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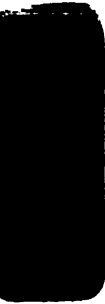
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# *The Irish Naturalist*

Royal Zoological Society of Ireland,  
Dublin Microscopical Club, Belfast Naturalists' Field Club



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The Armagh Natural History and Philosophical Society ;  
The Cork Naturalists' Field Club ; The Limerick Naturalists' Field Club.*

EDITED BY

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## ERRATA.

- Page 51, lines 11 and 13, for "leaves" read "hairs."  
 " 137, line 6, for "MARCH" read "APRIL."  
 " 179, line 21, for "*H. allaria*" read "*H. alliarica*."  
 " 231, line 23, for "*Necordes*" read "*Necrodes*."

TO THE BINDER.

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Plate 2 (Mitchelstown Caye) was inserted in the number by error opposite page 100. It should face page 101.

# The Irish Naturalist.

## VOLUME V.

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### A FORTNIGHT WITH THE BIRDS OF CONNEMARA.

BY HARRY F. WITHERBY, F.Z.S.

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ON May 18th last, I arrived in the town of Galway intent on exploring Connemara. My sole object in so doing being to find out as far as possible what birds were there, and to note their habits and breeding-haunts.

It may be as well to say at once that the following record is very incomplete as regards inland birds, chiefly because, finding the country uninteresting and the birds few, I made my way as quickly as possible to the coast. Consequently this paper must not in any way be taken as a record of all the birds to be found in Connemara, but at the same time it is to be hoped that these few notes may be of some interest to Irish ornithologists.

Birds are fairly numerous round Galway town. Yellow Hammers, Blackbirds, Thrushes, Robins, Wheatears, Chaffinches, Willow Wrens, Cuckoos, Corncrakes, Jackdaws, and Magpies abound. All through Connemara I was struck by the numbers of Corncrakes and Jackdaws. The absence of the Whinchat, and more especially of the Stonechat, and the omnipresence of the Wheatear, are also remarkable.

After one day only in Galway I went on to Oughterard, but as I confined my attentions to Lough Corrib and its islands, which have already been explored by Mr. Ussher, there will be little important to say of my stay there. Of small birds I found the Reed, Common and Yellow Buntings, Chaffinches, and Blackbirds tolerably common on the islands, and Sedge-warblers especially so. A Reed-bunting's nest with eggs several feet up a tree was peculiar. Some of the islands boasted a pair of Magpies, while others literally swarmed with nesting Wood Pigeons. On one island I came across a

A

remarkable eccentricity, which has already been reported to the *Zoologist*.

“The island to which I refer was thickly wooded with small firs, oaks, willows, and other trees and shrubs. Round the edges of the wood there was a line of high heather. Wood Pigeons were breeding in considerable numbers in the wood ; but as I was going round the edge of the island I almost stamped on a Wood Pigeon which rose from out of some high heather. Thinking that this was a curious place for the bird to be feeding, I looked down amongst the heather. In the midst of a thick clump of tall heather was a Pigeon’s nest, composed of a few sticks placed literally on the ground. The nest contained one egg. This seemed very strange, but I thought it must be an accident. On the other side of the island, however, I flushed another Pigeon in the same way, and found another nest in exactly the same sort of position, but this nest contained quite a big young one. There seems no accounting for this curious fact. The birds must have nested in this position by deliberate intent. Yet there were plenty of good trees for their purpose, where other Pigeons were breeding.”

As regards sea-birds on Lough Corrib—the Black-headed and Lesser Black-backed Gulls I found breeding on several islands, and the Merganser (*Mergus serrator*) was no doubt nesting, as I saw several pairs but found no eggs. This bird is locally known on Lough Corrib as the Shield-duck. A number of Dunlin, some of which were singing beautifully, were flying about in small flocks, and the Common Sandpiper was breeding fairly plentifully. A few Cormorants visit the lake every morning and evening to feed. The Wild Duck (*Anas boschas*) was breeding fairly numerously, but although I heard various rumours from the fishermen of Widgeon and Pochard I was unable to confirm them.

Recess, in the centre of Connemara, was my next stopping place. A more barren country for birds I never came across. The scarcity of birds is no doubt due to the scarcity of food. The mountains—the celebrated Twelve Pins—are stony and barren, and can support nothing. The rest of the country is a flat plateau of bog, studded with small lakes. One would expect to find the bog swarming with Snipe, but not a single one could be seen, and I was told that even in the hardest

winters they were very scarce. A few pairs of Golden Plovers and innumerable Larks were nesting on this dreary expanse of miles and miles of flat bog, but beyond these, and now and then a Hawk sweeping by in the far distance, not a bird was visible. All the bird-life seemed to be concentrated in the lakes, every one of which has one or more islands, and, curious to say, in the midst of this treeless, shrubless waste, these islands are thickly covered with heather, willows, dwarfed oaks, and other trees. It would, no doubt, repay anyone who would take the trouble to explore these islands. It is, however, no easy matter to get out to them, as most of the lakes are too deep to wade, and hidden snags make swimming to them dangerous. An india-rubber boat would be valuable as a means of reaching the islands. With no such adjunct I was able to explore but a few out of a great number. The only birds I found were Wild Duck and Teal, but my guide told me that Hooded Crows and Herons used to nest on the islands. I began to believe that anything might be on the islands, which we could only view from a distance, as my guide's invariable answer to the question "Does such and such a bird breed here?" was, "It moight be on the island, sor, but faith I don't know!" Otters seem very plentiful here from the number of their tracks, and doubtless the many underground channels connecting the lakes are much to their liking. A Corncrake rattled incessantly all night just under my window.

At Clifden a fair absorbed my first day, and on the next I visited Cruagh and High Islands. I found a small colony of Great Black-backed Gulls on Cruagh, but nothing else of note. On High Island Black Guillemots were breeding, and I saw also a pair of both Peregrine Falcons and Ravens. The latter had a young one, and a skirmish between the male Peregrine and one of the Ravens was extremely interesting. The Peregrine beat the Raven at all points, whirling up into the air and dashing down upon it like a stone. The Raven indeed only saved itself from the Falcon's savage onslaught by clinging closely to the cliff, and thus sneaking away. For a long time the Falcon flew round crying shrilly as a guinea pig, and whenever the Raven showed itself it made its life a burden. That Raven would do well to shift its quarters. On



so small an island it must be difficult to keep the peace. It is the home of a good many Rabbits and Rock Doves, and they, no doubt, form good food for the Peregrine.

At this part of the coast, and north as far as Clare Island I think, there are no convenient nesting-ledges for Guillemots and Razorbills, consequently one misses these birds; but their genus is represented by the Black Guillemot, which is very fairly numerous. On both of these islands (High and Cruagh) I found a great number of dead birds. They chiefly consisted of Starlings, but there were also a good many Snipe and a few Curlew. Would the exceptional gales and hard weather of last winter account for this? Or may the birds have been driven out to the west by one of those inexplicable eruptive migration fevers only to return and die on the nearest land? On some of the low flat islands off Renvyle (my next stopping place), the Black Guillemots seemed to be laying their eggs under the large boulders scattered about. I saw several at different times fly out from amongst them, but could not reach the eggs. Another curious nesting habit I noted was, that the Oyster-catchers, which were numerous, invariably nested on the rocks or turf even on islands where there was shingle in every way suitable for them. This fact would seem to show that rock and not shingle is their original, or at all events their favourite nesting site, and yet one never finds their eggs without pebbles or some such substitute as rabbits' excrement, heads of Sea Campion, shells, or bits of wood underneath them. Terns, both Common and Arctic, were just commencing to lay on the lowest and smallest of the islands. It might be mentioned that off the west coast of Scotland, as here, the Terns seem to prefer the low islands for nesting. Cormorants and Shags, both young and old, were swarming everywhere.

On Inishturk I came across a large colony of Sparrows breeding in an ivy-covered cliff by the harbour. Had it not been so far west one would have expected these to have been *Passer montanus*, but they were all the homely *domesticus*, at least as far as I could see. It seems curious that there should be such a large colony of House Sparrows on this barren island containing but a score or so of houses, while throughout Connemara it is a comparatively uncommon bird. Indeed I saw more Sparrows in a day on Inishturk than I did in a fortnight in the rest of Connemara. On Inishturk the Wheatear and

Sedge-warbler were common, very far west for these migrants. Yellow Buntings and Twites were also present, and of course the Rock Pipit. I was surprised to find on the top of a small but fairly high island a little fresh-water lake, and still more surprised to find it inhabited by a Moorhen.

I will conclude these incomplete notes with an account of two interesting migrants which I found lingering in the south so late in the year. Curiously enough they were both on the same island (Inishdalla). The date of my visit to this island was May 30, and the two species I refer to were the Turnstone and the Purple Sandpiper. The first of these was represented by a small flock of six birds in nuptial dress. Since they are known to commence laying in the first part of June it seems strange that these birds should have been in a flock on May 30.

Before I landed on the island I had caught a glimpse of what I thought must be a Purple Sandpiper, and soon after landing I found two of them. Thinking that by some lucky chance they might be nesting on this island, I watched them for a long time, and then searched the whole island through, but without success. As I spent nearly the whole day in searching for their eggs, it is to be hoped that I shall be forgiven for shooting the birds. By this I was able to find that they were a pair, and that the ovaries of the female were fairly advanced. The presence of a pair of these birds in full breeding plumage in a place which was apparently in every way suitable for breeding purposes, seemed to me to be a hopeful sign that it might some day be added to the British list of breeding and resident birds. But this hope was damped when Mr. Harvie-Brown pointed out to me that in the Faroes this bird does not breed near the sea-level or on grassy holms, but on the tops of the highest hills. Therefore, if they do breed in Ireland, it would not probably be lower than 2,000 feet altitude.

Altogether Connemara is not in my opinion a tempting place for the ornithologist. Bird-life there is woefully scarce, both in species and numbers. Even the Hooded Crow and the Redshank seemed to be absent from Connemara.

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## FUNGI FROM BRACKENSTOWN, CO. DUBLIN.

BY E. J. M'WEENEY, M.A., M.D.

(Excursion of the Dublin Naturalists' Field Club, 5th October, 1895.)

WHEN, after many hours of sorting and dissecting and mounting and gazing down through the microscope, and measuring of spores and comparing of authorities, there confronted me at last the repulsive-looking list herewith presented, I conceived the idea of writing something which might render it intelligible to the large majority of Irish field-naturalists, and prevent it from remaining a useless monument of cacophonous terminology.

I am hardly entitled, however, to use the term cacophonous in connection with the first part of the list. For this comprises the Agaricini, the most highly organised of all the Fungi—the division which has been classified by the illustrious Swedish botanist, Elias Fries, who was certainly one of the most skilful inventors of well-sounding generic names the world has ever seen. Fries' classification of the mushroom-tribe is a triumph of ingenuity. Taking as his criterion the colour of the spores, he divided the hundreds of toadstool-species, which had hitherto lain inextricably jumbled, into five series:—

Those with white spores, or *Leucosporæ*.

Those with pink spores, or *Rhodosporæ*.

Those with brown spores, or *Ochrosporæ*.

Those with purple spores, or *Porphyrosporæ*, and

Those with black spores, or *Melanosporæ*.

What is very remarkable about this curious division is that the species in each group run parallel, or nearly so, to the homologous species in the other groups, and that, generally speaking, there is a gradual ascent in the evolution of the type from the lowest, least well-organized forms, which are in the black-spored series, to the highest best organized ones in the white-spored division. Fries places the majority of mushroom-like plants in the one great genus *Agaricus*, which he then divides, as above stated, into series, and each series is then further split up by certain characters into a number of sub-genera, the names of which are placed between brackets after the generic name *Agaricus* and before the name of the

species. An example will serve to show how this plan works. Let us take an agaric with the gills free from (*i.e.* not touching) the stem. If such a specimen had white spores it would be in sub-genus *Lepiota*, if pink, then *Chamaeota*, if brown, then *Pholiota*, if purple, then *Psalliota*. Again, an agaric with "sinuate" gills is, if white-spored, in *Tricholoma*, if pink, in *Entoloma*, if brown, in *Hebeloma*, and if purple, in *Hypholoma*. Neither character is represented in the black-spored series. Thus we have explained the names in brackets with which most Fungus-lists commence. In the present case the species of *Agaricus* and its allies are remarkably few, not a single specimen of the large genera *Russula*, *Lactarius*, and *Cortinarius* having been found. The reason would seem to be that the warm wet weather in August brought these great toadstools to maturity six weeks earlier than usual, and that they had already ripened their spores and died by the commencement of October. That this is not mere supposition is shown by the fact that in mid-August, whilst cycling through the beautiful wood near Glenealy, having been compelled to dismount and shelter from a tremendous downpour, I collected twenty species of the largest Agarics within the sheltered space under my own and a few neighbouring trees, as well as such a host of smaller sorts that all the available pieces of letters, envelope-backs, &c., which I had about me, were insufficient to write down the names. I emptied the contents of the tool-bag into my pockets and filled it with the smaller species. The hour and three quarters I spent under these trees was well employed.

Passing by *Agaricus* and its grimy poor relation *Coprinus*, a black-spored genus which, white and tender when placed in the vasculum, emerges from it next morning an inky mass of loathsome deliquescence—we come next to a couple of species of *Tremella*. Fungus-jelly they might be called, the first bright yellow, the second, as its name indicates, a dingy grey. We find them on dead branches, the tough bark of which they are able to crack, gelatinous as they are, in their efforts to expand. The puff-balls come next, *Lycoperdon* and *Scleroderma*. We found them in all stages, from a tiny nodule, not bigger than a pin's head, just emerging from the mycelial cord—fit research material for the student of development—

up to over-ripe specimens of *L. giganteum*, larger than one's head, and by this time fluffy, brown and dusty—very different to the creamy delicious specimens which some of us hoary-headed original members can still call to mind as they lay during a Club tea at the International Hotel in Bray. That was in 1886. I believe some enthusiastic mycophagist wanted to eat some then and there, and if my recollection serves me aright, our whilom Secretary, Mr. Pim, did actually remove the said specimens for the expressed purpose of feeding thereon. I have since repeated his experiment—on specimens found near Glensouthwell, and which were so big that my carrying them home on a Sunday afternoon excited comment—with most satisfactory results. The recipe for cooking them, however, I am under an honourable obligation to keep secret.

Next we come to the Rusts and their allies (Uredinei) which grow parasitically on flowering plants. These are anything but well represented, and with them we need not stay long, pausing, however, an instant to glance at the curious *Tuberculina*, a parasite of a parasite. It covers the Coltsfoot-Cluster-cup with its brownish-violet spore-beds. The Cluster-cup fungus is a parasite on the Coltsfoot, and the *Tuberculina* is a parasite on the Cluster-cup. At Brackenstown, however, we found it, not on the Cluster-cup, which had long since disappeared, but on its relative and successor the *Coleosporium*—a fact which deserves to be noted. *Synchytrium taraxaci*, next on the list, is also a parasite. It forms orange-red crusts on leaves of Dandelion, and is as far below those just named in point of structure as they are below the Agarics. The mysterious group Chytridieæ, to which it belongs, have not even got the length of forming a mycelium, and if we exclude the Myxomycetes and Bacteria, stand at the very bottom of known Fungi, whilst their strange sporangia and tiny, active, flagellate swarm-spores possess a deep interest for the microscopist, whose command of high powers permits him to trace the developmental cycle of these intra-cellular parasites. Four years ago, on Dalkey Hill, I found the first recorded Irish specimen of *S. taraxaci*, and to-day the species still remains the only one on our Irish list. Will any sharp-sighted reader find me the one on the Scabious? or the species that inhabit Perennial Mercury, or Self-heal, or Chickweed?

We are now amongst the Mould-fungi, Hyphomycetes, and the very first we come to, *Oospora crustacea*, is only placed here provisionally, as the specimen does not quite agree with the description. It formed bright red patches the size of a pin's head on some old rotting cloth which I picked up and put in a bottle. The spots were not there when the specimen was collected, but developed whilst the contents of the bottle were awaiting examination. Several other strange organisms there were on this same old cloth, which I could not identify and whose development, from want of time, I had to leave untraced. *Bactridium flavum*—a new Irish record—puzzled me for long, and I had to appeal to the superior knowledge of my friend, Mr. Massee, of Kew, before finding a place for it. It has the largest spores of any fungus I have ever seen—about  $\frac{1}{80}$ -inch long, club-shaped, and divided by partitions into compartments. The fungus forms little yellow dots on rotten wood, and seems to be a speciality of this locality, for several members brought me specimens, including Mr. Jameson, who found it most abundantly on a fallen trunk in a swamp. The next species, *Monotospora sphærocephala*, is like a tiny round-headed black pin  $\frac{1}{8}$  of an inch high. Hundreds of these stand up stiffly from the piece of rotten bark which they cover like bristles.

The moulds finished, we pass, with *Erysiphe*, over into the Ascomycetes—fungi that produce their spores in little sacs called asci. The species first mentioned, together with its ally the *Phyllactinia*, collected on Hazel by Mr. Jennings, are good examples of those forms that grow parasitically on green plants, and are called mildews. We hardly sympathize with a strong coarse weed like the Hog-weed (*Heracleum*) when it suffers from this disease; but many a cottage gardener has good reason to bewail the fate of his late peas when they fall victims to *E. Martii*. In early summer we see a sort of grey bloom overspreading the leaves. In autumn this is still there but covered with tiny black grains like gunpowder—the fruit of the fungus. These are like little brown spherical boxes, the wall of which is composed of hexagonal plates, and which are fastened on to the leaf by delicate mycelial threads which are often beautifully branched. Inside the boxes are the asci, each containing four to eight spores. The other ascomycetes must not delay us long. *Hymenoscypha* and *Mollisia* are small disc-

shaped fungi, the former with a stalk, the latter without one. The next fungus is also a *Periza*—as these disc-shaped species are called—and is a much prettier object, its blood-red disc being surrounded with a circlet of brown bristles. It grew at Brackenstown more abundantly than I had ever seen it previously, and was found on the fallen stumps by nearly every member of the party. The two *Ascoboli*, despite their lowly habitat, are also handsome objects. Their spores are large, violet, and adorned with a beautiful raised tracery, whilst there is besides the peculiar character that the ascus as well as the spores is ejected at maturity. The spore-bag, however, is not quite dislodged, but projects above the surface of the hymenium, and opens at the top by a dainty little lid, and so allows the spores to issue forth. Lastly, we have *Stemonitis*, a representative of that strange order intermediate between plants and animals, the Slime-fungi (*Myxomycetes*), which at one time appear as shapeless, creamy, or foamy masses of living jelly—pure undifferentiated protoplasm, the very naked and unadorned basis of life—whilst the next day they have turned into little spore-cases of various and distinct shapes. Sow the spores in a drop of water, and you will see them presently burst. A tiny, shapeless mass of jelly will crawl forth, and, meeting another such “*amœba*,” the two will flow together, and others will then join the company until ultimately a large mass of protoplasm, quite easily seen, is the result. This crawls about, feeds, grows, becomes changed into spore cases, and thus the appointed cycle goes round.

Before concluding this little paper, in which I hope to have said something to clothe the dry bones of our Brackenstown fungus-list with a living interest, I must express my warmest thanks to my friend Prof. Johnson, whose liberality in giving me access to the fungus-literature at his disposal, has placed me in a position to determine many of the species.

**Agaricus (*Collybia*) *radicatus*, Relh.**—One specimen had the stem 9 inches long, exclusive of the root, which was, unfortunately, broken off short. The pileus was 6 inches across.

**A. (*Giltochybe*) *infundibuliformis*, Sch.**

**A. (*Mycena*) *tintinnabulum*, Fr.**

**A. (*M.*) *corticola*, Schum.**

**A. (*M.*) *tenerrimus*, Bk.**

[Two other species of *Mycena* were collected, but not identified.]

