bred a nice variety of *Z. filipendulae* of a semi-transparent light steel blue, the spots and hind wings being pink; a parallel form to the ab. *eboraceae* of *Z. lonicerae*.

I spent several evenings on the bogs at Lough Neagh, and found *Selidosema ericetaria* flying in abundance, and beat out of birch bushes at dusk three *Drepana falcataria* and one *Acidalia inornata*. I took also *Atolmis rubricollis* at rest on a pine trunk.

In the month of August in the same district the rare littte moth **Dyschorista suspecta* was discovered; as far as I can make out this species has not been met with in Ireland since Bouchard's captures at Killarney in 1859. It was fairly abundant, flying over the heather at dusk and at heather bloom after dark, but being of a shy and retiring nature, it gets well into the clumps of heather; and its various colours harmonise so well with the fallen birch leaves and its surroundings, that it is not easily seen, and at the slightest shake drops like a stone and is lost. Among the number which I took the following forms occurred: var. *pallida* Tutt, the commonest form;

vars. *congener*, *variegata* and *rufa* Tutt, several, and one var. *nigrescens-variegata*, Tutt.

An afternoon spent in overhauling beds of Typha on the bogs gave me a number of the pupae of *Nonagria typhae*, as many as three pupae being found in one stem of Typha. Late in the month an unexpected addition to the local lepidoptera was made, by the capture of **Agrotis vestigialis* on the sandy shore at Washing Bay; this littoral species has been recorded inland from the Brecksand district of Norfolk, a coast-line of bygone days. Its occurrence on Lough Neagh is in keeping with the maritime character of a group of the local fauna. At the same place **A. nigricans* and a puzzling species of Hydroecia were common on the Ragwort.

Towards the end of the month *Agrotis agathina* began to appear on the heather and was plentiful early in September, and I captured in various localities some nice forms such as *rosea* Tutt, *hebridicola*, Stand., and *scopariae* Mill. This is another species whose Irish distribution is very little known, being only recorded from Howth, Derry (rare), and Clonbrock. In this district it is widely spread and abundant in suitable seasons; it is also sometimes frequent at Churchill, Co. Armagh.

While searching for *A. agathina* after dark on the Lough Neagh bogs I happened to find a larva of **Acronycta menyanthidis* at rest on the heather, and a visit on the following afternoon showed them in numbers feeding solely upon *Calluna vulgaris*, although *Myrica gale* also grows abundantly on the bogs. This area of bogland will soon be cut away to supply turf for the mills at Portadown and the interesting species which occur there will disappear. I tried "treacle" for the first time in September, in Killymoon demesne and captured a pair of **Amphipyra pyramidea*, another addition to the local list. *Vanesso io* has appeared again in numbers here this autumn and seems to be increasing.

In the foregoing rambling account I have only mentioned the more noteworthy species. The season's work has resulted in the addition to the county list of the six insects marked with an asterisk, and of eight new to the local list of lepidoptera.

Stewartstown, Co. Tyrone.

CENTIPEDES AND MILLIPEDES.

A Systematic Note.

BY PROFESSOR GEO. H. CARPENTER, M.SC., M.R.I.A.

Several recent papers in the *Irish Naturalist*—such as those of Mr. Nevin H. Foster,[1] and of Miss Hilda Brade and Mr. Graham Birks[2]—afford encouraging evidence of the interest that is being taken in those obscure and difficult animals the centipedes, the millipedes, and the Symphyla. Introducing his list of Irish species of the last-named group, Mr. Foster informs us that "by some zoologists the Symphyla are regarded as an order of the class Myriopoda, whilst others consider them as worthy of Class rank." The faunistic worker at such groups as these finds abundant mental exercise in the discrimination of genera and species, but it is well not to neglect the relationships of the higher divisions, and my friend's remark incites me to offer a few suggestions which may help to put the study of these crawling creatures in connection with that of other classes of Arthropoda.

For many years past I have been convinced that the Symphyla as well as the centipedes (Chilopoda) and the millipedes (Diplopoda) are "worthy of class rank," and consequently that the time-honoured "class Myriopoda" —or "Myriapoda" as the word is more generally spelt— ought to disappear from systematic zoology. This view was put forward thirty years ago[3] by R. I. Pocock, and strongly enforced by him in a later paper,[4] which deserves careful study by all naturalists who work at the Arthropoda. The class Myriapoda was established in 1797 by P. A. Latreille,[5] who defined its members as possessing an

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[1] "Natural History Notes from Carlingford." *Irish Nat.*, vol. xxiv., 1915 (pp. 103-4). "Distribution of Symphyla in Ireland." *Ib.*, pp. 174-5.