**A. (*Pleurotus*) *corticatus*, Fr.**

- A. (Flammula) lentus**, Fr.—Short-stemmed form.  
**A. (Phollota) aureus**, Matt.—A smaller form, with stem very bulbous beneath.  
**A. (Hypholoma) velutinus**, Pers.  
**A. (Psathyra) corrugis**, Pers.  
**Coprinus pilcatilis**, Fr.  
**Tremella mesenterica**, Retz.  
**T. indecorata**, Schum.  
**Lycoperdon perlatum**, Pers.  
**L. bovista**, Linn.—Form *giganteum*.  
**L. pyriforme**, Schaeff.  
**Scleroderma vulgare**, Fr.  
**Puccinia veronicarum**, DC.  
**Coleosporium sonchi**, Pers.—On *Petasites*.  
**Tuberculina vinosa**, Sacc.—On the last species.  
**Synchytrium taraxaci**, De By.  
**Oospora crustacea**, Sacc. ?—This curious red mould on old rotting cloth may prove distinct.  
**Cylindrium heteronemum**, Sacc.—On Beech mast.  
**Cylindrium sp.** ?—On hymenium of *Lachnea scutellata*.  
**Cylindrium**.—Another sp. as yet unidentified.  
**Fusisporium sp.**—Seemingly distinct.  
**Bactridium flavum**, K. & S.  
**Monotospora sphaerocephala**, B. & Br.  
**Ramularia urticae**, Pers.  
**Torula expansa**, Pers.  
**Pliobolus longipes**, Van Tiegh.—Mr. Jameson—on rat's excrement.  
**Erysiphe umbelliferarum**, Lév. (= *E. Martii* var. *E.*) On *Heracleum*.  
**Ascochyta graminicola**, Sacc.  
**Septoria veronicæ**, Desm.  
**Hymenoscypha tuba**, Bolt.  
**Mollisia cinerea**, Batsch.  
**Lachnea scutellata**, Linn.  
**Ascobolus furfuraceus**, Pers.  
**A. glaber**, Pers.—In company with the last.  
**Diatrype disciformis**, Hoffm.  
**Xylaria polymorpha**, Grev.  
**Hypoxylon multiforme**, Fr.  
**Stemonitis ferruginea**, Ehrb.

Mr. Pim has kindly supplied me with the following additional species :—

- Phyllactinia guttata**, Lév.—On Ash leaves, plentiful, Mr. Jennings.  
**Lachnea stercorea**, Fr.  
**Helotium citrinum**, Hedw.  
**Sphaeria canescens**, P.  
**Valsa sp.**—On beech mast.



## LITHOBIUS VARIEGATUS, LEACH.

BY HENRY W. BROLEMANN.

SINCE Mr. R. I. Pocock's "Notes on some Irish Myriapoda" appeared in the *Irish Naturalist* (vol. ii., December, 1893) I do not know that any paper has been published on the matter, and the list, amounting to twenty-two species, given by him has not since been increased.<sup>1</sup>

Thanks to the extreme kindness of Prof. D'Arcy W. Thompson, of University College, Dundee, I have been enabled to examine the material collected by him in the County of Galway and was fortunate enough to find, amongst other species, four Myriapods, the presence of which in Ireland has not been mentioned, which brings the number of known Irish forms up to twenty-six.

Recapitulating briefly the species alluded to in Mr. Pocock's paper, I mark with a \* the species which were not represented in Prof. Thompson's collection, and which I have not been able to examine, thus :—

<i>Lithobius forficatus</i> , L.	<i>S. maritimus</i> , Leach.	* <i>Atractosoma polydesmoides</i> , Leach.
<i>L. variegatus</i> , Leach.	<i>Stigmatogaster subterraneus</i> , Leach.	* <i>Blaniulus fuscus</i> , Amstein.
<i>L. melanops</i> , Newport.	* <i>Polyxenus lagurus</i> , L.	<i>Iulus britannicus</i> , Verhoeff.
* <i>L. microps</i> , Meinert.	<i>Glomeris marginata</i> , Villiers.	* <i>I. pilosus</i> , Newport.
<i>Cryptops hortensis</i> , Leach.	<i>Polydesmus complanatus</i> , L.	* <i>I. albipes</i> , C. Koch.
<i>Geophilus longicornis</i> , Leach.	<i>P. gallicus</i> , Latzel.	<i>I. sabulosus</i> , L.
<i>G. carpophagus</i> , Leach.	<i>Brachydesmus superus</i> , Latzel.	
<i>Scoliopterus crassipes</i> , C. Koch.		

To these I add :—

<i>Geophilus gracilis</i> , Meinert,	<i>Blaniulus guttulatus</i> , Bosc.
<i>G. proximus</i> , C. Koch,	<i>Iulus (Leptoilulus)</i> , sp. incerta.

<sup>1</sup> Since the present paper was written, there appeared in the special number of the "Irish Naturalist," vol. iv., No. 9, September, 1895, Mr. George H. Carpenter's list of the Myriapoda collected in Galway during the excursion of the Irish Field Club Union, where *Scolopendrella immaculata*, Newport, was recorded.

The following is to be observed in reference to the Myriapods here mentioned:—

**Geophilus proximus**, C. Koch.—One specimen has very short maxillipedes, which, when closed, do not reach the point of the head. Whether this is accidental or not, I have not been able to ascertain.

**Polydesmus complanatus**, L.—The males I examined belong to the variety named *angustus* by Dr. R. Latzel.

**Polydesmus gallicus**, Latzel.—The Irish specimens, though unmistakably belonging to Dr. Latzel's species, are much more narrow than the type of the south of France, with which I have compared them, the former measuring  $\frac{1}{2}$  mm. to 2.20 mm., while the latter reach 2.80 mm. to 3 mm.

**Iulus britannicus**, Verhoeff.—Certainly represents the form indicated by Mr. Pocock under the name of *Iulus luscus*, Meinert.

**Iulus (Leptolulus)**, sp. incerta.—Having seen no male, I do not risk a specific name for the female specimens of this form, owing to the difficulty of recognizing the species of this group, even when males are at hand. These probably belong to the same species which Mr. Pocock has called by Newport's name, *I. pilosus*; but as Newport's description can equally well be applied almost to any of the species of the *Leptolulus* subgenus, his denomination has no meaning, and I find it unnecessary to retain it.

This paper, thus lacking in interest, would never have seen light, had it not been for the opportunity offered to me to examine specimens of *Lithobius variegatus*, Leach.

Described for the first time in 1817 by Leach<sup>1</sup> in a very abbreviated way, the species was mentioned afterwards by Newport and others, who added little to the knowledge we had of this, so far purely British form. Recently Mr. Pocock, in his above-mentioned pamphlet, reassuming the characters given by Leach, adds some particulars, but merely for the purpose of distinguishing it from the common species *Lithobius forficatus*, L., and omits the main point, which throws some light on the place this species has to occupy in the numerous list of congeneric forms, viz., the fact that the posterior angles of the seventh dorsal plate are produced, causing *L. variegatus* to belong to the group of *Lithobius* termed *Neolithobius* by Stuxberg. However, the obtuse shape of the angles might, to a certain extent, account for this omission.

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<sup>1</sup> For bibliographical indications, see description of *L. variegatus*.

It is therefore advisable to publish a new description, which will read as follows :—

Genus, **LITHOBIUS.**

Subgenus, **OLIGOBOTHRUS.**

**Lithobius variegatus**, Leach, 1817.

Leach—The Zoological Miscellany, iii., London, xii., 1817, p. 40.

Do.—Edinburgh Encyclop.; vii., p. 409.

Gervais—Études p. servir à l'Hist. Nat. des Myriapodes—*Ann. d. Sci. Nat.* (2), vii., 1837, p. 49.

Lucas—Hist. Nat. des Animaux Articulés, i., Paris, 1840, p. 543.

Walker—Notes on Myriapoda.—*Newman's Entomol.*, January, 1842, p. 238.

Newport—A list of the species of Myriapoda, order Chilopoda, &c. *Ann. and Mag. Nat. Hist.* (1), xiii., 1844, p. 98.

Do.—Monograph of the Class Myriapoda, Order Chilopoda, &c. *Trans. Linn. Soc., London*, xix., 1845, p. 363.

Gervais—Hist. Nat. des Insectes Aptères, iv., Paris, 1847, p. 231.

Newport and Gray—Catalogue of the Myriapoda in the collection of the B. M., London, 1856, p. 15.

R. I. Pocock—Notes upon some Irish Myriapoda.—*Irish Naturalist*, vol. ii, 1893, p. 310.

Length and width nearly as in *L. forficatus*.

Robust, parallel-sided, flattened.

Cephalic plate rounded anteriorly, posterior angles blunt, surface not punctate, but bearing two distinct longitudinal furrows near the posterior margin. Ocelli condensed, numbering 16 or 17, disposed 1 + 4.5.4.3., the posterior ocellus very large, elliptical in shape, the three first ocelli of the upper row large, more or less rounded, the rows somewhat curved and irregular. Antennæ long, reaching the posterior border of the fifth dorsal plate, pilose, 36-42 jointed, the last joint alone as long as the two preceding joints, or even longer. Coxæ of maxillipedes with anterior margin wide, almost straight, slightly notched in the middle, armed with 6 + 7 or 7 + 7 black, small, blunt teeth; surface of coxæ punctate, the punctures well marked and dense towards the anterior margin, becoming scattered and gradually fading away posteriorly, medial sulcus deep.

Dorsal plates shiny, uneven in the sides; plates no. 3, 5, 8, 10, and 12, marked laterally with a transverse impression, almost equally distant from both angles, or nearer to the posterior angle; 14th dorsal plate with two rough impressions

near the posterior angles, posterior margin somewhat concave. The above-mentioned sculpture or roughness having often been noticed on immature specimens of *L. forficatus*, cannot be considered as characteristic of *L. variegatus*.

The posterior angles of the 7th dorsal plate, though not much developed, project somewhat on the line of the posterior margin, and the posterior angles of the 9th, 11th, and 13th dorsal plates are acutely produced.

The two last pairs of legs are thin and long. The following details are to be observed as well on female as on male specimens, but are more marked on the 15th than on the 14th pair of legs. The superior inside edge of the third joint is hollowed longitudinally, the furrow being wider at the back end; also the superior outside edge is sulcate, the furrow being only noticeable on the posterior two-thirds of the joint; the superior surface is thus reduced to a rounded ridge. These two furrows are continued on the following joint, the fourth, being narrow and deep; on the fifth joint, only the inside furrow is to be found, being much attenuated. On the inferior surface of the third joint a rounded ridge runs longitudinally between two furrows, the outer of which is often shortened.

The spines of the 1st, 14th, and 15th pairs of legs are disposed as follows:—

1st pair,  $\frac{0.0.2.1-0.1-0.}{0.0.0. \quad 2. \quad 1.}$ , double claw.

14th pair,  $\frac{1.0.3.1.1.}{0.1.3.3.2.}$ , double claw.

15th pair,  $\frac{1.0.3.1.0.}{0.1.3.3.1.}$ , single claw.

The spine of the fifth joint, below, occupies the medial position.

Female genitalia armed with 2 + 2 strong spines, the outer pair of which is the larger; claw strong but narrow, with a blunt tooth on the inside edge.

Coxal pores large, circular, disposed on one line, numbering 6.5.5.5., 5.4.4.4.

This species much resembles *L. leptopus*, Latzel, from which it is easily distinguished by the arrangement and number of coxal pores.

them. These ticks are believed to live on plants of various kinds, but wherever opportunity offers, they attach themselves to an animal body, and suck blood voraciously. The mouth-organs, adapted for this purpose, consisting of a pair of maxillæ united to form a channeled rostrum with toothed edges, and a pair of retractile chelicerae with complicated barbed processes at the extremity, were shown under a high power. Mr. A. D. Michael has kindly confirmed the identification.

Professor GRENVILLE COLE showed rhyolite-obsidian from Sandy Braes, Co. Antrim, containing a crystal of hypersthene. The minute structure of the glassy ground shows a delicate intermingling of little rods, each formed of a row of globular crystallites. These are excellent types of what Vogelsang called "margarites," from their resemblance to strings of pearls. In this slide a strongly pleochroic rhombic pyroxene (hypersthene) occurs. This mineral has not previously been recorded from the Antrim rhyolites, and has possibly in this case been picked up from a more basic lava.

Mr. GREENWOOD PIM exhibited *Tuberculina persicina*, a curious parasitic fungus growing on another fungus (*Coleosporium tussilaginis*) on leaves of *Tussilago* at Brackenstown, near Swords. It forms compact little cushions, surmounted by minute spores, and these cushions are seated on the *Coleosporium* pustules. In Plowright's book on the Uredines it is described as parasitic on the *Aecidium* which occurs very abundantly on *Tussilago* in spring, so that it also occurring on the *Coleosporium* is worth recording. The plant is very readily passed over as a specimen of the host fungus partially decayed.

Prof. T. JOHNSON exhibited *Melobesia confinis*, Grn., a calcareous red alga, growing on *Corallina officinalis*, on which, as also on limpet shells, it forms small slightly thickened hard swellings. A preparation showing the characteristic bisporous tetrasporangia and the vertically elongated thallus-cells was exhibited. The material was gathered by the exhibitor in 1891, at Frenchfort, Co. Mayo, when with Mr. Green in ss. "Harlequin" (R.D.S. Fishery Survey). *M. confinis* is recorded hitherto from the coast of Brittany only.

Mr. M'ARDLE exhibited a specimen of *Riccardia latifrons*, Lindberg, bearing the large perianth and capsule, with the androecium at the base of the perianth, showing the parecious character of the plant. The specimens were collected in Lord Howth's demesne last March. This rare liverwort was first detected by Professor Lindberg, who collected it at O'Sullivan's Cascade, Killarney, in company with the late Dr. D. Moore, in 1873. It is an addition to the Co. Dublin list of Hepaticæ.

Mr. H. LYSTER JAMESON showed feathers from the base of beak of adult and immature Rooks, showing the frequent presence of unpigmented feathers in the young bird, and the aborted or abraded feathers in this region in adult Rooks, which gives the well-known appearance of a bare patch round the base of the bill. Mr. Jameson referred to the theory that these feathers are mechanically rubbed away by the Rook

in digging for worms, which was urged by Weismann as a case of an acquired character which is not transmitted. The meaning of the unpigmented feathers in the young Rook was discussed. The presence of these white feathers was first observed by Mr. T. H. Gurney, of Norwich.

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BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 5th.—The opening meeting of the seventy-fifth session was held in the Museum. There was a large attendance of members and friends.

Mr. ROBERT LLOYD PATTERSON, F.L.S., President of the Society, in opening the proceedings, said his thanks were due to his fellow-members of the Council for electing him again their President.

The Honorary Secretary (Mr. R. M. YOUNG, B.A.), announced the receipt of several donations to the Museum, and a cordial vote of thanks was accorded the donors.

The PRESIDENT then proceeded to deliver an address on the Migration of Birds, which was effectively illustrated by a large series of special photo-lantern slides, shown by Mr. A. R. Hogg. Mr. Patterson commenced his paper by stating that of the large number of birds which have now—many of them, in his opinion, wrongly—been placed on the British list, some are mere accidental stragglers; and others, although met with regularly, do not occur with sufficient frequency to be called common; so that the number of different species of our well-known every-day birds is probably considerably below 200. Of these some occur only in summer, and others again only in winter, these two sub-divisions going to form the division of migratory birds; as compared with the other division, the permanent residents. The lecturer next proceeded to point out that even among our so-called permanently resident birds migration prevails to a large extent; and he illustrated this by reference to the habits of the Curlew, the Starling, the Skylark, and others. The questions of what began the migration movement and what leads to its continuance were next discussed at some length, and the theories of different authorities on the subject alluded to in detail. He next proceeded to give a comprehensive sketch of the great migratory movement—"the mystery of migration," as he not inaptly termed it—as observed in various places, paying a high compliment to Mr. Seebohm and Mr. Harvie-Brown for their investigations in this direction. Mr. Seebohm he alluded to most particularly as having undertaken a journey of over 15,000 miles to the mouth of one of the great Siberian rivers—the Yenesay, falling into the Arctic Ocean—in his endeavours to track some of our migrants to their summer homes. The scenes witnessed by the intrepid travellers were graphically described, and were admirably illustrated by the lantern-slides. Migration in the United Kingdom, but in Ireland in particular, and in Continental Europe, was next alluded to, the lecturer concluding with a description of the wonderful migration which occurs in Heligoland, as recorded in a recently-published translation of the great work on the birds of that island by a

veteran resident there, Mr. Gätke. The nesting habits of some of the birds were described, and views of some favourite nesting-places exhibited, these and the other views adding an artistic attraction to an interesting and instructive lecture, which was listened to with attention throughout by a most appreciative audience.

Dr. REDFERN had pleasure in moving a very hearty vote of thanks to the President. Mr. J. F. SHILLINGTON seconded the motion. Mr. PATTERSON pointed out that it was not their custom to pass votes of thanks to their own members, but he was very grateful for the kind words used by Dr. Redfern and Mr. Shillington.

DECEMBER 3rd.—Mr. George Coffey, B.L., lectured to a large audience on the subject "From Egypt to Ireland: a chapter in the History of Ornament."

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#### BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 19th.—The opening meeting was held, when the President (Mr. F. W. LOCKWOOD, C.E.), delivered his inaugural address. Mr. Lockwood took as his subject, "The Interdependence of the various Branches of the Club's Work." The address first touched upon the increasing prosperity of the Club, as indicated by the activity of the various sections, and though some of the older members had doubts as to the wisdom of the recent changes, Mr. Lockwood himself felt none. The President then referred to the different nature of the work done now to what was open to the students of thirty years ago, which necessitated sometimes a change in method. He then went on to show the dependence the various branches had upon each other. To take an instance, that pursuit which has brought the Club a very considerable reputation, microscopy, and more especially that branch so successfully pursued by Mr. Joseph Wright, the foraminifera, he (the President) thought it certain that Mr. Wright little considered his investigations into the white chalk powder in the flints would ultimately lead to discoveries necessitating careful reconsideration of the theories as to the origin of boulder clay. Mr. Lockwood then referred to the careful and minute work required in tracing out the erratic blocks to their parent formation. Broad questions of meteorology are well worth working at in order to help to solve such problems as why Greenland should be covered with an ice-cap and Siberia quite dry. The President next touched upon the engrossing subject of botany, and pointed out that although such work as that done by Messrs. Stewart, Corry, and Praeger cannot be done over again, very valuable results, indeed, could be obtained from the almost unknown deposits of plant-remains between the lava-flows of the upper and lower basalts. Good work also remains to be done in tabulating these outflows, such as the rhyolites and pitchstones. Referring to the work done by the Duke of Argyll, Starkie Gardner, and some of the Club's members, Mr. Lockwood suggested that the fauna be especially searched for in these old lake-bottoms. The Carboniferous period should also yield further results, from the Tyrone and Ballycastle coal-measures, and

from the results of such exploration as this to form, perhaps, some idea of the ancient coast-lines, and whether or not the main continental out-lines have ever been much as they are now. The next point considered was archaeology, including ethnography and the Celtic department, and Mr. Lockwood suggested lines of work on the palæolithic remains and the ancient races of inhabitants of Ireland. Mr. Lockwood concluded by saying that he trusted he had said enough to show that there was plenty of work to do still, and that all the branches of the Club were mutually interdependent.

Mr. WRIGHT, F.G.S., in response to Mr. Lockwood, described his early experiences in searching for foraminifera, and concluded by criticising some of the arrangements with the Irish Field Club Union.

Mr. WM. GRAY, M.R.L.A., gave a report on the meeting of the British Association at Ipswich, to which he went as a delegate from the Club. Mr. Gray described the mode of arrangement of the various sections, and pointed out the value of minute and detailed work in all subjects, even temperatures, rainfalls, floods, and tides, also such work as the Club is now busily engaged in, in tracking down the erratic blocks in the boulder clay. He then spoke strongly against the all too prevalent custom of digging up rare plants, and thus destroying them, and especially entreated everyone not to buy the ferns offered for sale by the peasantry. Mr. Gray then referred to the excursions made to the deposits of the Red Crag at Ipswich, with its extraordinarily numerous fossils, of which a considerable number were on view, including the peculiar left-handed spiral so rare now, and apparently so common then in *Fusus*, and also the modern flint works at Brandon, from which Mr. Gray had brought a number of very beautiful copies of old axes, celts, spear-heads, and flakes made by the quarrymen.

Mr. LOCKWOOD briefly described some of his experiences in the Red Crag district, pointing out the layer of rolled fossils found below it, containing very numerous mammalian remains, and also the curious cutting down into the Crag by a recent stream, the bed of which is sometimes refilled with recent alluvium, forming a deceptive deposit unless carefully noticed.

DECEMBER 11TH.—The Geological Section met, when Mr. F. W. LOCKWOOD contributed some notes on the Tarns of the Mourne Mountains. He first described the action of running water in canons and deep gorges, and then the modification caused by the action of frost on the sides of valleys. Running water and frost are the cutting instruments of nature, ice in the mass is a planing and smoothing instrument. Before the Glacial Epoch the hills were more rugged and the valleys deeper than at present. Four out of the five lakelets of the Mourne district are extremely small and shallow, the fifth, Lough Shannagh, is the only one of importance, but it also is small. They all lie upon ledges or shelves of rock a great height above the general level of the valleys, and have steep cliffs above them. There is no clear indication that they are true rock basins such as most of the tarns in Cumberland



and Westmoreland undoubtedly are, but Lough Shannagh may be in part. The others are probably formed by dams of boulder clay squeezed up on the side of the ice-stream of the main valleys. A most interesting feature is the rugged character of the hill-tops generally in the British Isles above a level of something about 2,500 feet, showing that the ice, from whatever source derived, did not rise above that level. The summits of Sca Fell, Helvellyn, Ben Nevis, and Slieve Donard are all a mass of large boulders apparently the result of sub-aerial weathering, the lower hills have all been swept bare. In the course of the subsequent discussion, Mr. J. O. CAMPBELL mentioned finding Ailsa Craig eurite as an erratic in the Spinkwee valley of the Mourne mountains, also an apparently Antrim flint on the Aran Islands. A portion of the British Association "Erratic Blocks" report, containing a reference to glacial work done by the Club, was followed by a paper on the Silurian rocks of Pomeroy, by Mr. R. BELL, who also contributed erratics from boulder clay at an elevation of 1,300 feet between Divis and Black Mountain, including Ailsa and Tormamoney eurite. Rock specimens were presented by the Hon. Sec.

NOVEMBER 30th.—The opening meeting of the new Botanical Section of the Club was held in the Club Rooms at the Museum, on Saturday afternoon. It was decided to meet on the last Saturday in each month at four o'clock, and to devote the first hour to structural botany and practical work with the microscope, and the remaining time to the study of the natural orders of British plants. Some notes were then given by Rev. C. H. Waddell, on protoplasm and chlorophyll. Papers and short notes have been promised on "Sedges," "Hieracia," "Alien plants," "Duckweeds," &c. The meetings are open to all who are interested in botany, and the names of any persons who wish to join should be sent in to the Secretary, Rev. C. H. Waddell, Saintfield.

DECEMBER 13th.—MICROSCOPICAL SECTION.—Dr. Lorrain Smith lectured on "The Study of Bacteriology."

DECEMBER 17th.—The President (Mr. F. W. Lockwood) in the chair. The PRESIDENT read a short note on the gravels at Larne, Co. Antrim, which will appear in our next issue.

Miss NORA STEEN contributed a short paper on Craiganogh cave, Co. Antrim, which we hope to publish shortly.

Mr. ROBERT BELL read a paper entitled "A Day among the Silurian Shales of Pomeroy." The paper dealt with the results of a visit in last July. These shales are very interesting, being the nearest place where those characteristic Palæozoic crustaceans, the trilobites, can be obtained. Mr. Bell's experience in expending half the time at his disposal in searching for the beds, in spite of full instructions kindly given by Mr. M'Henry, M.R.I.A., is one common to many geologists. The rough fossiliferous grits, with marks resembling sea-weeds and worm-tubes, lie south of the granite hill at Bardahessiaigh; newer sandy beds have been deposited uncomformably upon them. The trilobites occur in a section cut by the river near Dickson's house and the slate quarry. The fossils found were on view during the evening.

Mr. ALEC G. WILSON described the geological features of the Galway Conference, illustrating his remarks by numerous fine lantern-slides from photographs taken on the excursion, by Messrs. Welch, Gray, and Fennell. A report on the geology of this excursion, by Miss S. M. Thompson, has already appeared in our September number.

Miss S. M. THOMPSON, Secretary of the Geological Section, read a report on the Geological excursions of the past season. We hope to comment upon this paper in our next issue. On the table there was a fine display of rocks, fossils, and glacial erratics, collected on the excursions referred to, and microscopic sections of rocks were also shown.

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#### DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 19.—The first business meeting was held. The PRESIDENT (Mr. G. H. CARPENTER) in the chair. The SECRETARY exhibited on behalf of Mrs. Ross a number of prize chrysanthemums. Professor JOHNSON exhibited a beautifully dried series of alpine plants prepared by Lady Rachel Saunderson. Mr. F. W. BURBIDGE and Mr. PRAEGER spoke in praise of the exquisite preservation of these specimens. The VICE-PRESIDENT (Professor COLE) having taken the chair, the PRESIDENT delivered an address on the subject, "The Mingling of the North and South." He first referred to the recent formation of the Irish Field Club Union, by means of which the members of the various Naturalists' Field Clubs were getting to know each other and to assist each other in their work. Reference was then made to the Field Club Conference held at Galway in July last, in which all the Irish Clubs and a number of English scientific societies took part. The districts visited on that occasion, it was pointed out, furnished a very remarkable mingling of northern and southern types of animal and plants. The various hypotheses that have been put forward to account for the strange overlapping of types were reviewed, and the evidence in support of various theories considered. The address, which was illustrated by zoological and botanical specimens and by many lantern slides of plants, animals, maps and scenery, will shortly appear in our pages. An interesting discussion on the paper ensued.

Prof. T. JOHNSON complimented the President on his address, and referred to the tradition that some of the Iberian plants had been introduced by the Spaniards. Mr. PRAEGER stated that he had been often struck by the way these western Irish species did *not* spread, in spite of their abundance in places, and the prevalence of strong winds. He thought this went against any theory of their introduction. Mr. M'ARDLE referred to the peculiar tropical distribution of a number of the south-west Irish liverworts. Mr. F. W. BURBIDGE also discussed the question of artificial introduction of species; and remarked that it did not appear correct to assume that an ice age would sweep all vegetation off the face of the country, since some of the species which flourish at sea-level in the west of Ireland had been found to grow up as far north as man has yet penetrated. Mr. H. LYSTER JAMESON referred to the importance of studying these questions of past and present distribution.

Mr. HALBERT remarked that as the late A. H. Haliday had not found *Otiorrhynchus auro-punctatus*, it might be thought by some that that beetle had been recently introduced. Dr. C. H. HURST said that the success or failure of such attempts depended on a very large number of circumstances, and that there were many inter-relations between plants and animals that had important bearing on the question. Prof. COLE pointed out that in considering the possible ancient routes by which migration had taken place, it must not be forgotten that North-western Europe was really the ancient Europe, and was dry land while the more southern tracts were again and again submerged.

Mr. PRAEGER subsequently exhibited a number of additional photographs taken on the Galway excursion. The following were elected members of the Club:—Miss Lilius J. Aimers, B.A.; D. R. Alcock, J. J. Alcorn, F. H. R. Brady, Miss Ida Carolin, W. V. Coppinger, Alec Gray, M.A., C. Herbert Hurst, PH.D.; A. Vaughan Jennings, F.G.S.; Miss Laird, Geo. F. Mahon, Conolly Norman, F.R.C.P.I.; Kenneth C. Ogilvie, A. Ward, C.E.; and Rev. C. A. Williamson.

DECEMBER 10th.—Mr. WILLIAM GRAY, M.R.I.A., delegate from the Belfast Naturalists' Field Club, lectured on "The Physical Features and Scenery of County Antrim." The chair was occupied by the PRESIDENT (G. H. Carpenter, B. Sc.), and there was a crowded attendance. Some formal business having been transacted, Mr. GRAY proceeded with his lecture, which was illustrated by a magnificent set of lantern views. He first described the geology of the district, and dealt with the various formations in their order of succession. Special notice was taken of the basaltic rocks, which form the leading feature of Antrim geology and scenery. The Chalk, Greensand and Lias also came in for due attention. Afterwards the various headlands, bays and glens were described and illustrated. A vote of thanks to the lecturer was proposed by Prof. G. A. J. COLE, F.G.S., seconded by GREENWOOD PIM, M.A., and carried by acclamation. Frederick T. Eason and Wm. F. Henderson were elected members of the Club.

#### CORK NATURALISTS' FIELD CLUB.

NOVEMBER 28th.—A lecture was delivered by Mr. R. LLOYD PRAEGER, B.A., B.E., the President of the Club (Mr. W. H. Shaw, M.A.) in the chair. The lecture hall of the School of Science was crammed, and the lecture, which treated of the Galway Field Club Conference in 1895, and which was illustrated by an optical lantern, was followed with attention. Mr. Praeger first dealt with the visit of the members of the Conference, which included representatives from Belfast, Dublin, Cork, Limerick, and important centres in England, to Galway City, and pointed out the chief places of interest in that district. Connemara, Burren and the Aran Islands were duly described, and many views taken by members were shown. The peculiar flora of these districts was next described, and in conclusion the lecturer pointed out the important results of the Conference, and exhorted the members of the Cork Club to renewed exertions in their own sphere of work. At the close of the lecture a discussion took place, and seven new members joined the Club,

DECEMBER 13th.—Mr. WM. GRAY, M.R.I.A., of Belfast, delivered a lecture in the Ball Room, Imperial Hotel, to the members of the Cork Literary and Scientific Society, and the Cork Naturalists' Field Club on "The Physical Features and Scenery of the County Antrim." Mr. Wm. Lane, J.P., President of the Society, occupied the chair, and there was a full attendance of members. The lecturer, who is a prominent member of the Belfast Naturalists' Field Club, stated he attended under the auspices of the Naturalists' Field Clubs of Dublin, Belfast, Limerick, and Cork, as well as of the Literary and Scientific Society, to describe some portions of the field of investigation of their Club in Antrim. By means of lantern-slides the lecturer illustrated the geological strata of the county, and dwelt at length on the trap, Chalk, Greensand, Lias, and New Red Sandstone—giving their origin, their characteristic features, and their action of the various natural influences on them. He pointed out in detail the formation of the Giant's Causeway, which was of volcanic origin, and the columns of which were naturally formed by a process of cooling under pressure, and amongst the other principal natural phenomena treated of were the Cave Hill, the columns at Fair Head, and the sea-stacks to be found round the coast. The address was delivered in a more or less conversational style, and the interest of the audience was quickened by a copious supply of lantern-slides. The Chairman, at the conclusion, conveyed the warm thanks of the Society to the lecturer.

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#### LIMERICK NATURALISTS' FIELD CLUB.

NOVEMBER 27th.—Mr. R. LLOYD PRÆGER delivered a lecture under the Field Club Union Scheme, his subject being "The Galway Field Club Conference, 1895, with notes on the Flora of the districts visited." Dr. Fogerty occupied the chair, and there was a good attendance. Mr. Præger first touched on the history of the various Field Clubs of Ireland, and the formation of the Field Club Union. The excursions carried out during the Galway conference were next described, illustrated by a large series of lantern-slides from photographs of the districts visited taken by members. The peculiar flora of Connemara and Burren were considered, and a series of characteristic plants exhibited, and finally the part played by the Limerick Club was dwelt on, and the duty that rested with members of helping the growth and progress of their Club in every possible way.

DECEMBER 11th.—Mr. WILLIAM GRAY lectured on "The Physical Features and Scenery of County Antrim." He said he came as the representative of the Belfast Club, under the Field Club Union Scheme, to tell them of that part of the sphere of work of the Belfast Club which dealt with geology and physical geography. With the help of a large series of lantern-views, he described the structure of the county, and the characters and mode of origin of the Basalts, Chalk, Greensand, Lias, New Red Sandstone, and older rocks. The peculiar features of the Giants' Causeway were treated of in detail. The features of the coast were described, with numerous illustrations of the headlands, bays, and valleys.

## FIELD CLUB NEWS.

An amusing incident occurred at a recent meeting of the Cork Field Club. A speaker referred to the Cork Cuverian Society, which did much good work in the middle of the century, as being "as extinct as the Irish Elk." Whereupon arose a member of the said Society, to state that the Cork Cuverian Society was not dead, but hibernating; he had attended the last meeting which the Society held, some twenty years ago, which was adjourned *sine die*. He objected to be relegated to the Pleistocene period. As a consequence of the discussion which ensued there is talk of reviving the Cuverian Society, or of amalgamating it with the Cork Field Club.

Lectures under the Field Club Union Scheme are being energetically carried out. During the past month Mr. W. Gray, a veteran member of the Belfast Club, lectured before the Clubs at Dublin, Cork and Limerick, and in November Mr. Praeger, as representative of the Dublin Club, lectured at Cork and Limerick.

The Committee of the Dublin Club have nominated Professor Cole, F.G.S., as President for 1896, and Mr. N. Colgan as Vice-President. Mr. Colgan is well-known to Irish botanists by his papers on the flora of County Dublin.

A party composed chiefly of members of the Belfast and Dublin Field Clubs intend visiting Connemara next spring, with the object of investigating the kitchen-middens along the coast.

The Belfast Club do not intend to let the stimulus given to the study of geology and botany by the recent courses of lectures by Prof. Cole and Prof. Johnson die away for want of encouragement. The geological section is holding frequent meetings, both in the field and in the cosy workroom, and with regard to botany, a series of informal meetings is being held under the direction of Rev. C. H. Waddell, for practical botanical work.

The Rev. W. F. Johnson, so well known to all Irish naturalists through his work on the Coleoptera and other insects, has removed from Winderterrace, Armagh, to Acton Rectory, Poyntzpass, Newry. We have no doubt that Mr. Johnson's researches in this new field will largely add to our knowledge of Irish insects. Correspondents will please note the change of address.

Prof. Johnson, D.Sc., has kindly offered to give a course of practical work to serve as an introduction to the study of sea-weeds, for the benefit of members of the Dublin Club. The course would be held during the spring months.

The next undertaking of the Field Club Union will be a Directory of Irish Naturalists, the publication of which should do much to facilitate intercourse between Field Club members of similar tastes residing in different parts of the country. The preliminary steps are being now taken, and a printed form to be filled by persons wishing to be included in the Directory will be shortly sent to all Field Club members and subscribers to this Journal.

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## NOTES.

Col. G. T. Plunkett, R.E., has been appointed Director of the Science and Art Institutions in Ireland. He will therefore take up the late Dr. Ball's work in Leinster House, and also continue his former duties as Secretary to the Royal College of Science.

Prof. Sollas, F.R.S., of Dublin, will leave in March for Sydney, to take charge of an expedition that is being despatched to make deep borings in a coral atoll. The scheme, which is supported by a strong scientific committee, has been financed by the Royal Society to the extent of £800; and the Government are placing a gunboat at the disposal of the party, to convey them from Sydney to Funifuti, in the Central Pacific, which has been selected as the scene of operations.

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### BOTANY.

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#### PHANEROGAMS.

**Irish Hawkweeds, &c.**—The following plants were collected by me during the summer of 1895, and verified by Mr. F. J. Hanbury:—

*Hieracium Schmidtii*, Tausch, Ballintoy, Co. Antrim; *H. murorum*, var. c., *microladum*, Newtowncrommelin and Garvagh, Co. Derry; *H. iricum*, Fr., Lisoughter, near Recess, Co. Galway; *Carex Goodenovii* b. *juncella*, Fr., and *Scirpus rufus*, Schrad., Ballintoy, Co. Antrim.

S. A. BRENNAN, Knocknacarry.

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### ZOOLOGY.

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#### CRUSTACEA.

##### **New Species of Copepoda from the South-west of Ireland.**

—In the *Ann. Mag. Nat. Hist.* for November, 1895, p. 359, &c., Messrs. T. and A. Scott describe with figures three new forms of parasitic crustaceans obtained at Valentia by Messrs. W. I. Beaumont and F. W. Gamble. Two of these, found on ascidians, are referred with some doubt to the genus *Enterocola* and named *E. hibernica* and *E. Beaumontii*. For the third, which was found as a parasite on the nudibranch *Lomanotus gusii*, a new genus *Lomanoticola* is proposed, the species being designated *L. insolens*. This last form shows great degradation, there being no apparent segmentation of the fore-body, and the antennules, antennæ and mouth-organs being absent. Except for the hindmost segment of the abdomen with its two curious egg-sacs, the parasite was completely buried in the body of the nudibranch.

## REPTILES.

**A Stray Snake near Cork.**—A recent issue of the *Cork Constitution* records the occurrence of a snake near Blarney. The reptile was encountered crossing a grass field and is said to have been at first mistaken for an eel! It was promptly knocked on the head, a fate which meets all the members of its order, which purposely or accidentally are let loose in Ireland.

## BIRDS.

**The Brambling (*Fringilla montifringilla*) in the Vale of Ovoca.**—On December 8th, a specimen of this rare winter visitor was shot quite close to here by the Rev. J. M. Robinson, Rector of Ovoca, who kindly presented it to me; it is now with Messrs. Williams & Son of Dame-street for preservation.

J. HUNTER, Wooden Bridge.

**Crossbills breeding in the Vale of Ovoca.**—This year, 1895, Crossbills (*Loxia curvirostris*) bred in this neighbourhood. On April 1st I secured an old and young bird, which are in the collection of Mr. Barrington, Fassaroe, Bray.

J. HUNTER.

**Crossbills in Queen's County.**—The presence of a flock of these interesting birds in Queen's Co. is noted in the *Field* for November 16th.

**Stock-Doves in Co. Dublin.**—On the 19th of November, my brother shot two Stock-Doves (*Columba oenas*) at Carrick Hill near Malahide. They were first noticed in this district in November, 1893, when a flock of twelve remained for about a fortnight.

J. TRUMBULL, Malahide.

**Longtailed Duck in Co. Clare.**—I shot an immature Longtailed Duck (*Harelda glacialis*) on Lough Derg on Monday last, December 2nd. The bird was one of a pair. I also shot two more out of three (also immature birds) on the 27th December, 1890. These are the only two occasions on which I have seen them since I came here in 1888. As they are by no means common so far south (*vide* Seeböhm) the fact seems worthy of record.

R. F. HIBBERT, Scariff, Co. Clare.

**Long-tailed Duck in Co. Wexford.**—Mr. H. R. Guinness records, in the *Field* of November 16th, an adult male of *Harelda glacialis*, shot on Tacumshin Lake.

## MAMMALS.

**Pine Martens recently taken in Ireland.**—During the last twelve months I know of three specimens having been trapped or shot; as follows:—One last winter in Lord Clonbrock's Demesne, Co. Galway. One in the spring at Castle Taylor, Ardrahan, in the same county. One this autumn at Enniscor, on the shores of L. Conn, by the game-keeper of Joseph Pratt, Esq., Co. Mayo.

WM. F. DE V. KANE, Monaghan.



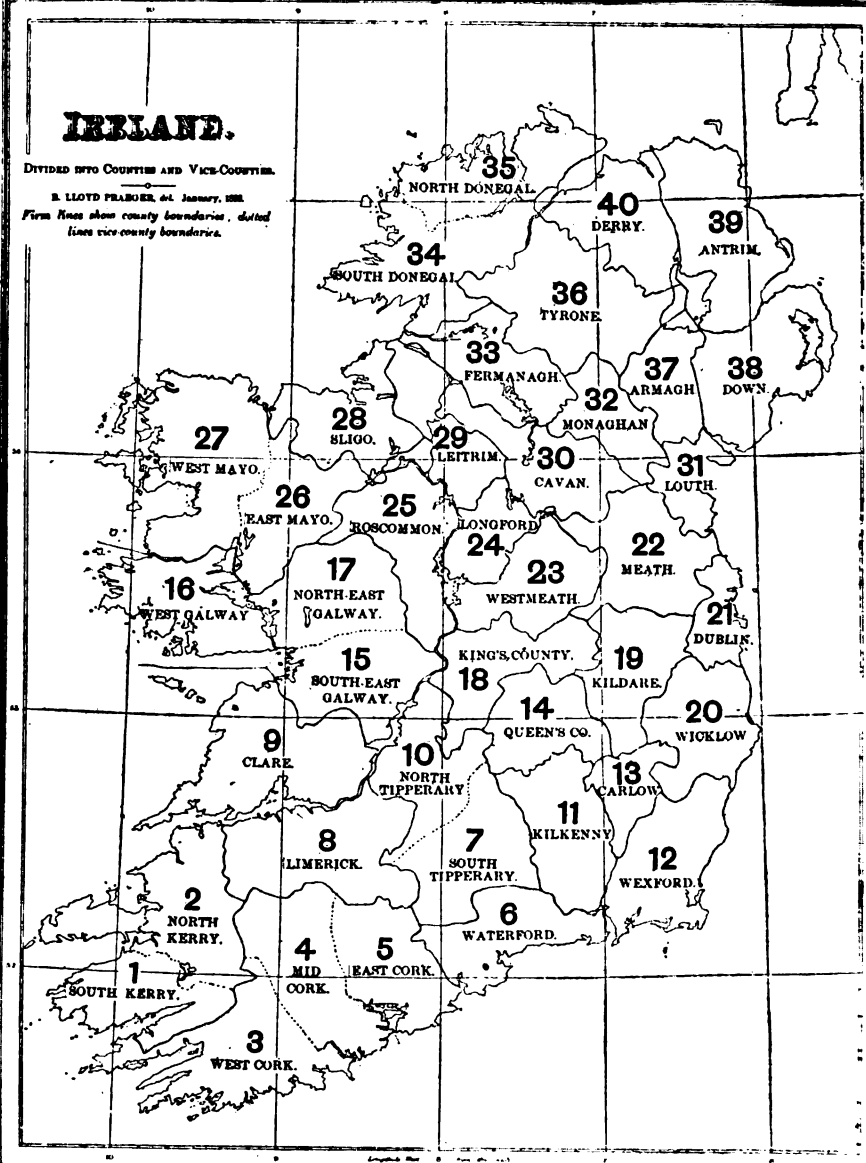


# IRELAND.

DIVIDED INTO COUNTIES AND VICE-COUNTIES.