[2] "Two Irish Chilopods." *Irish Nat.*, vol. xxv., 1916, pp. 121-135.

[3] "On the Classification of the Diplopoda." *Ann. Mag. Nat. Hist.*, (5) vol. xx., 1887, pp. 283-295.

[4] "On the Classification of the Tracheate Arthropoda." *Zool. Anz.* vol. xvi., 1893, pp. 271-5.

[5] "Précis des Caractères Génériques des Insectes, disposés dans un Ordre Naturel." Paris.

antenniferous head, distinct from the body, mandibles with a conical basal process, two pairs (at most) of maxillae, a lower lip, and seven or more pairs of legs. To this class he referred not only centipedes and millipedes, but also the Isopoda—now universally regarded as a crustacean order. In most zoological systems the "class Myriapoda" has been restricted to Latreille's "genera" Iulus and Scolopendra, that is to say, the millipedes and centipedes—those air-breathing (tracheate) arthropods that bear a considerable number of pairs of generally similar legs on the body-segments which are not differentiated into thoracic and abdominal regions as is the case in Insecta, Crustacea, and Arachnida. The superficial resemblances between millipedes and centipedes—the single pair of feelers on the distinct head, the elongate worm-like body with its usually large number of segments and similar paired limbs—made this association easy of acceptance

Now Pocock, in the paper mentioned above, points out that—despite the superficial likeness—centipedes differ widely from millipedes in a very important structural feature—the position of the reproductive apertures, which in centipedes are situated on the hindmost segment but one, and in millipedes only a short way behind the head—on the third segment of the body. In this character, therefore, centipedes resemble insects, while millipedes are like crustaceans and arachnids. Pocock lays so much stress on this character that he proposes a fundamental division of the Arthopoda into two great series: (1) the Progoneata, including Crustacea, Arachnida and Diplopoda (millipedes), and (2) the Opisthogoneata, including Chilopoda (centipedes) and Insecta. Pocock included the Symphyla (Scolopendrella, etc.) in the latter group under the erroneous belief that in these animals the reproductive apertures are far back, whereas they are—as in millipedes—far forward, on the third segment of the body.

Besides the position of the reproductive openings there are several other important structural distinctions which forbid us to include millipedes and centipedes in a single class. Centipedes have segments with extensive sterna so that the legs are attached laterally to the body which is flattened dorso-ventrally. In millipedes the sternal

region is so greatly reduced that the legs seem attached close together in the mid-ventral line, this modification involving a corresponding displacement of the spiracles. The air-tubes of millipedes are far simpler than those of centipedes. And it is well known that in the great majority of millipedes most of the primitive body-segments become fused together in couples, so that each apparent segment in the adult carries two pairs of legs. No doubt can be entertained—if these considerations be given due weight —that centipedes are more nearly related to insects than they are to millipedes. If millipedes and centipedes be placed in one class, insects must also be included in the same class, which can then no longer be termed "Myriapoda." But the more reasonable arrangement by far is to treat each group as an independent class.

Another important distinction between centipedes and millipedes is found in the appendages of the head. In a centipede, such as Lithobius, there are elongate feelers, mandibles, two pairs of maxillae, and a pair of poison-feet belonging to the first body-segment. In a millipede like Iulus there are short feelers, mandibles, and a plate-like "gnathochilarium" made up apparently by the partial fusion of a pair of maxillae. Sir Ray Lankester, who strongly supports[1] the abolition of the class Myriapoda, lays very great stress on this difference in the jaws, defining the millipedes as "monoprosthomerous" (with only one maxillary segment) and the centipedes and insects as "triprosthomerous" (with three maxillary segments). This distinction cannot, however, be maintained. In a study of the jaws of that interesting primitive millipede Polyxenus[2] I demonstrated the presence of a pair of maxillulae in addition to one or two pairs of maxillae. Subsequently Miss M. Robinson[3] in an embryological study of a large Iuloid millipede has recognised a tritocerebral segment in front of, and a maxillular segment behind

[1] "The Structure and Classification of the Arthropoda." *Quart. Journ. Micr. Sci.*, vol. xlvii, 1904, pp. 523-582.