R. LLOYD PRABER, ed. January, 1888.

Firm lines show county boundaries, dotted lines vice-county boundaries.



## ON THE BOTANICAL SUBDIVISION OF IRELAND.

BY R. LLOYD PRAEGER, B.E.

(PLATE I.)

THIRTY-SEVEN years have now elapsed since, at a meeting of the Dublin University Zoological and Botanical Association, a paper by Charles C. Babington was read, entitled "Hints towards a Cybele Hibernica." In this communication, the author put forward a scheme for the subdivision of Ireland into twelve provinces and thirty-seven counties and vice-counties, on the plan of Watson's *Cybele Britannica*; and as the paper is not readily accessible to most botanists, the suggested division may be reprinted here:—

XIX. SOUTH ATLANTIC.—113. South Kerry; 114. North Kerry; 115. South Cork.

XX. BLACKWATER.—116. North Cork; 117. Wexford; 118. South Tipperary.

XXI. BARROW.—119. Kilkenny; 120. Carlow; 121. Queen's Co.

XXII. LEINSTER COAST.—122. Wexford; 123. Wicklow.

XXIII. LIFFEY AND BOYNE.—124. Kildare; 125. Dublin; 126. Meath; 127. Louth.

XXIV. LOWER SHANNON.—128. Limerick; 129. Clare; 130. East Galway.

XXV. UPPER SHANNON.—131. North Tipperary; 132. King's Co.; 133. Westmeath; 134. Longford.

XXVI. NORTH ATLANTIC.—135. West Galway; 136. West Mayo.

XXVII. NORTH CONNAUGHT.—137. East Mayo; 138. Sligo; 139. Leitrim; 140. Roscommon.

XXVIII. ERNE.—141. Fermanagh; 142. Cavan; 143. Monaghan; 144. Tyrone; 145. Armagh.

XXIX. DONEGAL.—146. Donegal.

XXX. ULSTER COAST.—147. Down; 148. Antrim; 149. Derry.

Following Watson, Babington founded his twelve provinces as far as possible on the principal river-basins of the country. Ireland does not readily lend itself to such a plan of division. The Shannon valley occupies about one-sixth of the entire island, and other river-basins are small in comparison. Also, the mountain-chains being mostly near the coast, considerable areas are drained by small rivers only. The consequence was that in many cases river-basin provinces were not practicable, and this gave an opportunity for the using of

<sup>1</sup> *Nat. Hist. Review*, vi., pt. 2, 1859. *Proc. D. U. Zool. and Bot. Assoc.*, i.

natural botanical divisions, such as Kerry and South Cork, Connemara and West Mayo, and Donegal. So that, although the partition of Ireland by river-basins is not satisfactory, nevertheless Babington's twelve provinces appear to be as good as could have been selected.

Seven years after the publication of Babington's paper, *Cybele Hibernica* appeared, under the authorship of Dr. David Moore, and Mr. A. G. More. In this work the twelve provinces suggested by Babington were adopted, the only alteration being that they were called "Districts," and were numbered 1 to 12, instead of XIX to XXX.—of which more anon. In his *British Rubi*, published three years later (1869), Babington used the twelve provinces he proposed; indeed, it was for the purpose of showing the distribution of the *Rubi* that he first undertook the botanical division of Ireland; as he himself modestly says—"I should not have intruded myself into a work which seems especially Irish, had it not become necessary for me to subdivide the country for the purpose of recording the distribution of the Irish *Rubi*, as a part of my projected, and to a considerable extent completed, treatise upon the *Rubi* of the United Kingdom." So much for the proposed twelve botanical divisions of Ireland; they have been adopted by the leaders of Irish botany, and the large amount of botanical survey work carried out since they were first suggested has not in any way shaken our faith in their scientific usefulness and practical convenience.

Next, as regards the second part of Babington's scheme—the subdivision into counties and vice-counties. We have not yet in Ireland got so far as a *Topographical Botany*; and, although the publication of *Cybele Hibernica* marked the commencement of a large amount of field-work, this was in most cases confined to small areas, and Babington's county list lay unused and apparently almost forgotten till 1884, when Prof. W. R. M'Nab read before the Royal Dublin Society, a "Short Note on the Botanical Topographical Divisions of Ireland" which is printed in their *Proceedings*.<sup>2</sup> This paper purports to be a revision and extension of Babington's scheme, but the suggestions put forward—the Roman numerals for

<sup>1</sup> Hints towards a *Cybele Hibernica*, l. c.

<sup>2</sup> *Sci. Proc. R.D.S.*, n.s., iv. 197 (1885).

the provinces, the use of the word "province" instead of "district" (which was used in *Cybele Hibernica*), the giving of names to the provinces, and the numbering of the vice-counties--all these had been already published in Babington's paper; and M'Nab's table of provinces and counties is identical with that of Babington, except that he commences the numbering of provinces and of counties with I., and that he does not subdivide the county of Kerry.

No further reference to or use of Babington's county-division scheme appears until the year 1895, when Messrs. Groves employed it in their valuable paper on "The Distribution of the *Characeæ* in Ireland," in which the distribution of the species and varieties is shown in list form, on the plan of Watson's *Topographical Botany*.

For some time past, a sense of the importance of commencing the large amount of field-work that must be carried out before an Irish *Topographical Botany* become a possibility, has been steadily growing in my mind; and this led me some months ago to go carefully into the question of the most advantageous subdivision of the country into counties and vice-counties. As regards about twenty-four out of the thirty-two Irish counties, I had the benefit of at least some personal knowledge, topographical and botanical; and regarding others, I have had the great advantage of the opinions of botanists whose special acquaintance with the flora of these counties is well known. The first result of my enquiry has been the conviction that the subdivision of the larger counties as proposed by Babington can be now improved upon; and indeed this is not a matter for surprise, when we consider the enormous advance made during the intervening period of thirty-seven years in our knowledge of Irish botanical topography (though that knowledge is yet very far from complete). I am also convinced that the order in which the counties and vice-counties are numbered in Babington's scheme is not the most convenient or useful one that can be devised: and in this view I am glad to have the support of several of the most practical Irish botanists. It is manifestly important that some scheme of county-division and county-numbering should be fixed once for all, according to which future records may

<sup>1</sup> *Irish Naturalist*, Jan. and Feb., 1895.

be systematically noted. This is especially desirable at the present time, when there appears to be a distinct increase of activity as regards Irish botany, as shown not only by the work which is being done by home workers, but also by the welcome visits which we have had during the past two seasons from quite a number of the leading field botanists of England. And if any alteration is to be made in the only county-division scheme that has been put forward, then the sooner it is made the better. Since they were proposed thirty-seven years ago, the only published paper in which Babington's county-numbers have been used is that of Messrs. Groves, already quoted. The scheme, in fact, has not been generally adopted, so that no great inconvenience can result from a revision of the county list : though if this scheme had already been used in a number of papers, it would be a question whether the inconvenience of any alteration of the county-numbering would not outweigh the advantages of an improved subdivision.

These considerations have led me to put forward without further delay the following revised scheme, not without a full enquiry as to the value of each of the alterations which is suggested, and careful consideration of its desirability. It will be most convenient to give the list first, and state the reason for the changes afterwards.—

- |                        |                    |
|------------------------|--------------------|
| 1. South Kerry.        | 21. Dublin.        |
| 2. North Kerry.        | 22. Meath.         |
| 3. West Cork.          | 23. Westmeath.     |
| 4. Mid Cork.           | 24. Longford.      |
| 5. East Cork.          | 25. Roscommon.     |
| 6. Waterford.          | 26. East Mayo.     |
| 7. South Tipperary.    | 27. West Mayo.     |
| 8. Limerick.           | 28. Sligo.         |
| 9. Clare.              | 29. Leitrim.       |
| 10. North Tipperary.   | 30. Cavan.         |
| 11. Kilkenny.          | 31. Louth.         |
| 12. Wexford.           | 32. Monaghan.      |
| 13. Carlow.            | 33. Fermanagh.     |
| 14. Queen's County.    | 34. South Donegal. |
| 15. South-east Galway. | 35. North Donegal. |
| 16. West Galway.       | 36. Tyrone.        |
| 17. North-east Galway. | 37. Armagh.        |
| 18. King's County.     | 38. Down.          |
| 19. Kildare.           | 39. Antrim.        |
| 20. Wicklow.           | 40. Derry.         |

It may be stated at once that this arrangement differs from that of Babington, first, as regards the subdivision of the counties of Cork, Kerry, Galway, and Donegal; and secondly, in the renumbering of the counties and vice-counties according to a different plan. It will be seen that the figures ascend regularly from the extreme south-west of the country to the extreme north-east, the numbering following a backwards-and-forwards line, irrespective of the "province" boundaries.

In working out the above scheme, the following considerations influenced the subdivision of the larger counties:—

*Natural Boundaries.*—Where clearly-defined natural boundaries, botanical, geological, or physical, exist, it is manifestly advantageous that they should be followed; but it is not always possible to follow them, on account of other considerations. The convenience of county-divisions is so great, that except in the subdividing of a large county, it does not appear desirable to forsake county boundaries.

*Equalization of Areas.*—It is also desirable that, so far as possible, the country should be divided into portions of approximately equal area; but here again, the less the arrangement by counties is disturbed the better.

*Utilization of past or future botanical Work.*—It is manifestly desirable that the scheme as regards subdivision of counties should harmonize with the subdivisions used, or to be used, in published or future county or local floras; since this will save a large amount of labour, when it comes to working out the flora of each vice-county.

*Nature of Boundaries.*—Where a new boundary-line is required, it is desirable that it should be something conspicuous—a railway, road, or river—in order that it may be easily found in the field; an imaginary line, such as a straight line between two places, though it looks very well on a map, is often difficult to trace in the field.

Let me now take up in turn each of the cases in which the plan suggested differs from that proposed by Babington, explain the nature of the change, and give the reasons.

**CORK.**—Is now divided into three vice-counties (3, 4, 5), by two N.W. and S.E. lines. Babington divided it into two vice-counties, one much larger than the other, by the east and west course of the River Sullane and its continuation the River Lee. In that useful little flora, *The Flowering Plants and Ferns of the County Cork* (1883), the author, Rev.

Thomas Allin, departs from Babington's boundary, and adopts instead "a line drawn along the Killarney Junction Railway from the border of Co. Kerry to Millstreet, thence running across the country in a straight line to Macroom, thence in a similar line to Bandon and from that town, following the Bandon River, to the sea." This line appears to have been wisely chosen, dividing the western mountainous portion of the county, with its Atlantic, Highland, and American plants, from the more level tract, with its calcicole and Germanic species. The latter district (1,747 square miles) being still considerably larger than the largest of the counties which it is not proposed to subdivide, is conveniently divided into two by the Great Southern and Western Railway from Charleville to Cork, and thence by the western shore of Cork Harbour to the ocean; this line forms approximately the western boundary of the Carboniferous limestone. The great county of Cork is thus divided into three parts of almost equal area, the size of each being about that of an average Irish county. As regards the division of Co. Cork, I have had the advantage of the hearty co-operation of Mr. R. A. Phillips, whose knowledge of the Cork flora is well-known, and who suggested to me the sub-division of the county adopted in this paper.

**KERRY.**—In Babington's scheme Kerry is divided into two vice-counties by a line following the River Flesk, the northern shore of the Lower Lake of Killarney, and the River Laune. Mr. R. W. Scully, F.L.S., whose researches in the Kerry flora readers of this Journal well know, has kindly favoured me with his views. He points out that the Dingle promontory, which Babington includes in North Kerry, belongs botanically to South Kerry; and this, indeed, Babington himself admits in his paper.<sup>2</sup> Mr. Scully also kindly informs me that when his forthcoming *Flora of Kerry* is published, the distribution of species will probably be shown by baronies; it will therefore be an advantage to use barony boundaries in fixing the Kerry vice-counties; and the best division is evidently a line separating the baronies of Magunihy and Trughnacmy on the one hand from Glanarought, Dunkerron, Iveragh, and Corkaguiny on the other; this forms roughly a N.W. and S.E. line, and divides the county into a mountainous south-western part, composed of Silurian and Devonian rocks, intersected by deep bays, and rich in alpine and Atlantic plants, and a more level and less maritime north-eastern portion, composed of Carboniferous limestone, and Coal-measures. Mr. Scully agrees as to this being the best division of Kerry into two vice-counties.

**GALWAY.**—Connemara forms a division in every way distinct, and Babington's line correctly cuts off the mountainous metamorphic maritime district lying west of Lough Corrib, with its peculiar flora, from the inland limestone plain of East Galway. The latter area is so very extensive (1,613 square miles, twice the size of an average county), that there can be no doubt as to the desirability of forming it into two vice-counties, and a convenient east and west dividing line is formed by

<sup>1</sup> *Op. cit.*, Introduction, p. xii.

<sup>2</sup> p. 536, line 1--3.

the Midland Great Western Railway from Oranmore, at the head of Galway Bay, to Ballinasloe on the River Suck, the eastern boundary of the county. It may be remarked here that the Aran Islands, though part of Co. Galway, belong botanically to Co. Clare, and are so treated in *Cybele Hibernica*; and that Inishbofin, formerly included in Co. Mayo, is now a part of West Galway, to which it naturally belongs.

**DONEGAL.**—This large county (1,870 square miles) should evidently form two vice-counties, in order to keep the variation of size of our ultimate divisions within reasonable limits, and thus ensure that a statement of the number of county-divisions in which a plant occurs in the country may be a tolerably correct indication of its area of distribution.

The boundary which I suggest is the roughly east and west line which separates the baronies of Inishowen and Kilmacrenan on the north from Raphoe and Boylagh on the south. This line crosses the Inishowen isthmus at its narrowest point, follows the shore of Lough Swilly, and then the River Swilly almost to its source, and descends to the western ocean along the course of the Gweedore River; and it divides the county into two almost equal parts.

The whole of Ireland, 32,513 square miles, is thus divided into 40 portions of as nearly equal size as conditions will permit, the average area of these portions being 813 square miles. This size is almost identical with the average size of Watson's 112 vice-counties of Great Britain, which is 804 square miles.

Next, as to the order in which the counties and vice-counties should be numbered. Watson numbered the British provinces I. to XVIII., commencing with S.W. England and ending with the extreme north of Scotland. The vice-counties he numbered in the same order, those included in Province I. being numbered 1 to 6, those of Province II. 7 to 14, and so on. Babington proposed a similar method for Ireland, but the result is not satisfactory. The Irish "provinces" are not numbered regularly from south to north, but the numbering runs first up the east coast, and then drops back into the south-west; and this absence of regular progression becomes accentuated if the vice-counties are numbered in the sequence of the provinces; when, for instance, we suddenly pass from Louth (127) 120 miles south-westward to Limerick (128). It will be generally admitted that the best scheme, and the most natural, is one which will show a regular progression from south to north—from a higher temperature to a lower: with such a system, the largeness or smallness of the numbers in the list showing the county-distribution of a species, will



themselves be a key to the northward or southward range of the plant. Thus, if out of say 40 vice-counties we find the range of a plant is from 1 to 20, we shall immediately know that it is confined to the southern half of Ireland. It appears to me that the practical advantages of such a plan are much greater than those which arise from a consecutive numbering for the vice-counties of each "province;" and the scheme which I suggest therefore embodies this principle. A glance at the botanical map in *Cybele Hibernica* shows that the characteristic plants of Ireland are distributed according to lines which have a general trend north-west and south-east, rather than west and east; this is also the course followed by the isothermal lines of winter and spring; and I have adopted a system of numbering that follows these natural lines, and proceeds in a regular manner from the extreme south-west of the country to the extreme north-east. Such a plan does not prevent the vice-counties being grouped under the "provinces" if for any reason this is desired. We should then have the following table; for the "provinces" I give the numbering used by Moore and More in *Cybele Hibernica* :—

I. South Atlantic, . . . .	1. South Kerry.
	2. North Kerry.
	3. West Cork.
II. Blackwater, . . . .	4. Mid. Cork.
	5. East Cork.
	6. Waterford.
	7. South Tipperary.
III. Barrow, . . . .	11. Kilkenny.
	13. Carlow.
	14. Queen's County.
IV. Leinster Coast, . . . .	12. Wexford.
	20. Wicklow.
V. Liffey and Boyne, . . . .	19. Kildare.
	21. Dublin.
	22. Meath.
	31. Louth.
VI. Lower Shannon, . . . .	8. Limerick.
	9. Clare.
	15. South-east Galway.
	17. North-east Galway.
VII. Upper Shannon, . . . .	10. North Tipperary.
	18. King's County.
	23. Westmeath
	24. Longford.

VIII. North Atlantic,	. . .	16. West Galway.
		27. West Mayo.
IX. North Connaught,	. . .	26. East Mayo.
		28. Sligo.
		29. Leitrim.
		25. Roscommon.
X. Erne,	. . .	33. Fermanagh.
		30. Cavan.
		32. Monaghan.
		36. Tyrone.
		37. Armagh.
XI. Donegal,	. . .	34. South Donegal.
		35. North Donegal.
XII. Ulster Coast,	. . .	38. Down
		39. Antrim.
		40. Derry.

Lastly, a word as to the numerals used to denote the districts and county-divisions. Babington numbered his first Irish province (South Atlantic) XIX, being the number following that of the last province of Great Britain (North Isles), and similarly numbered the first vice-county (South Kerry) 113; and the sequence involved in the latter has been used by Messrs. Groves in their recent paper on Irish *Characeæ*, their reason, as given in a friendly note to the writer, being that the British Isles form a natural botanical district, of which Ireland is a part. Quite so; but let us look more closely into this matter. According to Watson's arrangement, as first put forward in *Cybele Britannica*, and now universally adopted, the vice-county numbering in Great Britain commences in the Atlantic counties of Cornwall and Devon, which in all Britain have botanically the nearest affinity to the characteristic flora of Ireland; yet in the county list they are removed from the allied districts of Ireland by the whole length and breadth of England, Wales, and Scotland. The county-numbers in Great Britain led us gradually northward, from Cornwall right up to the Shetlands, and the largeness or smallness of the figures themselves thus afford a useful clue to the northern or southern range of a species; but, according to this scheme of continuous numbering, the moment we pass 112 we plunge from the almost Scandinavian flora of Shetland into the luxuriant southern flora of Killarney, thence to proceed by degrees to the more northern flora of Derry. A

continuous numbering for the whole of the British Islands would be certainly a desideratum; but one which passes without a break or indication of a change from Shetland to Killarney is too unnatural to commend itself. Botanists will form their own opinions on this point; for my part, I prefer to follow the lead set by the careful and able authors of *Cybele Hibernica*, who numbered the Irish districts 1 to 12, not XIX to XXX; and I have numbered the counties and vice-counties of Ireland 1 to 40.

Another point requiring a passing notice is the use of the words "province" and "district." Babington, following Watson, called the twelve Irish botanical divisions "provinces"; the authors of *Cybele Hibernica* used the term "district" instead; M'Nab proposed to return to the word "province." Considering that Ireland is divided geographically into four provinces—Ulster, Munster, Leinster, and Connaught,—and that in Ireland the term "province" is invariably used in this sense only, I believe its use to signify the twelve botanical divisions of the country would lead to confusion; and I follow Moore and More, who (probably on the same consideration) called them "districts."

In conclusion, I wish to acknowledge the ready and willing assistance which I received from many Irish botanists in the inquiries made for the purposes of the present paper; and I would specially offer my thanks to Messrs. N. Colgan, M.R.I.A., R. A. Phillips, R. W. Scully, F.L.S., S. A. Stewart, F.B.S.E., and Rev. C. H. Waddell, B.D., for information and for useful criticism given in correspondence, or in conversation.

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<sup>1</sup> Babington's Irish "provinces" correspond in size and importance to Watson's "vice-provinces," rather than to his "provinces," and might preferably have been numbered XXXIX to L. in continuation of the last British vice-province (Shetland), rather than XIX to XXX.

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## A LIST OF IRISH HYMENOPTERA ACULEATA.

BY PERCY E. FREKE.

I OFFER the following paper on the Aculeate Hymenoptera of Ireland, not with any pretensions to its being a complete list of that part of our fauna, but as a first effort towards a more complete knowledge of the number and distribution of its members.

When taking up lately the study of this subject I found no list of our Irish Aculeate Hymenoptera to guide me with reference to occurrences or the distribution of such insects as I obtained, and it is with a view to establishing some such record, and inducing others to aid us with more complete information, that I now propose the following list as a basis on which to commence.

I regret that my notes cover but a part only of this country; from much of the western side of Ireland I have no records; and even the eastern side, with the exception of what might be termed the Dublin district, has hitherto been worked in a most casual manner. When others who have better opportunities than I have had, can be induced to record their captures, the number of species in my list will probably be very much increased, and many that I have met with but sparingly may be found abundant in other localities.

I must here offer my warmest thanks to Mr. Edward Saunders, for the patience and kindness he has shown me in naming insects which I have sent for his determination; to Mr. Carpenter and Mr. Halbert, of the Irish National Museum, for their unfailing kindness and courtesy in giving me on all occasions the benefit of their experience, and allowing me to inspect the insects in the National collection; and to my coadjutor, Mr. H. G. Cuthbert, in freely furnishing me with records of his many captures, and in largely adding to the material of my collection. I have also to thank the Flora and Fauna Committee of the Royal Irish Academy for the records of specimens collected under their auspices.

The letter (M) signifies that the specimen is in the Dublin Museum collection. The name of the collector or authority is added in all but the common species of general distribution.

## FORMICIDÆ.

**Formica rufa**, Linn.—(Haliday, M.) Churchill, Co. Armagh (Rev. W. F. Johnson, M.)

**F. fusca**, Linn.—Common and generally distributed.

**Lasius flavus**, De Geer.—Very common everywhere.

**L. fuliginosus**, Latr.—Lismore (Halbert).

**L. niger**, Linn.—Common in suitable localities.

**Leptothorax acervorum**, Fab.—Carlingford (Rev. W. F. Johnson, M.); Oughterard (Carpenter).

**Myrmica rubra**, Linn.—

Race *ruginodis*—Very common everywhere.

*levinodis*—Coolmore, Co. Donegal (Rev. W. F. Johnson, M.); Carrickmines, Lucan, Co. Dublin; Dingle (Halbert).

*scabrinodis*—Less common than *ruginodis*; Castletown-Bere, Co. Cork (Carpenter, M.); Armagh (Rev. W. F. Johnson, M.); Greystones (M.); Dalkey (M.); Courtown, Co. Wexford, and Co. Dublin (Cuthbert).

*lobicornis*—Armagh (Rev. W. F. Johnson, M.)

## SPHEGIDÆ.

**Pompilus rufipes**, Linn.—I took three specimens at Courtown, Co. Wexford, last year. This season I have looked for them in the same place in vain.

**P. plumbeus**, Fab.—Very common in most sandy localities along the coast.

**P. niger**, Fab.—Glencullen, Co. Dublin (Cuthbert); Co. Kildare (Freke); common at Rosscarberry, Co. Cork (Cuthbert).

**P. gibbus**, Fab.—Common and generally distributed.

**Sallus fuscus**, Linn.—(Haliday, M.); Armagh (Rev. W. F. Johnson, M.); Friarstown, Co. Dublin (Cuthbert).

**S. exaltatus**, Fab.—(Haliday, M.) (Dr. A. W. Foot, in *Proc. Nat. Hist. Soc. of Dublin*, vol. vi., pt. 1, p. 83).

**Ceropales maculata**, Fab.—Fairly common in suitable localities on the sea-coast.

**Astabus boops**, Schr.—Donabate, Co. Dublin (Cuthbert).

**Tachytes pectinipes**, Linn.—Very common in suitable localities on the sea-coast.

**Ammophila hirsuta**, Scop.—I took two specimens last season near Arklow, Co. Wicklow.

**Spilomena troglodytes**, V. de Lind.—(Haliday, M.)

**Pemphredon lugubris**, Fab.—Monkstown, Co. Dublin, and Courtown, Co. Wexford (Cuthbert).

**P. Shuckardi**, Moraw.—Dundrum, Co. Dublin (Freke).

**P. Wesmaeli**, Moraw.—Monkstown, Co. Dublin (Cuthbert).

**P. lethifer**, Shuck.—Courtown, Co. Wexford, and Laytown, Co. Dublin (Cuthbert).

**Passalocetus monilicornis**, Dbm.—(Haliday, M.)

**Mimesa unicolor**, V. de Lind.—Laytown, Co. Dublin (Cuthbert).

**Psen pallipes**, Panz.—Monkstown, Co. Dublin (Cuthbert)

**Gorytes mystaceus**, Linn.—(Haliday, M.)

**Nysson spinosus**, Fab.—Glencullen, Co. Dublin (Freke).

**Mellinus arvensis**, Linn.—Common in suitable localities on the sea coast.

- Oxybelus unigtumis**, Linn.—Bundoran (Rev. W. F. Johnson, M.); Laytown, Co. Dublin; near Drogheda; and Roscarberry, Co. Cork (Cuthbert).
- Crabro tibialis**, Fab.—(Haliday, M.)
- C. clavipes**, Linn.—(Haliday, M.), Dundrum, Co. Dublin (Freke).
- C. leucostomus**, Linn.—Not uncommon.
- C. palmipes**, Linn.—Not uncommon. Portmarnock and Glencullen, Co. Dublin; Arklow, Co. Wicklow; and Courtown, Co. Wexford (Freke); Laytown, Co. Dublin (Cuthbert).
- C. varius**, Lep.—Not uncommon on sandhills on the east coast.
- C. wesmaell**, V. de Lind.—Dundrum, Co. Dublin (Freke); Laytown, Co. Dublin (Cuthbert).
- C. quadri-maculatus**, Fah.—Courtown, Co. Wexford (Freke), an unusual dark form.
- C. dimidiatus**, Fab.—Bruckless, Co. Donegal (Rev. W. F. Johnson); Sandyford, Co. Dublin (Cuthbert); Scalp, Co. Dublin (Freke); an unusual dark form.
- C. cephalotes**, Panz.—Not uncommon.
- C. vagus**, Linn.—Monkstown, Co. Dublin (Cuthbert).
- C. peitarius**, Schreb.—Common on sandhills on the sea-coast.

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*VESPIDÆ.*

- Vespa vulgaris**, Linn.—Very common everywhere.
- V. germanica**, Fab.—Very common everywhere.
- V. rufa**, Linn.—Less common than the two preceding, but generally distributed, at least from Dublin southward.
- V. austriaca**, Panz.—Local and not very uncommon in the Dublin district. Females only recorded.
- V. sylvestris**, Scop.—Common.
- V. norvegica**, Fab.—Common.
- Odynerus spinipes**, Linn.—Killiney, Co. Dublin (Cuthbert).
- O. parietum**, Linn.—Not uncommon.
- O. pictus**, Curt.—Common.
- O. trimarginatus**, Zett.—(Haliday, M.); Courtown, Co. Wexford (Cuthbert), Roscarberry, Co. Cork; a variety with spotted tibia (Cuthbert).
- O. parietinus**, Linn.—Common.

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*APIDÆ.*

- Colletes succincta**, Linn.—(Haliday, M.); Roscarberry, Co. Cork (Cuthbert).
- C. fodiens**, Kirb.—Courtown, Co. Wexford (Cuthbert).
- C. picistigma**, Thoms.—Common at Courtown, Co. Wexford (Freke).
- C. davlesana**, Sm.—Killiney, and Sandyford, and Laytown, Co. Dublin; Courtown, Co. Wexford; and Roscarberry, Co. Cork (Cuthbert).
- Prosopis confusa**, Nul.—(Haliday, M., as *punctatissima*); Glencullen, Co. Dublin (Cuthbert); Gorey, Co. Wexford (Freke).
- Sphécodes gibbus**, Linn.—Glencullen, Co. Dublin (Cuthbert and Freke).
- S. subquadratus**, Sm.—Roscarberry, Co. Cork (Cuthbert).
- S. spinulosus**, Hag.—Kilkenny (Rev. T. B. Gibson, M.)

- Sphecodes pilifrons**, Thoms.—Kilkenny (Rev. T. B. Gibson, M.); Rosscarberry, Co. Cork (Cuthbert).
- S. similis**, Westm.—Glencullen, Co. Dublin, and Courtown, Co. Wexford (Freke).
- S. variegatus**, Hag.—Sandyford and Glencullen, Co. Dublin (Freke).
- S. dimidiatus**, Hag.—Sandyford, Co. Dublin (Cuthbert and Freke).
- S. affinis**, Hag.—Rosscarberry, Co. Cork (Cuthbert).
- Haliictus rubicundus**, Chr.—Common everywhere.
- H. sexnotatus**, Kirb.—Saunders in his book on British Hymenoptera Aculeata, p. 214, states that it has been taken here by Haliday. I cannot trace the specimen in the Irish Nat. Museum.
- H. cylindricus**, Fab.—Common everywhere.
- H. albipes**, Kirb.—(Haliday, M.); Kilkenny (Rev. T. B. Gibson); Kildare (Freke); Lucan, Co. Dublin (Halbert).
- H. subfasciatus**, Nyl.—(Haliday, M.); Coolmore, Co. Donegal (Rev. W. F. Johnson); Kildare (Freke); Tallaght, Co. Dublin (Halbert).
- H. villosulus**, Kirb.—(Haliday, M.); Courtown, Co. Wexford, and Rosscarberry, Co. Cork (Cuthbert); common in Kildare (Freke); Killaloe (Halbert).
- H. minutus**, Kirb.—Courtown, Co. Wexford (Cuthbert).
- H. nitidiusculus**, Kirb.—(Haliday, M.); Dunsink, Co. Dublin (H. B. Rathborne, M.); Monkstown, Co. Dublin; Courtown, Co. Wexford; and Rosscarberry, Co. Cork (Cuthbert).
- H. tumulorum**, Linn.—(Haliday, M.); Golden Ball, Co. Dublin, and Courtown, Co. Wexford (Cuthbert); Dundrum, Co. Dublin (Freke); Lucan and Tallaght, Co. Dublin (Halbert).
- H. smeathmanellus**, Kirb.—Tallaght, Co. Dublin (Halbert).
- H. morio**, Fab.—Common.
- H. leucopus**, Kirb.—Dundrum, Co. Dublin (Freke).
- Andrena albicans**, Kirb.—Common everywhere.
- A. atriceps**, Kirb.—Kilkenny (Rev. T. B. Gibson, M.)
- A. rosse**, var. **trimmerana**, Kirb.—Common everywhere.
- A. clinearia**, Linn.—Armagh (Rev. W. F. Johnson, M.); Rostrevor, Co. Down (W. Hooper, M.)
- A. thoracica**, Fab.—Armagh (Rev. W. F. Johnson, M.)
- A. nitida**, Fourc.—Kilkenny (Rev. T. B. Gibson, M.); Courtown, Co. Wexford (Cuthbert).
- A. clarkella**, Kirb.—“United Kingdom” (Smith, p. 40); “all over our islands” (Saunders, p. 242). I have not hitherto met with it myself.
- A. nigrosenea**, Kirb.—Common.
- A. gwynana**, Kirb.—Not uncommon and generally distributed.
- A. helveola**, Linn.—Blanchardstown, Co. Dublin (Halbert).
- A. fucata**, Smith.—Skerries, Co. Dublin; and Courtown, Co. Wexford (Cuthbert); Portmarnock, Co. Dublin (Freke).
- A. denticulata**, Kirb.—Rosscarberry, Co. Cork (Cuthbert).
- A. fulvicrus**, Kirb.—Dunsink, Co. Dublin (Rathborne, M.); near Dublin (Cuthbert).
- A. albicrus**, Kirb.—Sandyford and Laytown, Co. Dublin (Cuthbert); Portmarnock, Co. Dublin (Freke).
- A. analls**, Panz.—Ireland (Smith, p. 65).
- A. coitana**, Kirb.—Limerick (Halbert).
- A. minutula**, Kirb.—Common and generally distributed.

- Andrena nana**, Kirb.—Rosscarberry, Co. Cork (Cuthbert).
- A. afzellella**, Kirb.—Killiney, Co. Dublin (Cuthbert).
- A. wilkella**, Kirb.—Common and generally distributed; found stylized by Cuthbert.
- Nomada solidaginis**, Panz.—(Haliday, M.)
- N. succincta**, Panz.—(Haliday, M.); Dunsink, Co. Dublin (Rathborne); Dundrum, Co. Dublin (Freke); Portmarnock, Co. Dublin (Halbert).
- N. alternata**, Kirb.—Very common and generally distributed.
- N. ruficornis**, Linn.—Common and generally distributed.
- N. borealis**, Zett.—(Haliday, M.); Stillorgan Park, Co. Dublin (Cuthbert).
- N. bifida**, Thoms.—Courtown, Co. Wexford, and Glencullen, Co. Dublin (Cuthbert); Dundrum, Co. Dublin (Freke).
- N. ochrostoma**, Kirb.—(Dr. A. W. Foot, *l.c.*); Stillorgan Park, Co. Dublin, and Rosscarberry, Co. Cork (Cuthbert); Howth, Santry, etc., Co. Dublin (Halbert).
- N. obtusifrons**, Nyl.—(Haliday, M.)
- N. ferruginata**, Kirb.—Glencullen, Co. Dublin (Cuthbert).
- N. fabriciana**, Linn.—(Haliday, M.)
- N. flavoguttata**, Kirb.—(Haliday, M.); Courtown, Co. Wexford, and Monkstown, Co. Dublin (Cuthbert); Glencullen, Co. Dublin (Freke); Santry and Tallaght, Co. Dublin (Halbert).
- N. furva**, Panz.—(Haliday, M.)
- Colloxys elongata**, Lep.—Not very uncommon. Fermoy, Co. Cork (Halbert); Monkstown, Co. Dublin, and Rosscarberry, Co. Cork (Cuthbert); Counties Wexford, Dublin, Kildare, and King's (Freke).
- Megachile centuncularis**, Linn.—Common and generally distributed.
- Anthophora pilipes**, Fab.—“United Kingdom” (Smith, p. 191, as *acervorum*).
- Paltryrus rupestris**, Fab.—Limerick (F. Neale, M.); Courtown, Co. Wexford (Freke); Rosscarberry, Co. Cork (Cuthbert).
- P. vestalis**, Fourc.—Dundrum and Tallaght, Co. Dublin, and Courtown, Co. Wexford (Freke); Sandyford, Co. Dublin, and Rosscarberry, Co. Cork (Cuthbert).
- P. barbuteus**, Kirb.—Dundrum, Co. Dublin (Freke); Rosscarberry, Co. Cork (Cuthbert).
- P. campestris**, Panz.—(Dr. A. W. Foot, *l.c.*); Rosscarberry, Co. Cork (Cuthbert); Ireland (Smith, p. 224).
- Bombus cognatus**, Steph.—Very common and generally distributed.
- B. muscorum**, Linn.—Very common and generally distributed.
- B. latrailleus**, var. **distinguendus**, Mor.—Courtown and Gorey, Co. Wexford, and Arklow, Co. Wicklow (Freke).
- B. hortorum**, Linn.—Common and generally distributed.
- B. schrimshirani**, Kirb.—Carrickmines and Dundrum, Co. Dublin (Freke); Rosscarberry, Co. Cork (Cuthbert).
- B. sylvarum**, Linn.—Port Ballintrae, Co. Antrim (Rev. W. F. Johnson); Courtown, Co. Wexford, and Rosscarberry, Co. Cork (Cuthbert).
- B. derhamellus**, Kirb.—Coolmore, Co. Donegal (Rev. W. F. Johnson).
- B. lapidarius**, Linn.—Very common and generally distributed.
- B. terrestris**, Linn.—Both forms *lucorum* and *virginalis* are very common and generally distributed.



## THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

DURING the past season a considerable number of species and varieties of plants not previously recorded from this county, or from District VII. of *Cybele Hibernica*, have been discovered, almost altogether by my friends the Revds. E. F. Linton, W. R. Linton, and E. S. Marshall, who paid me a visit in July last, and to whom I am indebted for much valuable information kindly afforded.

Among the *Rubi* especially, as might be expected in a country which had not previously been examined for the genus in any but the most casual manner, many interesting discoveries were made by the Messrs. Linton, so much so indeed that several of the species collected have not as yet been finally determined.

## LIST OF SPECIES.

- Caitha palustris**, L., var. **procumbens**, Beck (VII.) *vide* Ar. Bennett.—Shores of Brittas Lake, Knock Drin. This plant appears to be very near *C. radicans*, Forster, rooting at the nodes of the branches, and with deltoid toothed leaves.
- Aquilegia vulgaris**, L.—Shore of L. Derevaragh near Knock Body. This plant has been already recorded from the county; but in the present locality it has every appearance of being indigenous, whereas in those previously mentioned it is doubtfully so.]
- Papaver dubium**, L., var. **Lecoqii**, Lamotte (VII.)—Shore of L. Derevaragh at Lake House.
- Viola Reichenbachiana**, Bor. (VII.)—Knock Ross.
- Vicia cracca**, L., var. **incana**, Thuill. (VII.)—N.W. end of L. Owel.
- Prunus insititia**, Huds. (VII.)—Roadside hedge, Gararee, Knock Drin.
- P. cerasus**, L. (VII.)—Knock Drin wood.
- Rubus idæus**, L., var. **asperimus**, Lees (VII.). Growing with the type, Knock Drin wood.
- R. pilcatus**, W. and N., form with pink petals.—Drimmore and Crooked Wood—rather plentiful in the latter locality.
- R. opacus**, Focke (VII.)—Crooked Wood.
- R. carpinifolius**, W. and N. (VII.)—Crooked Wood.
- R. villicaulis**, Koehl., var. **Selmeri**, Lindeb. (VII.)—Clonave; N.W. end of L. Derevaragh, also in boundary hedge between Ballynegall and Longhanstown.
- R. hirtifolius**, Muell. and Wirtz., hairy form (VII.)—Knock Drin.  
var. **danicus**, Focke (VII.)—Knock Drin woods.