[2] "Notes on the Segmentation and Phylogeny of the Anthropoda, with an account of the Maxillae in Polyxenus lagurus." *Quart. Journ. Micr. Sci.*, vol. xlix., 1905, pp. 469-491.

[3] "On the Segmentation of the Head of Diplopoda." *Quart. Journ. Micr. Sci.*, vol. li., 1907, pp. 607-624.

the mandibles, as well as a post-maxillary segment behind the gnathochilarium. These discoveries show that the monoprosthomerous condition of the millipede head is a specialized not a primitive condition, and support that argreement of head-structure throughout the Arthropoda which I advocated in the paper just quoted.

If the centipedes and millipedes then be relegated to distinct classes, the Symphyla must also be regarded as a distinct class. These frail little creatures are of high interest, as their general appearance suggests that they form a connecting link between those primitive insects the Thysanura and the centipedes, while in the position of the reproductive opening they resemble the millipedes. In the segmentation of head and body they seem to agree exactly with a thysanurous insect on the one hand and with Polyxenus on the other, so that their name—Symphyla —well indicates how they form an annectant group with affinities at once with millipedes, centipedes and insects.

A tabular arrangement of the classification advocated in this note may be of service to those interested in the subject :

CLASS DIPLOPODA.

Order Chilognatha.
Iulidae. Chordeumidae. Polydesmidae. Glomeridae.

Order Pauropoda.
*Pauropidae.**

Order Pselaphognatha.
Polyxenidae.

CLASS SYMPHYLA.
Scolopendrellidae.

CLASS CHILOPODA.

Order Epimorpha.
*Lithobiidae. Scutigeridae.**

Order Anamorpha.
Scolopendridae. Geophilidae.

In the above arrangement the series begins with the more highly organised of the millipedes, from which a

* Not yet recognised in the Irish fauna.

"descending" series leads to the primitive annectant Symphyla, these being followed by the centipedes in "ascending" order. In a natural, phylogenetic scheme, the Symphyla would stand at the base of the assemblage near the Thysanura among the insects, while the millipedes and centipedes would form two divergent classes. An attempt at such a scheme may be found in a paper of mine published thirteen years ago.[1]

Royal College of Science, Dublin.

A COMPREHENSIVE AUTHOR-INDEX.

The present volume—the twenty-fifth of the *Irish Naturalist*—is now nearing its completion, and it has been thought that a carefully-compiled author-index of the whole series might be valued by our readers. We propose therefore to issue such an index as a concluding double-number for November and December of the current year. We are able to do this through the great kindness and energy of Mrs. R. F. Scharff, who has spent much time on a tedious piece of labour which will greatly facilitate the work of those who may have occasion to consult the pages of this Magazine.

IRISH SOCIETIES.

DUBLIN NATURALISTS' FIELD CLUB.

September 23.—Excursion to the Dingle.—A small number of members and visitors travelled from Harcourt Street to Carrickmines by the 1.35 train. A walk across the fields brought the party to the Dingle, and as the weather during the preceding weeks had been very fine the sole of the gap was quite dry, and members were able to pass through the dense thicket of Holly, Oak, Hazel, Wild Cherry and Rowan which fills the northern end of the Dingle. During the walk the conductor, J. de W. Hinch, pointed out the evidence which proves that this gap is the old overflow channel of a glacial lake. From the glen the party walked to the Scalp, and after tea returned to Dublin by train from Carrickmines.

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[1] "On the Relationships between the Classes of the Arthropoda." *Proc. R. Irish Acad.*, vol. xxiv. (B). 1903, pp. 320-360, pl. vi.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a large Patas Monkey from Mr. T. K. Laidlaw, two Rabbits from Mrs. Light Gordon, a Barn Owl from Mr. W. F. Cleeve, a Golden Pheasant and three Silver Pheasants, two Ringdoves, five Pigeons and a Cockatoo from Mr. Norman Robinson, two Black Mangabeys, three Caratrix Monkeys, a pair of Mongooses, a pair of African Cape Hyraxes, and a Great Anteater have been received in exchange for a pair of Lion Cubs.