- R. leucostachys**, Schleich (VII.), form with spreading sepals.—Crooked Wood and Knock Ross.
- [**R. Drejeri**, G. Jansen, included previously among the Westmeath plants (*Irish Naturalist* for May, 1894, p. 98), must now be struck out of the list. It has been excluded from the 9th edition of the London Catalogue, *R. Leyanus*, Rogers, having taken its place; but careful examination of the Westmeath plant has satisfied Mr. Rogers that it is not his *R. Leyanus*, and it must, for the present, remain undetermined.]
- R. radula**, Weihe, form tending towards var. **echinittoides** (VII.)—Knock Drin.—Var. **echinittoides**, Rogers (VII.)—Knock Body.
- R. oligoclados**, Muell and Lefv., var. **Newboldii**, Bab. (VII.)—Crooked Wood, a somewhat less glandular form than the type; but otherwise not differing from it.
- R. scaber**, W. and N. (VII.)—Crooked Wood, Knock Ross, and Knock Drin.
- R. fuscus**, W. and N., var. **macrostachys**, P. J. Muell (VII.)—Knock Ross.
- R. fuscus x incurvatus**.—Crooked Wood. A well-marked hybrid.
- R. thyriger**, Bab. (VII.)—Knock Drin. Mr. Rogers remarks that this differs from the type in the want of hairy clothing, and in the slightly less irregular serrature of the leaves, and rather less armature.
- R. rosaceus**, W. and N., var. **silvestris**, R. P. Murray (VII.)—Knock Drin; this is considered to be only a shade-grown form of *R. hystrix*.
- N.B.—Besides the above-mentioned *Rubi*, about a dozen species were collected last summer in the neighbourhood of the Lakes, and at Knock Drin, including several of the *hirtus-viridis* group, which have not as yet been finally determined.
- Potentilla procumbens**, Sibth.—Shore of L. Derevaragh near Knock Body wood. Not previously definitely recorded from this county; but found in the Co. Longford (Dist. VII.) by Messrs. Barrington and Vowell.
- P. procumbens x sylvestris** (VII.)—Same locality as, and growing with, the last.
- Rosa septum**, Thuill. (VII.)—Shores of L. Derevaragh at Knock Eyon and Knock Body; rather plentiful.
- R. canina**, L., var. **urbica**, Lemm (VII.)—Shore of L. Derevaragh at Knock Body.
- R. canina**, L., var. **dumalis** (Bechst.) (VII.)—Near the plantation at Clonave. Shore of L. Derevaragh.
- [**Lythrum salicaria**, L.—Shore of L. Owel at Clonhugh, all three forms—*i.e.*, with long, short, and intermediate length style—were collected, growing together.]
- Epilobium obscurum x palustre** (VII.)—Bog of Lynn.
- Aplum nodiflorum**, Reichb. fil., var. **ochreatum**, Bab. (VII.)—Shore of L. Owel at Clonhugh—and shore of L. Derevaragh at Donore. Not uncommon.

- Gallum palustre**, L., var. **Witheringii**, Sm. (VII.)—Bog of Lynn and shore of Brittas L., Knock Drin. Not previously definitely reported from the county; but said to be common about L. Ree (Barrington and Vowell).
- Leontodon hispidus**, L.—Shores of L. Derevaragh at Knock Eyon and Donore—new localities. Previously reported from Creggan Lough, near L. Ree, by Messrs. Barrington and Vowell.
- Taraxicum officinale**, Web., var. **udum**, Jord. (VII.)—Knock Drin
- Scrophularia aquatica**, L., var. **cinerea**, Dum. (VII.)—Shore of L. Derevaragh at Donore.
- Veronica anagallis-aquatica**, L., var. **anagallisformis**, Bor (VII.)—Knock Drin, and Scraw Bog, Loughanstown.
- Euphrasia officinalis**, L., var. **Rostkoviana**, Hayne (VII.)—Bog of Lynn.
- Rhinanthus Crista-Galli**, L., var. **fallax**, Wimm. and Grat. (VII.)—Bog of Lynn.
- Melampyrum pratense**, L., *forma latifolia*, Bab.—Knock Eyon. This is given as a variety in the London Catalogue; but it appears to run into the type.
- Utricularia intermedia**, Hayne (VII.)—Tullaghan Bog—a very interesting discovery by Mr. E. F. Linton.
- Chenopodium rubrum**, L. (VII.)—Shore of L. Derevaragh near the mouth of the Yellow River, and shore of L. Drin.
- Polygonum maculatum**, Trim. and Dyer (VII.)—Shore of L. Derevaragh near Knock Body.
- Rumex crispus x obtusifolius** (*R. acutus*, L.) (VII.)—Knock Drin—*vide* remarks in *Cybele Hibernica*, p. 252.
- \***Humulus lupulus**, L.—Naturalized and well established in hedges near Mayne—Lady Katherine Pakenham.
- Salix triandra**, L. (VII.)—Roadside, Quarry Bog, Knock Drin.
- S. cinerea**, L., var. **oleifolia**; Sm. (VII.)—Bog of Lynn.
- S. aurita x cinerea** (*S. lutescens*, A. Kern.) (VII.)—Near the mouth of the Yellow River, at L. Derevaragh.
- S. aurita x caprea** (*S. caprea*, J. Keon) (VII.)—Shore of L. Derevaragh at Donore.
- S. aurita x repens** (*S. ambigua*, Ehrh.) (VII.)—Scraw Bog, Loughanstown.

- [\***S. nigricans**, Sm. (VII.),  
 \***S. phyllifolia**, L. (VII.),  
 \***S. aurita x nigricans** (VII.),  
 \***S. nigricans x phyllifolia**  
 (VII.)

{ Near the mouth of the Yellow River, L. Derevaragh. Were introduced by the Earl of Longford when planting a strip of the foreshore of the lake after it was lowered. This fact is mentioned here for the information of any botanists who may hereafter meet with these plants in this locality, and consider them to be indigenous }

- S. viminalls x caprea** (*S. Smithiana*, Willd.)—Roadside, Quarry Bog, near Mullingar.
- Epipactis media**, Fries (VII.)—Knock Drin wood.
- Orchis incarnata**, L. (VII.)—Bog of Lynn; *vide* remarks regarding this plant in the *Cyb. Hib.*, p. 281.
- Sparganium ramosum**, Huds., var. **microcarpum**, Newm. (VII.)—Quarry and Tullaghan Bogs.
- Potamogeton rufescens**, Schrad.—Drain from L. Drin. A new locality for this uncommon Westmeath plant. It is recorded from L. Ennel (Belvedere Lake) in the *Cyb. Hib.*—and was again found there this year; also from near L. Ree by Messrs. Barrington and Vowell.
- P. decipiens**, Nolte. (= *P. lucens x perfoliatus*) (VII.)—L. Derevaragh.
- P. Friesii**, Rupr. (VII.)—In a dense mass in Lord Longford's boat harbour at L. Derevaragh; also at L. Ennel.
- Carex divulsa** (Good.) (VII.)—Knock Ross.
- C. Goodenovii**, J. Gay., var. **juncella**, T. M. Fries (VII.)—Bog of Lynn.
- Agrostis canina**, L., *forma mutica*, Doll. (VII.)—Drinmore.
- Phragmites communis**, Trin., var. **nigricans**, Gren. and Godr. (VII.)—N.W. end of L. Owel.
- Poa pratensis**, L., *forma subcœrulea*, Sm. (VII.)—Bog of Lynn.
- Glyceria pilcata**, Fr. (VII.)—In drains, Knock Drin.
- Athyrium Filix-fœmina**, Roth., var. **convexum**, Newman (VII.)—Knock Drin.
- Lastrea Filix-mas**, Presl., var. **affinis**, Bab. (VII.)—Knock Drin.  
var. **paleacea**, Moore (VII.)—Knock Drin.
- Chara vulgaris**, L., var. **longibracteata**, Kuetz. (VII.)—L. Ennel.

## CORRESPONDENCE.

### The Shell of *Helix nemoralis*.

SIR,—In the admirable issue of the *Irish Naturalist* for September, 1895, Mr. R. Standen describes (p. 270) the shells of the sub-fossil *Helix nemoralis* of Dog's Bay as being "not calcareous as in recent examples, but more of the nature of aragonite." We have passed out of the days, let us hope, when shells were commonly said to consist of "lime"; but the above statement is so surprising that it should not remain without comment. What is aragonite if it is not calcareous? And how can a substance be "more of the nature of" a well defined mineral species? I presume that the shell of *Helix nemoralis* has been proved to consist of calcite in fresh specimens.

GRENVILLE A. J. COLE.

## GEOLOGICAL STUDIES IN THE NORTH.

MESSRS. R. Tate, Wm. Gray, Swanston, Wright, and Stewart, have always been known to their brother-geologists by their active researches in the field; but the meeting of the Belfast Naturalists' Field Club held on December 17th, 1895, deserves special comment, as affording so remarkable a proof of the spread of geological observation in the north. Miss Steen described the contents of a newly opened cave; Mr. Robert Bell gave the results of his patient search among the Silurian shales of Pomeroy; and Mr. A. G. Wilson detailed the geological features seen on the great Galway excursion. But the paper requiring separate attention is that by Miss S. M. Thompson, secretary of the geological section of the Club, in which the series of excursions held by that section were described, with the accompaniment of critical notes upon the districts studied.

The area covered by the field-work of the section, from Annalong to Ballycastle, enabled the fourteen or fifteen excursions in themselves to form an admirable *précis* of geology. As one reads the report, one sighs to think of the hundreds of students to whom the subject is still one of diagrams and text-books, and who have to study in regions far removed from the enthusiastic guidance of Miss Thompson. On March 23rd, glacial and marine post-Pliocene beds were visited, in a new sea-swept exposure, at Ballyholme. The numerical work of the boulder-recorders was continued; and the submerged peat, intermediate in age between the glacial and the "estuarine" clays, was found exposed on a second visit. This study of "post-Pliocene diastrophism," as our Californian friends term it, was completed by an excursion to the fossiliferous boulder-clay on Divis, some 1,350 ft. above the sea. It is typical of the energy of these northern workers that one unsuccessful visit was made to this mountain-plateau during a storm, and was followed six weeks later by a fruitful one under the guidance of Mr. Stewart, the veteran discoverer of the deposit. Miss Thompson comments on the abundance of chalk boulders at these high levels, far above their parent masses. One would be glad to know how far the former chalk surface spread to eastward; was the eurite of Ailsa Craig intruded into a highland of Cretaceous rocks, on the lower and western slopes of which the basalt vents had already opened? The hardened chalk and northern igneous rocks might then have come rolling down these slopes in glacial times, to become mingled in the boulder-clays on the denuded surface of the basalts. The frequent discovery of large blocks of the Ailsa rock in Co. Down and Co. Antrim points to its having at one time formed a mountainous and snow-covered mass comparable to the Mourne themselves. There is always the possibility, however, that some of the riebeckite-rocks have been derived from those in Skye; and the Belfast geological section should endeavour to obtain from the Survey Office in London a sample of the more northern variety, which should be kept, with a section, for purposes of close identification. As to the Upper and Middle Lias fossils, however, which form one of the most brilliant discoveries of Prof. Sollas and Mr. Praeger at Kill-o'-the-Grange near Dublin, I feel

by no means "driven to the Hebridean islands"<sup>1</sup> for their source; there seems no reason why higher Liassic beds should not have existed in Co. Antrim, and even, with a capping of Cretaceous strata, in Co. Dublin. We often lose sight of the fact that every fragment of detrital material found in one spot means that so much has vanished away from another spot; occasionally, as in the case of the Inch conglomerate near Dingle and the diamonds of Golconda, it is only the detritus that remains.

On Easter Tuesday, the geological section visited Tardree, and this interesting rhyolitic area has been subsequently attacked several times. Mr. J. J. Phillips's photographs of the quarries vie with the best successes of Mr. Welch as scientific works of art. Miss Thompson, in her paper, reviewed the controversy as to the relative ages of the rhyolites and the basalts. On Oct. 26th, an expedition was made to Templepatrick quarry, to follow out the observations of Mr. M'Henry,<sup>2</sup> and a number of photographs were taken, Miss M. K. Andrews securing a series of four, illustrating the whole north face. Changes at the east end were noted, due to quarrying since the date (1888) of Mr. M'Henry's drawing. Miss Thompson showed how the surface of the Chalk falls northward, and allows the overlying rhyolite to thicken in that direction. The well to which she referred is, however, west, not north of the quarry, and the fact that the rhyolite is intrusive—in part, at any rate—may give it a very variable lower boundary with the Chalk. Miss Thompson was able, in perfect fairness, to communicate the analysis of the rhyolite of Cloughwater, near Ballymena, made by Mr. A. P. Hoskins, F.I.C., as one of the outcomes of the geological activity of the Belfast Field Club. From the determination of species of fossil foraminifera to original chemical work, it is clear that the geological section will soon be competent to form a "bureau" for the survey of the county. It is not often that government offices, for special purposes, are so well equipped with specialists.

Another excursion described was that to Coalpit Bay, near Donaghadee, where Mr. Swanston worked in the earlier days of field-club enterprise. Graptolites fortunately rewarded the expedition. The beautiful little sections in Jurassic and Cretaceous rocks at Woodburn, where the Greensand is so green that the term can be no longer scoffed at, occupied another good May day. On June 8th, the glacial beds near Ballycastle were examined; on the 22nd, Liassic fossils were being unearthed at Island Magee; and the week spent in the north of Ireland by the Geologists' Association owed much of its organisation and success to the experience of the geological section. The dykes of the Mourne coast were visited on August 31st, and Miss Thompson made some interesting notes on intrusive rocks at Castlewellan.

Now that so much experience as to general geological features has been obtained, may I suggest, as an addition to the winter work, the collecting and, where necessary, the abstracting, of all papers relating to or bearing closely on the geology of Co. Antrim, so that this literature may

<sup>1</sup> *Irish Naturalist*, Dec., 1895, p. 328.

<sup>2</sup> *Geological Magazine*, June, 1895.

be permanently accessible to the Club? Chronological order need not be observed, provided that each pamphlet receives a number, and a triple index, arranged according to date, authors, and subjects, be kept going. Thus Jean François Berger's papers in the early Transactions of the Geological Society of London—containing, by-the-by, the best account hitherto published of the rocks of Sandy Braes—the works of Sir A. Geikie on Tertiary volcanic activity in our islands, Prof. Judd's three papers on the Secondary rocks of Scotland, and separate copies of geological papers in the Field Club's own Proceedings, should be collected whenever opportunity occurs. Second-hand catalogues will help, in the case of authors who are no longer living or who are unable to spare copies of their papers. The Geological Section has now established its position; every field-worker in our islands will be happy to assist in observations so brightly and energetically carried out.

GRENVILLE A. J. COLE.

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Squirrel and a Plover from Master Despard; a pair of Wolves and a pair of Storks have been purchased. 3,170 persons visited the Gardens in December.

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### DUBLIN MICROSCOPICAL CLUB.

DECEMBER 19th.—The Club met at Mr. MATTHEW HEDLEY's, who exhibited a section of the intestine of a Lamb in which the presence of a large number of coccidia was evident. Coccidiosis or psorospermiosis of the liver of the domestic Rabbit is comparatively common, and the disease is not rare among wild Rabbits. In that form in which the liver is attacked, the parasite has been designated *Coccidium ovisforme*. Besides this there is another form, which attacks both Pheasants and Rabbits almost identical, and which invades the intestinal epithelium, named *Coccidium perforans*. It is probable that the Lamb, in the instance under discussion, was affected by the *C. perforans*. The *Coccidia* belong to the class Sporozoa, and like the others of that class are reproduced by spores; there is an absence of flagella, cilia or suckers. They are parasitic in habit, and in the adult stage possess a capsule or shell. Mr. Hedley laid on the table a large number of transparencies which illustrated the characteristics and life history, so far as such is known, of this interesting division of Sporozoa. For these transparencies and slides he expressed indebtedness to Professor M'Fadyean, of London.

Mr G. H. CARPENTER showed a female spider, *Leptyplantes pallidus*, Cb., collected in the Mitchelstown cave in July last by Mr. H. L. Jameson. It is an addition to the Irish fauna. Although possessing well-developed eyes, this spider is stated by M. Simon to be, in France, an inhabitant of caves. It has been found in similar situations in Bavaria. Mr. Cambridge took the type specimen at roots of Heather in Dorset.

Mr. MOORE exhibited root-hairs of a plant which had been received at Glasnevin, as *Colliguaja odorifera*, but which was not this species. The plant produced slender green stems, bearing rather fleshy leaves. From the epidermal tissue around these leaves a dense cushion of unicellular delicate white root-leaves were produced, and later on from this cushion, in the axil of the leaves, an adventitious root was developed. The appearance of this cushion of fine leaves was very remarkable. The hairs had protoplasmic contents.

Mr. GREENWOOD PIM showed *Phyllactinia gullata*, Lev., an interesting mildew which occurred in great abundance on Ash leaves at Brackentown.

PROF. T. JOHNSON exhibited a section of *Dilsea edulis*, Stackh., a red alga to be found at low water all round the Irish and English coasts. The section showed growing, in the *Dilsea* thallus, a small green alga, *Chlorochytrium inclusum*, Kjell., and, on its surface, a red alga *Nitophyllum reptans*, Crn., which creeps over the *Dilsea* thallus, clinging to it by short multicellular crampons (sucker-like bodies). The endophyte, *C. inclusum*, and the epiphyte, *N. reptans*, are additions to the Irish marine flora. Both are recorded from the south coast of England, and *N. reptans* from the east coast of Scotland. The specimens (of which spirit material was also exhibited), were gathered in September, 1895, on the west coast of Sherkin Island (Co. Cork). Judging from Kjellman's remarks ("Algæ of the Arctic Seas"), *C. inclusum* should be found wherever *D. edulis* occurs. *C. inclusum* is a good illustration of a 'raum-parasite.' *N. reptans* was also found on *Laminaria* stalk, its more usual anchorage.

Mr. M'ARDLE exhibited the reproductive organs of *Plagiochila asplenoides*, L., which he collected recently in Howth demesne. This widely distributed liverwort is rarely found in fruiting condition. One specimen under the microscope showed the fully grown perianth, cut longitudinally and folded back, exposing several unfertilised archegonia at the base. The antheridia exhibited were large, obovate to spheroidal in shape, with a well-marked hyaline marginal ring, stalks or pseudopodia as long as the antheridia, of which there were three enclosed in the saccate base of each altered leaf, the whole amentæ is formed of from four to seven pairs, situated at the apex of each stem, which becomes incurved during growth in a remarkable manner. The male plant is much smaller than the female, and was growing apart from it, this may account in some measure for the scarcity of the fruit, although it has been reported to be found with both organs on the one plant (monœcious).



## BELFAST NATURALISTS' FIELD CLUB.

JANUARY 8th.—The Geological section met, when Alec G. Wilson, Hon. Sec. of the Club, gave some notes on a recent visit to Dungiven. The Cretaceous rocks exposed there are specially interesting, being believed to represent a higher zone than is found in County Antrim; and are noted for the numerous gastropods which they contain. A series of fossils obtained during the visit was exhibited. Much interest was aroused by some specimens of the porphyritic Rhyolite which occurs near Hillsborough, exhibited by Mr. Wilson, who succeeded in obtaining this rock, which is rather difficult to discover or obtain, as the quarry is flooded and no longer worked, and consequently overgrown with herbage. Extracts from an important pamphlet by P. F. Kendall, F.G.S., on the Glacial Geology of the Isle of Man, were also read. Rock specimens were presented by A. G. Wilson and R. Bell, who also presented a rock section for the microscope of the dyke of basaltic Andesite found by him at Ballygomartin.

JANUARY 21st.—The President (Mr. F. W. LOCKWOOD) in the chair. Mr. G. H. CARPENTER, delegate from the Dublin Naturalists' Field Club, lectured on "Our Plants and Animals: Old Inhabitants and New Arrivals." The lecture, illustrated by lantern slides of specimens and scenery, dealt with the problems of geographical distribution, and covered much the same ground as the address to the Dublin Club to be printed in full in our next issue.

The PRESIDENT expressed the pleasure it had given the Belfast Club to hear Mr. Carpenter's views on such an interesting subject.

Mr. W. GRAY was sure that Mr. Carpenter had not put forward his theories in a dogmatic spirit, but with a view to stimulate research. It was possible that the absence of records of a species from a certain district meant only that no one had looked for it there.

Prof. SYMINGTON said that no laboratory worker could disparage the labours of a systematic or faunistic naturalist, with the example of Darwin in view.

Mr. CARPENTER, in reply, thanked the Club for their kind reception. He quite agreed with Mr. Gray that there was need for caution, and remarked that such speculations as he had put forward, must rest on the records of animals and plants whose range had been fairly ascertained.

## DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 14th.—The Annual General Meeting was held at the Royal Irish Academy House. The President (G. H. CARPENTER, B.Sc.) occupied the chair, and there was a good attendance of members. The SECRETARY, in response to a call from the chair, read the Annual Report, which showed that during the year the membership had risen from 158 to 194. Reference was made to the decease of two original members of Committee—Dr. V. Ball and Mr. A. G. More. During the year six business meetings and seven excursions were held, and a conversazione in addition. Special reference was made to the good work done on the

excursions, the results including many species of plants and animals not hitherto found in Ireland. The most important event of the year was the week's Conference and Excursion of all the Irish Field Clubs, held at Galway in July, which has been fully reported in the *Irish Naturalist*. Under the Field Club Union an interchange of lecturers between the different Clubs was carried out. The Committee voted a sum of money towards defraying the expenses of the Union, and propose an addition to the Rules of the Club which will render membership of the different Clubs interchangeable. The Report of the Flora Committee showed good progress during the year. The Committee recommended a grant of £5 to the *Irish Naturalist*. The Treasurer (Prof. T. JOHNSON, D.Sc.) next submitted his report, which showed an increase of £13 in the balance on hand, and a thoroughly sound financial condition. The adoption of the report and accounts was moved by Prof. HADDON and seconded by Mr. W. F. DE V. KANE, and passed after a discussion in which Mr. J. J. Dowling, the President, Secretary, and Treasurer took part. In accordance with the Rules, the following officers for 1896 were declared elected—President, Prof. G. A. J. Cole, F.G.S.; Vice-President, N. Colgan M.R.I.A.; Treasurer, Prof. T. Johnson, D.Sc.; Secretary, R. Lloyd Praeger, B.A., B.E.; Committee, G. H. Carpenter, B.Sc., H. K. G. Cuthbert, J. J. Dowling, Rev. T. B. Gibson, M.A., Mrs. W. S. Green, Miss Hensman, H. Lyster Jameson, Miss E. J. Kelsall, D. M'Ardle, E. J. M'Weney, M.A., M.D., Greenwood Pim, M.A., Mrs. J. T. Tatlow. PROF. COLE having taken the chair, a hearty vote of thanks to Mr. Carpenter for his care and attention during the two years of his Presidency was passed, on the motion of Mr. H. C. Ramage, seconded by H. Lyster Jameson. The Secretary moved an addition to Rule V., providing "that Members of other Irish Field Clubs residing temporarily or permanently in or near Dublin may be enrolled members of the Club without election or entrance fee on production of a voucher of membership of another Club, and without subscription for the current year on production of a receipt showing that such subscription has been paid to another Club. Failing the production of such receipt, the usual subscription for the current year to be paid to the Treasurer on enrolment. The names of members so admitted to the Club to be published with the notice of meeting following the date of their enrolment." Mr. Carpenter seconded the motion, which was passed after a short discussion. The thanks of the Club were voted to the Council of the Royal Irish Academy for the use of the rooms, and to the press for their kindness in reporting the proceedings. A general discussion ensued on the improvement of the Club, next Summer's excursions, and other matters. Prof. Haddon subsequently addressed the meeting on the importance of studying the fresh-water fauna of Ireland, pointing out the interesting discoveries that have already been made, and the large field open for future research. The Secretary exhibited, on behalf of Mrs. Lawrenson, a number of beautiful Christmas Roses of her own raising, which were much admired. Mr. H. Roycroft was elected a member of the Club.

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## FIELD CLUB NEWS.

THE accounts of the Galway Conference are only now finally closed. They show a turn-over of over £500 during the week, and, all charges being paid, a balance of just 16s. remains in the Secretary's hands. A still closer cut was made in the case of the Dublin Club's Excursion account for the past year, which, with a total turn-over of £210, shows a balance on hands of 2d.!

The Cork Field Club purpose holding a *Conversazione* on March 10th, in conjunction with the Literary and Scientific Society. Arrangements are being made whereby all the Irish Field Clubs will be represented personally or by exhibits.

When, two years ago, the Belfast Club decided to make a collection of specimens of the rocks of their district, a hope was expressed that microscopic sections of many of the rocks would also be presented. Mr. Robert Bell has given the first section as yet received, being a portion of the dyke of basaltic andesite which he recently discovered at Ballygomartin, and other members have intimated their intention of bestowing similar gifts. The possession of a representative collection of rocks of their district will probably commend itself to all our Clubs, whose members recall the great advantage which they experienced during the Galway Conference in seeing the fine collection of local specimens in the Queen's College Museum.

Arrangements are now complete for the course of lectures on Sea-weeds by Professor T. Johnson, D.Sc., which we mentioned in our last issue. The lectures will be given on Wednesday and Saturday afternoons, commencing, on Saturday, March 7th, and several will take the form of excursions for the study of Sea-weeds in their native haunts. Inquiries about the course (the fee for which is only 10s. for the twelve lectures) should be addressed to Professor Johnson at the College of Science, Stephen's Green.

Professor J. W. Carr, M.A., lectured to a large audience of the Nottingham Naturalists' Society on January 14th, on the Field Club Union Excursion to Galway last July. The President (W. Stafford, M.B.) occupied the chair. The lecture was illustrated by the beautiful series of lantern views of the excursion by Mr. R. Welch, which most of our readers have already had an opportunity of seeing, and by a fine set of plants collected on the trip. The lecture was followed with deep interest, and very high praise was bestowed on the slides by experts who were present.

Dr. R. F. Scharff has contributed to the *Mémoires* of the *Société Zoologique de France* a most valuable paper, *Etude sur les Mammifères de la Région Holarctique et leurs Relations avec ceux des Régions voisines*, for which the Czar's prize was awarded at the Moscow International Zoological Congress. The present and past distribution of each animal is dealt with in turn, and conclusions are drawn therefrom regarding the geological history of Europe during Tertiary times.

## NOTES.

## BOTANY.

## FUNGI.

**A Bird's-nest Fungus new to Ireland.**—Some few years ago, and again last month, I received from Mr. James Thompson, Macedon, Belfast, specimens of a small Bird's-nest Fungus, which Dr. M'Weeney has identified for me as *Cyathus vernicosus*, DC., of which, he remarks, he has no previous record from Ireland. Miss S. M. Thompson has kindly supplied particulars about its occurrence. The fungus comes up year by year in pots of *Crassula*, *Pedunia*, Carnation, &c., in a cold house at Macedon; and its occurrence there has been noticed for more than twenty years. As some interest attaches to this very curious group of Fungi, I have deposited the specimens in the Herbarium at the Science and Art Museum, where they may be examined.

R. LLOYD PRAeger.

**Earth-Stars in Co. Tipperary.**—Last month Rev. J. W. French Sheppard, M.A., sent me from Rodeen, Borrisokane, three specimens of one of the strange-looking Earth-stars. They were found in a fir-wood. The specific characters of this group of Fungi appear to be somewhat slight, but Mr. Greenwood Pim, who has kindly examined the specimens, has little hesitation in referring them to *Geaster fimbriatus*, Fries.

R. LLOYD PRAeger.

## MUSCINEÆ.

**Moss Exchange Club.**—It is proposed to form an Exchange Club for Mosses and Hepaticæ somewhat on the lines of those at present in existence for exchanging and recording Phanerogams. Any persons interested in Bryology who would wish to become members are invited to send in their names to Rev. C. H. Waddell, Saintfield, Co. Down.

## ZOOLOGY.

## BIRDS.

**Irish Bird Notes.**—GREEN SANDPIPER (*Totanus ochropus*).—During the month of August several specimens of this bird have been obtained in different parts of Ireland, one so early as August 8th, shot at Kinnegad, Co. Meath, one on the 20th at Broadford, Co. Clare, and a third obtained at Mount Charles, Donegal.

**BLACKTAILED GODWIT (*Limosa agocephala*).**—Have been very numerous this autumn. A small flock frequented Baldoye Estuary the latter end of September, but I failed to obtain a specimen; one shot on 27th August, Rathangan, another at Clare Castle; several, Rosslare, Wexford, 24th August.

**BARTAILED GODWIT (*Limosa lapponica*).**—An individual of this species shot at Dundalk, September 7, retaining a good deal of the red summer plumage.

**AVOCET (*Recurvirostra avocetta*).**—A specimen of this exceedingly rare visitor to Ireland was obtained by Mr. Gibbon, junr., at Rosslare, Wexford, on the 27th August; it was a young bird of the year.

**HOOPOE** (*Upupa epops*).—One from Rosslea, Co. Fermanagh, 19th September, a very curious date for the occurrence of this bird, as it is generally on the spring migration and usually in the south of Ireland that it occurs.

**RICHARDSON'S SKUA** (*Stercorarius crepidatus*).—All the specimens of this bird I have met this autumn belonged to the dark form; one obtained Rathangan, 13th August, a good many from Cliffoney, Sligo, during September; amongst them a curious variety with patches of pure white on wings and breast.

**POMATORHINE SKUA** (*Stercorarius pomatorhinus*).—One from Killarney, October 10th, one on 14th, Ballinfull, Sligo, and another captured whilst eating a good-sized chicken at Ballinastragh, Gorey, Co. Wexford.

**SQUACCO HERON** (*Ardea ralloides*).—A beautiful specimen of this bird was shot at Waterville, Co. Kerry, 17th September, a young male in second year's plumage; the stomach was filled with remains of small crustacea; I have heard of another shot in Co. Cork same time, but have not particulars.

**GREAT NORTHERN DIVER** (*Colymbus glacialis*).—In full summer plumage, obtained so late as 16th October, without a trace of the winter moult, Kylemore, Connemara.

A variety of the **BALD COOT** (*Fulica atra*), with almost half the plumage pure white was obtained near Enniskillen, and a **ROCK PIPIT** (*Anthus obscurus*) with head, wings, and part of breast white, was shot near Bray.

EDWARD WILLIAMS, Dublin.

## GEOLOGY.

**Quartzite.**—It might, perhaps, be worth mentioning that on the occasion of the Belfast Naturalists' Field Club excursion to Co. Donegal last year, I secured in the quartzite specimens of sun-cracks, ripple-marks, and rain-drop marks, the two first being especially characteristic. All three are small hand-specimens chipped off large slabs of the formation, and were obtained in or close to the Seven Arches Cave, Portsalon. Should they be thought of sufficient interest either Mr. Watts or Mr. Kinahan are very welcome to examine them. Their general appearance, excepting, of course, the material, is wonderfully like the Triassic sandstones of Scrabo, near Newtownards, Co. Down, as the markings seem to occur chiefly on thin fine-grained bands, which are of mud, in the Triassic stones. A lucky chance might even hit on a fossil in some of these less altered deposits.

ALEC. G. WILSON, Belfast.

**The Denudation of the Chalk.**—Prof. Cole contributes a paper on this subject to the *Geological Magazine* for December, 1895. Particular reference is made to the startling photograph, by Mr. R. Welch, showing the condition of White Park Bay, Co. Antrim, after the great storm of December, 1894—a chaotic expanse of great blocks of Chalk, resting on a floor of Lias, where on the previous day, and for years previously, an uninterrupted expanse of smooth sand had stretched.

## THE MINGLING OF THE NORTH AND THE SOUTH,

BY GEORGE H. CARPENTER, B.SC.

(Presidential Address to Dublin Naturalists' Field Club, Dec. 10th, 1895).

THE last few years have been noteworthy in the annals of natural science in Ireland. Signs of renewed interest among the people in the studies which we hold dear, and the steady progress of zoological, botanical, and geological research in the country have combined to cheer us; though we feel deeply how much more of this western land of scientific promise still remains to be possessed. But the one feature which helps to make the last two years memorable, is the realisation of fellowship among our workers in different parts of the country which has culminated in the establishment of the Irish Field Club Union. It is a hopeful sign that the differences, which in Ireland array province against province and race against race, have no power to hinder the mingling of the naturalists of the north with their brethren of the south. Mr. Praeger's series of papers on the Irish Field Clubs<sup>1</sup> taught those societies each other's histories, and in his concluding remarks he pre-  
saged the foundation of the Union which this year has seen accomplished. In his history of our own Club, he reminded us how on several occasions we had enjoyed the privilege of a joint excursion with our elder sister of Belfast. Last year<sup>2</sup>, however, saw not only a most successful reunion of these two Clubs (and of a contingent of the North Staffordshire Club) at Drogheda, but a highly satisfactory gathering of the Dublin, Cork, and Limerick Clubs at Fermoy, where the Union was first proposed. During last winter, the Committees of all four Irish Clubs definitely constituted it by each appointing its President and Secretary to serve on a central Committee; and this year<sup>3</sup> has seen the first conference of the federated Clubs held at Galway, the meeting being rich both in edifying discussion and good practical work in the field. The pleasure and profit of the gathering were enhanced by the presence of many naturalists from England. How heartily they joined with us in exploring the natural treasures of the far west, and what results followed from the united labours of our harmo-

<sup>1</sup> *Irish Naturalist*, vol. iii., 1894.

<sup>2</sup> 1894.

<sup>3</sup> 1895.

nious party have been fully recorded.<sup>1</sup> Among the noteworthy utterances at that conference, I would recall and heartily wish fulfilment to the hope expressed by the Hon. R. E. Dillon—whose recent remarkable discoveries among the lepidoptera will be fresh in all our minds—that Galway may soon have a Field Club of its own. And I would also venture to echo Mr. F. J. Bigger's hope that the Union may be the means of knitting the various Clubs even closer together, until there shall be but one Naturalists' Society for the entire country. The mingling of the north and the south in the west, last July will, we trust, have far-reaching and beneficial effects. None could be present at such a gathering without realising the unity which binds together the naturalists of the country, cheers them for renewed effort, and makes them feel that all are working towards the same great end.

But is the end which field naturalists set before themselves indeed great? Who is the better or the wiser for knowing that some weed or beetle has been found in a county—or an island—where it had not been found before? Or for being able to decide whether the particles in a lump of clay were dropped from an ice-berg, left by a glacier, or carried by a current? In a recent charming book<sup>2</sup> one of our most eminent English entomologists has expressed the wish that more field naturalists would leave their records of "parochial distribution" and turn their attention to life-histories. It cannot be denied that such a rebuke is timely; and yet it is not the study of parochial distribution, but the study of distribution in a parochial spirit that deserves rebuke. The result obtained by the man who, after years of patient research with scalpel and microscope, calls up for us, from the vanished ages of the past, the image of the ancestor of the vertebrates or the arthropods "in fashion as he lived," appeals to the dullest mind as a veritable "fairy-tale of science." But can this be said of the product of the worker whose years of toil are rewarded by a list of long Latin names, meaningless to nine-tenths of the people who glance at them? If the list were the end, perhaps not. But each worker however humble, at the flora or fauna of a district however small, may realise,

<sup>1</sup> *Irish Naturalist*, vol. iv. (Sept. 1895).

<sup>2</sup> L. C. Miall.—*Natural History of Aquatic Insects*. London, 1895.

if he will, that the list is not the end: that each step towards a more complete knowledge of the geographical distribution of animals or plants is a step towards a more complete knowledge of the past history of the species he has studied, of their original home, their emigrations and immigrations, their advances and retreats; a more complete knowledge of the nature and positions of the old lands over which they passed, of the old seas, lakes, or rivers by whose margins they wandered. These are the problems which the combined work of the systematic and distributional naturalist and of the field geologist—may they ever work side by side—must help to solve. And when the problems have been solved, we shall see not only the hypothetical ancestor; we shall restore in imagination the sunken continent wherein he lived, and the severed isthmuses which his descendants crossed.

The members of our Galway Conference might have furnished material to the ethnographer for an interesting study. Gathered in that old western city were men and women representing varying types of race, and speaking with differing accents their common English tongue. A true Irishman whose ancestors have lived in the land since the days of the mythical heroes of the old folk-tales; an Ulsterman whose name is evidence that his forbears came from the "land of the mountain and the flood"; a member of one of those old Anglo-Norman families whose long sojourn in this island is said to have made them "more Irish than the Irish"; a Dubliner, settled since a few generations on Irish soil, though his name and sympathies mark him for a Teuton; an unmistakably English immigrant, who seems nevertheless to have come here to stay; another Englishman who will return to his own country when the Conference ends:—all these types might have been noted by the Connemara roadside or on the deck of the *Duras*. And the thoughtful naturalist could not fail to consider how this mixed assembly was typical of the fauna and flora of Ireland, made up as they are of varying elements which have entered the country at different times and by different roads—at what times and by what roads it is our business to find out.<sup>1</sup> We might present each of these typical naturalists with an appropriate animal or plant, whose

<sup>1</sup> C. Kingsley—"On Bio-Geology" (1871) in "Scientific Lectures and Essays." London, 1880.



place of origin roughly resembles his own, but whose age of family vastly exceeds his. The true Irish native who believes he came from Spain will be suited with St. Patrick's Cabbage; the Ulsterman with the Varying Hare; the Anglo-Norman with *Trifolium repens*—clover in England, but shamrock in Ireland. To the settler from England of some generations' standing, the Common Frog (if we are to trust tradition) would be a happy zoological partner. The English immigrant who has recently come to stay may be compared to the Magpie, and the visitor who will flit back straightway across St. George's Channel to the solitary Nightingale that once was seen on Irish soil—only that visitor was shot.

This recognition of distributional types among Irish animals and plants calls us to remember famous men. We have this year mourned the loss of two naturalists who did much for Irish science. Of the value of Alexander G. More's work there is no need for me to speak, but it would be ungracious not to recall the philosophical spirit in which he approached the study of distribution, and the importance of his work in applying Watson's botanical distributional types<sup>1</sup> to two groups of animals, the Birds<sup>2</sup> and the Butterflies.<sup>3</sup> The name of Valentine Ball I would mention, not only as that of a hearty friend and original member of our Club, but as a direct link with the naturalists of a past generation. His father's house was the meeting-place of a group of men whose brilliant labours threw a halo round British science in the first half of this century. Prominent among these men was Edward Forbes, and no one who takes up this subject of distribution can afford to neglect his classical paper<sup>4</sup> in which the special features of the Irish flora are treated with so masterly a hand. Into the labours of such men—Forbes and Thompson, Haliday and Jukes, we have entered. May we be worthy of our trust.

Of the various problems presented by the distribution of animals and plants in Ireland, I wish to dwell on the remarkable mingling of northern and southern forms, so well typified by the mingling of the northern and southern Clubs of the new Union. This mingling has been often alluded to

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<sup>1</sup> H. C. Watson—"Cybele Britannica." London, 1847.

<sup>2</sup> *Ibis* (2), vol. i., 1865.

<sup>3</sup> *Zoologist*, vol. xvi., 1858, p. 6018.

<sup>4</sup> *Mem. Geol. Surv. Gt. Brit.*, vol. i., 1846.

by the originator of this Club, Prof. Haddon,<sup>1</sup> as characteristic of the marine invertebrates of the west coast, and, as I have remarked in a recent paper,<sup>2</sup> the southern forms often range northwards up the coast as far as Donegal, the northern ones southwards as far as Cork. Within the last few months has been issued by the Royal Dublin Society the full report by Messrs. Holt and Calderwood<sup>3</sup> on the rare fish found during the survey of the western fishing grounds in 1890-1. The mingling of the north and the south is most markedly shown here, so that the vertebrate and invertebrate marine faunas are seen to present similar characters.

Such a mingling of northern and southern species is to be noted also among the land animals and plants, especially in the west. The wonderful assemblage of Pyrenean and Spanish plants, found in Cork, Kerry, and Galway, and nowhere else in the British Isles—the Saxifrages, the Arbutus, the peculiar Connemara Heaths are doubtless familiar to us all. Mingled with such southern forms as these, our Galway party noticed growing on Gentian Hill and elsewhere, hardly above sea-level, such characteristically arctic and alpine species as *Dryas octopetala*, *Arctostaphylos uva-ursi*, and *Lobelia dortmanna*. And it is well known that in the western counties are also to be found a few plants of North American origin—*Eriocaulon septangulare*, *Naias flexilis*, *Sisyrinchium anceps*, *Spiranthes romanzoviana*, the two latter unknown elsewhere in Europe, the first-named occurring also in Skye and other isles of the Hebrides, and the second in Perthshire. Discoveries within the last few years by Mr. Praeger and Mrs. Leebody have extended the range of the *Spiranthes* northwards to Armagh<sup>4</sup> and Derry.<sup>5</sup>

It will be of interest to see how Irish animals can be referred to distributional types corresponding with those of the plants just mentioned. Only this year has the assembly of North-American plants been matched among animals by Dr. Hanitsch's researches into our Freshwater Sponges,<sup>6</sup> showing that lakes in the west of Ireland possess three North-American sponges hitherto unknown in Europe.