The Anteater is a highly interesting addition to the Society's collection. He is kept in the monkey house, and may be seen on most days between eleven and two, and again for a few hours in the evening ; the rest of the time he spends in sleep. The method of feeding by means of the long flexible tongue is remarkable. The Hyrax (*Procavia capensis*) has not been shown alive in Dublin for very many years. These animals form an aberant group of ungulates especially characteristic of Africa, but with a single species—the " Coney " of the Authorised English Bible—in Syria and the Sinaitic peninsula.

NOTES.

ZOOLOGY.

Brachytron pratense in Co. Wexford.

This local species was amonng the Dragonflies observed by me at Ballyhyland during the summer of the present year. Only a few individuals were noted. *Brachytron pratense* is not new to County Wexford, being recorded from Rosslare by Messrs. J. F. X. King and J. N. Halbert in their List of the Neuroptera of Ireland (*Proc. R.I.A.* xxviii., see B. No. 2) ; but as it appears to be seldom met with I think a new locality is worth mention. I have seen the same insect on rare occasions in previous summers, but felt some distrust of the correctness of my identification until the present year.

C. B. Moffat.

Ballyhyland, Co. Wexford.

Turtle Doves in Cos. Dublin and Meath.

For the last three years we have had records of the occurrence of Turtle Doves in our neighbourhood. This year they were observed by Captain Taylor, D.L., at Ardgillan Castle on 24th May. They were afterwards seen by Dr. George Scriven more than once at Hampton Hall, and on June 13th were seen at Gormanstown in Lord Gormanstown's demense, the gamekeepers were unable to ascertain whether they were breeding or not. We have had the Grasshopper Warbler again at Balbriggan, but I am unable to claim the Quail this year as an honoured visitant.

Charles W. Benson.

Balbriggan.

Snipe Carrying Young.

As I was getting some work done in my bog at Kilkenny West near Lissoy (Goldsmith's "Deserted Village") I saw a snipe rise from a mud bank in a bog drain carrying a young one, and fly about thirty yards with it. It seemed to fly with considerable difficulty, and before it alighted the young bird was dangling down from it apparently held by the head only, and seemed to be slipping from its grasp. The old bird seemed to be supporting the young one with both bill and claws, at any rate it was all doubled up, its bill meeting its claws, and though I was very close to it when it rose I did not realise what bird it was till it dropped the young one. It came back to where I stood and flew round close to me several times. We soon after discovered another young snipe just dead from drowning beside the spot where the first was rescued; it seemed to be about two or three days old. There was a dog hunting alone about the spot when we were coming up, so I suppose the young birds were frightened into the water by this dog. The banks of the drain were high and steep, making it impossible for the birds to climb out, but the one I saw rescued managed to get on the mud bank which was just level with the water and was rescued by the old bird. As I do not remember to have heard before of a snipe carrying its young, I thought you might think it worth recording in the *Irish Naturalist.*

W. J. Nash.

Glasson, Athlone.

Short-eared Owl on Migration at Rockabill Light Station.

At 7.20 p.m. (8.20 p.m. Summer time) as dusk was setting in, I observed a brown owl (Short-eared to the best of my belief) flying round the rock. If flew completely round three times, keeping close to the water's edge and some fifty yards high. The flight was rapid. On the fourth round it made a dash among a party of Turnstones perched on a reef, and caught one, and then gliding down to the far side of the "bill" disappeared from sight. The gulls, a great throng, on seeing the disaster rose with one accord, and with loud cries made for the land in the late twilight. Even the Great Black-backed Gulls went off.

C. J. Patten.

The University, Sheffield.

Nightjar on the Black Rock, Mayo.

Mr. Godkin of the Black Rock lighthouse informs me of a Nightjar on the rock last autumn. He says, "A Fern Owl landed exhausted in October last and died in a few days." This is, so far as I know, only the second occurrence of the Nightjar at an Irish light station in autumn. The previous occurrence being at the Tuskar Rock (see Barrington's "Migration of Birds," pp. 175-176. "August 11th, 1888—one at light all night").

Robert F. Ruttledge.

Hollymount, Co. Mayo.

Local Name for Irish Jay.

As the Missel-Thrush is, throughout Ireland, almost universally called the Jay, some difficulty is experienced about provi ing the true Jay with a popular name in those districts in which it is a somewhat recent settler. In this part of N.W. Wexford (where I first saw it in 1891) the names of "Strange Jay" and "Foreign Jay" were applied to it soon after its arrival; but now it has been with us twenty-five years a more definite opinion has evidently come to prevail on the subject of its origin, for I hear it commonly spoken of as the "American Jay." Thus, by a capricious inversion, one of the very few birds in our fauna that can be claimed as exclusively Irish is set down in the local vocabulary as an undoubted alien, while a real invader which is not known to have been much more than a hundred years resident amongst us is accepted as our only true native "Jay".

C. B. Moffat.

Ballyhyland, Co. Wexford.

British and Irish Ornithologists.

We have received from Messrs. Macmillan & Co. Part iii. of W. H. Mullens and H. Kirke Swann's "Bibliography of British Ornithology from the earliest times to the end of 1912." The complete volume will be a valuable work of reference with a short biographical notice of each ornithologist and a complete list of his writings on birds.

Daubenton's Bat in Co. Wexford.

A haunt of Daubenton's Bat was discovered here this summer by a man named Thomas Doran, who was struck with the unusual spectacle of a number of bats "with a good deal of white in their colour" skimming over a small piece of water close to his house. On being told of the occurrence I watched beside the pool, and had the satisfaction of seeing the white-breasted figure of *Myotis daubentoni* begin its gliding flight about the surface of the water some sixty-six minutes after the local sunset (*i.e.*, at 9.15 p.m. on evening of July 23rd). The late hour at which this bat makes its appearance is probably the chief reason why it has not been noticed in a much larger number of localities. It has already been recorded from County Wexford, on the strength of a specimen sent to Mr. Barrington in 1891 from the Lucifer Shoals light-ship; but as the lightship in question is situated nine miles off the coast I think it is not superfluous to add a mainland station.

C. B. Moffat.

Ballhyland, Co. Wexford.

Entomological Notes from South Donegal.

I spent September at Coolmore, but owing to broken and rather cold weather insects were by no means abundant. The Peacock Butterfly (*Vanessa io*) was much in evidence on any fine day. I saw also a few Small Tortoiseshell Butterflies (*Vanessa urticae*) but neither a Painted Lady nor a Red Admiral. Other butterflies observed were the Large White (*Pieris brassicae*), the Small White (*P. rapae*), the Green-veined White (*P. napi*), the Wall (*Pararge megaera*) and the Small Copper (*Chrysophanus phloeas*). At Brown Hall, near Ballintra, I saw the Silver-washed Fritillary (*Argynnis paphia*) and the Speckled Wood (*Pararge egeria*) on the wing. I got larvae of the Marsh Fritillary (*Melitaea aurinia*) in the young stage in webs on heather. Larvae were numerous, and I observed those of the Elephant Hawk Moth (*Chaerocampa elpenor*) on Yellow Bedstraw, the Poplar Hawk Moth (*Smerinthus populi*) on the Bay-leaved Willow, the Buff-tip Moth (*Phalera bucephala*) mostly on sallows where they were causing considerable destruction of foliage, the Tiger Moth (*Arctia caia*), the Ruby Tiger (*Phragmatobia fuliginosa*), the White Ermine (*Spilosoma menthastri*) and the Buff Ermine (*S. lubricepeda*); the two last were mostly travelling about looking for a resting-place for the winter. The handsome caterpillar of the Oak Egger (*Lasiocampa quercus*) was conspicuous on various plants, also that of the Fox Moth (*L. rubi*). I did not notice any larvae of the Puss Moth, though in other years it was common, but the larva of the Grey Dagger (*Acronycta psi*) was common enough. Among Coleoptera I observed *Ocypus olens* several times; on one occasion it was busy trying to climb the stone parapet of a railway bridge, with what end in view I could not understand, but it did not seem likely to accomplish its ascent as the last I saw of it, it had fallen to the ground and seemed somewhat discouraged. I noticed quite a number of *Chrysomela Banksi* on herbage. They seemed to be freshly emerged and I noticed one pair *in cop.* I saw a couple of *Creophilus maxillosus* and one or two Philonthus. I saw a *Pterostichus vulgaris* on the road and a *Pt. versicolor* among herbage. Bees were fairly plentiful; I noticed *Bombus lapidarius*, *B. lucorum*, *B. muscorum* (*smithianus*) and *B. agrorum*, and I captured a single *Psithyrus campestris* Panz., a female. *Mellinus arvensis* was busy on sunny days on a sand bank, but I did not see any on the wing through the sandhills. Males of Halictus were pretty common on flowers, and one that I took proved to be *H. longulus*. I took a female example of *Salius exaltatus*, running after its manner among herbage on a grassy bank. It is exceedingly active and very difficult to catch, for just as you think you have it, it makes a sudden dart and eludes capture.

Ants were swarming and I captured a few on the wing, which proved to be males and females of *Myrmica ruginodis*. I took some Ichneumon Flies, but these I shall have to deal with in a future paper.

The fewness of insects shows the effects of the cold wet spring and early summer. Nothing, however, showed the effect more plainly than the scarcity of wasps, for I saw hardly any.

W. F. Johnson.

Poyntzpass

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THE IRISH NATURALIST, VOLS. I.-XXV.

AUTHOR INDEX.

BY ALICE SCHARFF.

The want of comprehensive Indexes to the growing number of volumes of the *Irish Naturalist* has been felt for some time. In 1911 the late R. M. Barrington published at his own expense an Index to vols. i.-xviii., compiled by cutting up and pasting down in alphabetical order the annual indexes issued with each volume. These annual indexes displayed some inequality of treatment, and this, combined with the accretion of seven volumes more, suggested the compilation of a general index to include the matter published during the first quarter-century of the *Irish Naturalist's* existence. In consultation with the Editors, it was decided to compile an Index of Authors, funds not permitting of the printing of the much larger amount of matter that would have been involved had subjects also been included. As regards arrangement, etc., the Index explains itself; it may be pointed out that in the case of reports of meeting of Societies, the Society stands as the author, except in cases where an abstract of a paper read contains definite information; then an entry is made also under the reader's name. I hope that the Index will prove useful to workers at Irish natural history.

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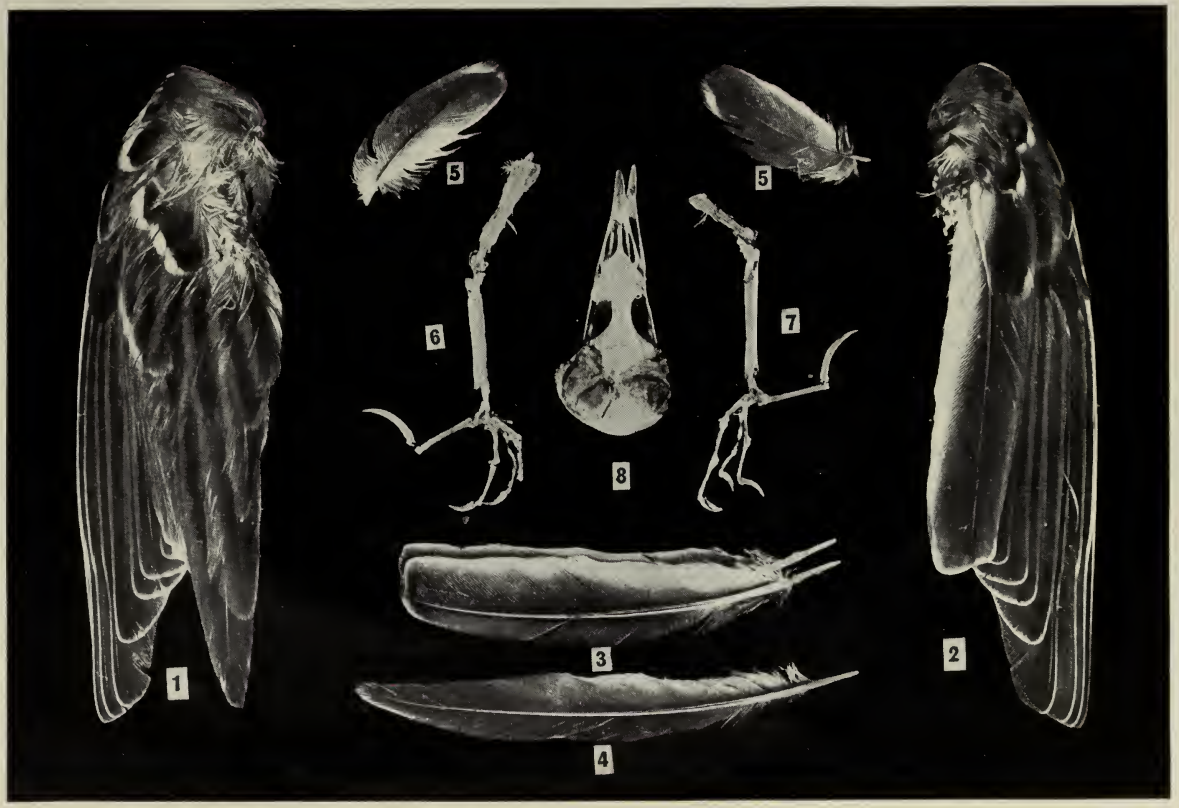
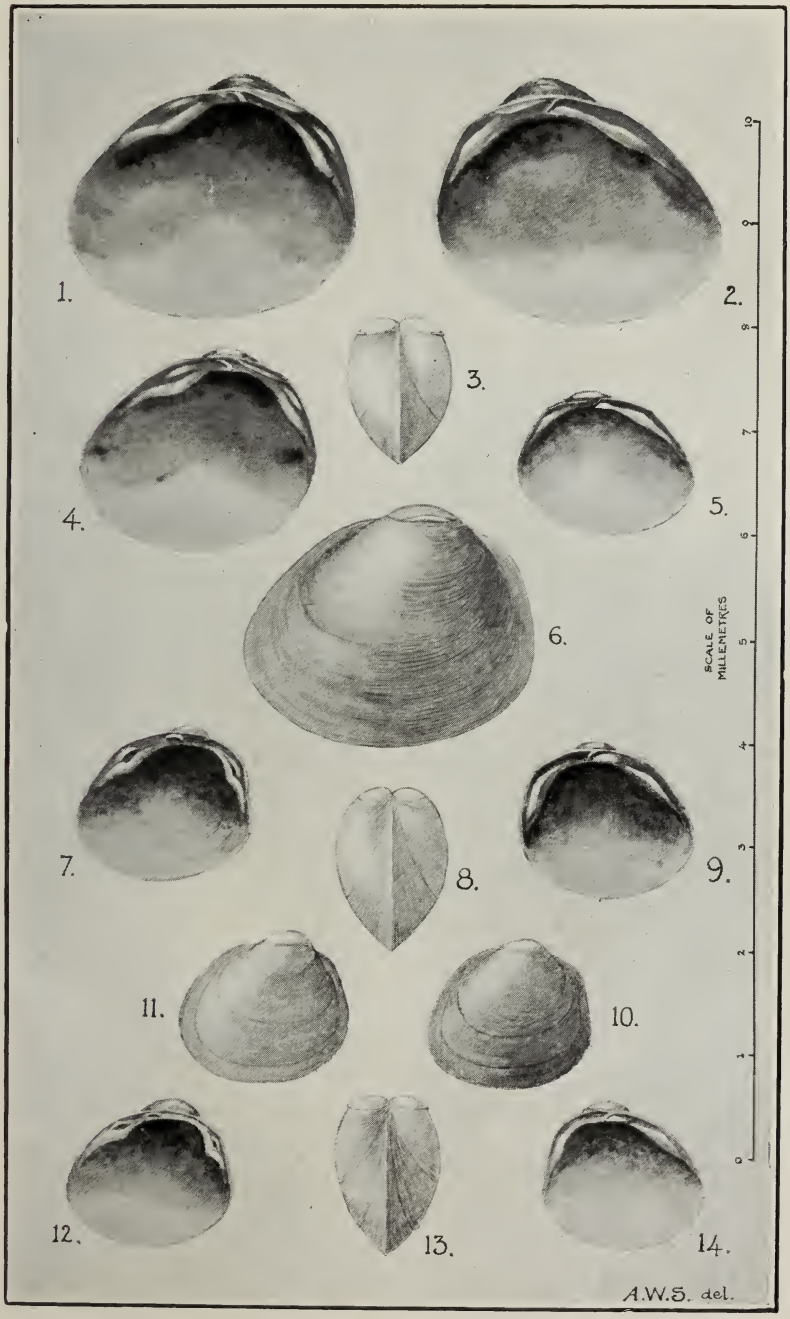


Fragmentary Remains of Tree-Pipit from Tuskar Rock, Co. Wexford.
Natural Size.

To face page 85.

C. J. Patten, Photo.



Pisidium supinum A. Schmidt and P. parvulum Clessin.
(Figs. 1 to 6). (Figs. 7 to 14).
Magnified 13½ diameters.