<sup>1</sup> *Proc. R.I.A.* (3), vol. i., p. 42.      <sup>2</sup> *Irish Nat.*, vol. iv., 1895, p. 297.

<sup>3</sup> *Sci. Trans. R. D. Soc.* (2), vol. v., 1895, pp. 361-512.

<sup>4</sup> *Irish Nat.*, vol. ii., 1893, p. 159.      <sup>5</sup> *l.c.*, p. 228.

<sup>6</sup> *Irish Naturalist*, vol. iv., 1895, p. 122.

Turning to the group of southern or Pyrenean plants we find a corresponding group of animals. The Kerry slug—*Geomalacus maculosus*, confined to a few square miles in the south-west and only known elsewhere from Portugal; *Mesitella Tardyi*, a beetle of a Mediterranean and Atlantic Island genus distributed nearly all over Ireland, and occurring also at a few points in the west of Great Britain; the house-spider (*Tegenaria hibernica*) of Dublin and Cork—unknown in Great Britain and closely related to a Pyrenean species; and the new British weevil (*Otiorrhynchus auropunctatus*) also a Pyrenean species, discovered by Messrs. Halbert and Cuthbert along the coast north of Dublin, are a few examples of this group. Striking additions to it have lately been made by Mr. Pocock's record of the millipede *Polydesmus gallicus*,<sup>1</sup> and Mr. Friend's discovery of two Mediterranean earthworms, *Allolobophora veneta* and *A. Georgii* in Ireland.<sup>2</sup> It is remarkable and puzzling however, that while the Pyrenean plants keep strictly to the west of Ireland, most of these animals range to the east and some are not found in the west at all. There is a western species, however, which I have no doubt should be reckoned as belonging to this southern group. Last year a former member of this Club—Rev. R. M'Clean—took on a mountain behind Sligo a specimen of *Erebia epiphron*—a butterfly unknown in Ireland since Birchall took it thirty years ago on Croagh Patrick. As this is a Scottish and north of England insect, it has been believed that it came into Ireland from the north. But when we consider that it is confined to the mountains of southern Europe: Pyrenees, Alps, Vosges, &c., and is unknown in Scandinavia, we must believe that it came to us with the Pyrenean flora and passed northward from us into Scotland.

But there is another and very distinct southern fauna in western Ireland. In a study of the distribution of British butterflies on which I am now engaged, I find that all the species of southern range in Great Britain have a southern or western range in Ireland. Our collections made in Galway furnish some striking parallels in other groups to this observation. The Rose-chaffer (*Cetonia aurata*) which we found in numbers on Inishmore might not be seen in a walk of two hundred miles across Ireland. It seems only to be at all plen-

<sup>1</sup> *Irish Nat.*, vol. ii., 1893, p. 309.    <sup>2</sup> See pp. 70 and 72 of current number

tiful along the south and south-west coasts. Yet on Aran, this insect—characteristic of the well-wooded and highly cultivated south of England—was abundant. On Aran too we got three species of *Attida* or jumping-spiders—a family which in tropical countries outnumbers all other spiders—though but seven species are, as yet, known in Ireland. Most striking of all however is the fact that some of the western Irish animals have a south-eastern range in Great Britain, and would be confidently referred to Watson's Germanic type of distribution. Such are some of Mr. Dillon's most startling Clonbrock lepidoptera—*Zeuzera pyrina*, *Macrogaster castanea*, and *Limacodes testudo*. And it is possible that two of the most conspicuous animals which attracted our attention around Galway—the large grasshopper *Mecostethus grossus*, and the great wolf-spider *Dolomedes fimbriatus*—must be reckoned as corresponding to these, though their continental range might indicate a northern origin. With little doubt we may place alongside them the Lough Corrib jumping-spider—*Attus floricola*—perhaps the most remarkable zoological find of the excursion, a German species, possibly occurring in France, but unknown in Great Britain. And here also belongs a discovery made by Messrs. F. Neale and J. N. Halbert near Limerick this year: *Panagæus crux-major*, a handsome ground beetle confined in Great Britain to south-eastern England, and ranging over Europe into the south of Siberia.

So much for the south. What had the Galway excursion to tell us of northern animals? On the summit of Ben Lettery, it was my good fortune to take a specimen of the rare alpine ground-beetle, *Leistus montanus*, not occurring in Great Britain south of Cumberland. By Lough Corrib shore, Mr. Halbert found another mountain beetle of the same family—*Carabus clathratus*—which inhabits various localities in Scotland, is unknown in England, Wales, or eastern Ireland, but is found on the mountains of the west as far south as Bantry Bay. But most striking of all was another ground-beetle which Mr. Halbert took on Lough Corrib shore: *Pelophila borealis*. By many an Irish lake is this beetle to be found, from Killarney to Armagh and Donegal. On the mainland of Great Britain it is quite unknown; but it reappears in the Orkneys, and

occurs all through the northern, sub-arctic regions of Europe and Siberia, another species of the genus being found in Alaska. This beetle yields in interest to no member of our fauna, and the occurrence of such a practically arctic animal within a few yards of *Mesites Tardyi* or *Geomalacus maculosus* is as striking an instance as can be found of the mingling of the north and the south which Ireland, presents.

In our excursions of the year nearer home, we have also found examples of the mingling. The Braganstown expedition in August will be remembered by us, not only because of Mr. Garstin's kind hospitality to our party, but on account of Dr. M'Weeney's discovery of *Stysanus ulmaria*, a new species of fungus whose nearest relation is to be found in Ceylon. This recalls to mind the remarkable tropical affinities of many of the Irish mosses and liverworts' with which Mr. M'Ardle has made us familiar. And, on this same Braganstown excursion, Mr. Halbert added to the Irish list of Hemiptera *Teratocoris Saundersii*, a Russian and Scandinavian species, which in Great Britain is known only from Aberdeen, Norfolk, and Kent. The continental range of this bug recalls that of the sedge *Carex rhynchophysa*, which Mr. Praeger in his investigation of the flora of Co. Armagh<sup>1</sup> added to the British flora three years ago.

Such are some of the facts which ask for an explanation from us, students of the natural history of Ireland. Is it wise, as yet, to attempt to explain them? Not if our explanation be dogmatic, but surely research will be stimulated by our endeavours to get an inkling of how these things have come to be. Let us theorise, and then test our theories by the light of the fresh facts with which the labours of years to come will surely supply us.

In the classical work of Forbes, to which reference has already been made, the group of southern plants characteristic of western and south-western Ireland was considered the oldest group in our flora, and was explained by the supposition of a Miocene Atlantic continent reaching to beyond the Azores. The boreal and alpine flora was believed to be a

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<sup>1</sup> A. R. Wallace—"Island Life," 2nd Ed. (p. 366). London, 1892.

<sup>2</sup> *Irish Naturalist*, vol. ii., 1893, p. 184.

remnant of the Ice Age. The plants of Watson's British, English, and Germanic types were all referred by Forbes to one great Germanic invasion which, after the Ice Age, overspread most of our islands. To decide the time of the incoming of the various groups of our animals and plants is however very difficult. Mr. A. G. More<sup>1</sup> considers our entire flora, including the Pyrenean species, to have come in since the Pleistocene cold period, while Dr. Scharff<sup>2</sup> believes that the whole of our fauna entered Ireland in Pliocene times.

Forbes' theory of an Atlantis is now generally held to be beset with insuperable difficulties, though there is a very general belief in the former extension of the European continent to the 100 fathom line to the west of our present Atlantic shore. Whatever view may be held as to the absolute ages of the three groups of our flora which I have mentioned, the comparative ages assigned to them by Forbes are highly probable. Let us see how they work with the corresponding groups of animals. It seems very likely that the Pyrenean animals are the oldest members of the British fauna, because they have been driven so far westwards, being almost confined to Ireland, a few occurring in the west of Great Britain. Most of the alpine and northern animals are less characteristically Irish than Scotch, and seem to have entered this country from Scotland. An apparent exception to the first of these statements we have seen in *Erebia epiphron*, a southern insect which, not rare in Scotland, is almost extinct in Ireland through which it must have passed northwards; and to the second in *Pelophila borealis*, an arctic beetle not rare in Ireland, but apparently extinct in Scotland through which it passed southwards.

If, as I consider well-nigh certain, the Pyrenean fauna at least must be supposed to have come to us from a time before the Ice Age, we are met with the question: how did the animals (and plants) survive? It may be that they did not survive in any part of the present Irish area, but in some old land tract to the south or west where the conditions were less severe. But it must be remembered that in the highest north which explorers have reached an abundance of life marks the short summer.<sup>3</sup>

<sup>1</sup> *Journ. of Botany*, vol. xxxi., 1893, p. 299.

<sup>2</sup> *Proc. R.I.A.* (3) iii., 1894, p. 479; *Mem. Soc. Zool. France*, 1895, pp. 436-474.

<sup>3</sup> See also G. W. Bulman in *Nat. Science*, vol. iii., p. 261.

In arranging a small museum case to show the comparative distribution of British animals,<sup>1</sup> I have applied the term Celtic to the combined older Northern and Pyrenean faunas, and Teutonic to the animals characteristic of eastern and south-eastern England, while recognising a general British fauna of more extended range over our islands, presumably older than the Teutonic, but more recent than the Celtic group. That this general British fauna was later than the Pyrenean or the Northern is admitted on all hands, as the existence of the older faunas in western districts, only or chiefly, is probably due to the pressure of new invaders having exterminated them in regions further to the east which there can be little doubt they once held. This consideration also gives us a clue to the mingling of the old northern and southern faunas in Ireland only. It seems to me that no peculiar climatic conditions are needed to explain how this can be. Both are with us because the eastern invasion was so largely kept out of Ireland by the breaking down of the land connection to our south-east. In North America Dr. Hart Merriam<sup>2</sup> has mapped the areas occupied by the Boreal and Sonoran faunas with a transition zone 300 miles wide in which they overlap. I would conceive of a time when a somewhat similar state of things prevailed in Western Europe, when all along the tract to the south of the glaciated area there was such a mingling of the north and the south as we have only in Ireland to-day. The great eastern invasion then came in and drove like a wedge between the two. Over most of the common area which the two old faunas once occupied together, they were exterminated; the one was driven to the north and to the Alps, the other to the south, while both were pushed to the west, where in Ireland they found something of a protected area to which only part of the incoming host was able to pursue them. This thought suggests a return to our ethnographical illustration, for have not successive races of men been driven to north, south, and west by invaders from the east? Dun Aengus, that last stronghold of a vanished people on the ocean cliff of Iuismore, has a lesson for the naturalist as well as for the antiquarian.

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<sup>1</sup> *Rep. Museums Assoc.*, 1894; also *Irish Nat.*, 1895, p. 215.

<sup>2</sup> *Proc. Biol. Soc. Washineton*, vol. vii., 1891.

There remains to be considered the newer southern fauna which we saw to be so unexpectedly represented round Galway, those animals of English or Germanic type which seem so strangely out of place in the west of Ireland. Forbes, as has been said, considered the plants of the British, English, and Germanic types of Watson to form but one great flora; and though many of our British animals have a range readily referable to one of these three types, others show a gradual transition from Germanic to English or from English to British. There is much reason therefore for considering these three types to be all sections of one great Central European fauna, some of which have attained in the British Isles a wider predominance than others.

Most of the animals of the British type of distribution, being found all over Ireland, may be presumed to have come in from the east across the valley which now forms St. George's Channel. But this assemblage of animals we are specially considering, of English or Germanic type in Great Britain, are not found in the east of Ireland. It seems a general rule that members of this newer fauna which are confined to the south of Britain are confined to the south or west of Ireland. It should be remembered that Forbes separated, as distinct from the Germanic flora, a small group of plants characteristic of the Chalk districts of south-eastern England, thinking them much older, older indeed than the Northern flora. But even if we compare with these the western Irish animals that we are discussing, we must hold them to be more recent than the Pyrenean group.

The explanation of the facts, which I now suggest, is that this section of the newer fauna broke through the line of the older, and, in the west of Ireland, was able to take the country of the latter in the rear, and spread from west to east. It will be generally admitted that the animals of this fauna would spread more rapidly over plains and along valleys than among hills. And the line of least resistance in our area was the wide-spreading valley which must at some time have led westward along the present area of the English Channel and to the south of Ireland. Down this valley, I suggest that this migration passed, and arrived at the south-west corner of



the present Irish area ; thence a limestone plain stretched west and north-west as far as the present 100-fathom line of the Atlantic. Established in this plain the colony invaded our present Ireland from the west. And so we have around Galway, Limerick, and Cork these animals, which are unknown near Dublin, where we might rather expect to find them. The Aran Isles are the remnants of the former extension of the limestone plain, and preserve for us some survivors of this colony which made so gallant an invasion of the far west.

I must, in conclusion, ask your pardon for having put before you at such length these tentative speculations. If they have done anything to indicate the great questions which lie behind the work of the humblest field naturalist, I shall be satisfied. We doubtless all recall the noble passage at the close of the "Origin of Species," in which Darwin dwells on the intense interest of some bank, covered with tangled vegetation, people with singing birds, hovering insects, and crawling worms, in the light of the descent of all these from "the few forms or on into which life was first breathed." Looking back to a past distant though less remote, we may regard our animals and plants as travellers which at different times and by various roads have come to the spot where we now find them ; a members of armies whose battles for the possession of our fair land have been fought through ages, compared with whose length the duration of the struggle of Teuton with Celt has been but as a day.

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## THE EARTHWORMS OF IRELAND.

BY REV. HILDERIC FRIEND, F.L.S.

DURING the past year we have witnessed the publication of a work on *Oligochaeta* which is of the first importance. Much fragmentary matter previously existed in sundry magazines and journals, but for a systematic treatment of the Order it was necessary for the student to consult the Continental memoirs of Rosa, Vejdovsky, or Vaillant. And even these did not attempt to cover all the ground. Now, however, the collector can consult Beddard's "Monograph of the Order OLIGOCHAETA"<sup>1</sup>—a work which merits the warmest commendation.

It will naturally be asked—What does the latest work on the subject say on the question of Irish Earthworms? I will endeavour to answer. Though I have received sundry specimens from Ireland which belong to other genera than *Lumbricus*, *Allolobophora*, or *Allurus*, these have never been described, because the specimens were either solitary or immature, and science gains nothing by the rash publication of imperfect matter. Consequently to the three genera above-named alone we have to look for information. It is rather curious to find (p. 723) that *Lumbricus papillosus*, Friend, is still entirely unknown outside of Ireland. Mr. Beddard gives it an undisputed place in his list. His definition, quoted from my original account, is—

"Length, 100 mm.; diameter, 8 mm.; number of segments, 130; colour, ruddy brown; clitellum, xxxiii.—xxxvii.; tubercula pubertatis, xxxiv., xxxv., xxxvi., xxxvii.; first dorsal pore, ix.—x. Hab.—Ireland."

The most interesting point about this species is the fact that it exactly fills a gap in the graduated series based upon the numbers of the segments which bear the tubercula pubertatis. This is the only species of *Lumbricus* peculiar to Ireland.

The number of species of *Allolobophora* recorded by Beddard is fifty-two, as against seven of *Lumbricus*. Among these one only calls for special notice, namely, *Allolobophora veneta*, Rosa, p. 713. It will, perhaps, be well to transcribe the whole account, which is prefaced by a list of synonyms.

<sup>1</sup> Oxford, Clarendon Press, 1895.

"*A. veneta*, Rosa, *Boll. Mus. Zool. Torino*, 1886, No. 3.

"*A. subrubicunda*, forma *hortensis*, Michaelsen, *J. B. Hamb. Wiss. Anst.*, vii., 1890, p. 15.

"*A. (Notogama) veneta*, Rosa, *Boll. Mus. Zool. Torino*, 1893, No. 160, p. 2.

"*A. hibernica*, Friend, *P. R. Irish Acad.*, 1893, p. 402.

"Definition. Length, 70 mm.; breadth, 5 mm.; number of segments, 153; clitellum, xxvi., xxvii.-xxxii., xxxiii. Setæ paired, but not strictly, the setæ of ventral pair more separated than those of dorsal pairs. Tubercula pubertatis on xxx., xxxi. Spermathecae, two pairs in ix., x., opening posteriorly. Habitat—Venice; Argentina; Portugal; Palestine.

"This species comes very near to *A. fetida*, with which it agrees absolutely in colour. It is to be distinguished by the position of the tubercula pubertatis. The spermathecae open close to the dorsal middle line, as in the species mentioned. The Portuguese specimens form a variety which is marked by its smaller size, and by the more strictly paired setæ. This same variety is found in Liguria and in the Argentine (whither it has been probably accidentally imported). It is not certain whether *A. submontana* of Vejdovsky is really different. The clitellum seems to have a different position (*i.e.*, xxiv.-xxxiii.), but the structure of the worm is not fully known."

It will be observed that no allusion is made to its Irish habitat. Is this a pure oversight, or did the author not wish to commit himself to an opinion respecting its indigenous or imported character? <sup>1</sup> I must point out that whatever may be said of Rosa's original specimens, those which he sent to me in spirits, and those which I received alive from Ireland, bore no colour-resemblance to *A. fetida* whatever, so that the strong affirmation of Beddard is misleading.

Turning now to *Allurus*, we find ourselves on debateable ground, owing to the fact that the different species which have at various times been recorded are insufficiently described and figured. After discussing the views of Michaelsen and Rosa the author adds (p. 696):—

"Friend has added three other species, viz., *A. tetragonurus*, *A. flavus*, and *A. macrurus*. Pending further information, *A. macrurus* seems to be a valid species, on account of the very forward position of the clitellum (xv.-xxii.). *A. tetragonurus* is probably, as Rosa thinks, merely a form of *Tetragonurus pupa*."

The difficulty arises from the fact that both *A. macrurus* and *A. tetragonurus* are based upon solitary specimens. I have not the least doubt about the genuineness of *A. macrurus*;

<sup>1</sup> In studying the "Monograph" more carefully I find that, by an unfortunate oversight, Beddard has not been made aware of the publication of my researches in the *Irish Naturalist*. Hence the absence of all allusion to Irish worms not recorded in the *Proc. R.I.A.*

*A. flavus* is probably only a variety of *A. tetraedrus*, while Rosa's supposition may or may not be correct respecting *A. tetragonurus*.

On page 3 the writer calls attention to the "remarkable extension backwards of the prostomium (in *Allolobophora chlorotica*), which reaches as far as the end of the fourth segment," to which I drew attention in *Nature*<sup>1</sup> on the strength of material received from Ireland.

It may be well in conclusion to supply an amended list of Irish Worms<sup>2</sup> so far as known at the end of 1895, following the nomenclature adopted by Beddard, with such modifications as my judgment leads me to think necessary.

**Allurus tetraedrus** (Savigny).—Tipperary. Also var. *flavus* (not noted by Beddard) from the same locality; also found in Mitchelstown Cave.

**A. macrurus**, Friend.—Dublin.

**Allolobophora calignosa**, (Savigny).

**A. turgida**, Eisen.

I cannot but think Mr. Beddard ill-advised in putting the two very distinct species formerly known as *trapezoides* and *turgida* under one heading (*A. calignosa*). I have examined many hundreds of specimens from all parts of the country, and could tell at a glance the one from the other. The author makes a point of Michaelsen's discovery of an "intermediate form which showed on one side of the body the character of one species, and on the other the character of the other species." I have often observed the same thing, and wonder it has not occurred to Mr. Beddard to ask what bearing such facts have on the question of hybridity—a question which, though treated by Rosa and myself, seems to have been entirely overlooked in the present memoir.

**A. terrestris** (Savigny).—Takes the place of the old *A. longa*, Ude.

It is, however, not given by Beddard as an Irish species. I have received it from Cork, Tipperary, and elsewhere.

**A. foetida** (Savigny).—Cork and Valencia.

**A. chlorotica** (Savigny).—Cork and Tipperary.

**A. Eiseni** (Levensen).—Takes the place of *Dendrobaena Eiseni*. Found in Dublin. The author has done well for the present, no doubt, to sink several of the generic terms which had been adopted by various authors, for this and other species. I think, however, that the genus will bear division into three or four sub-genera.

**A. subrubicunda**, Eisen.—Tipperary.

<sup>1</sup> Vol. xlvii., p. 316.

<sup>2</sup> See *Irish Nat.*, vol. ii., 1893.

- A. profuga**, Rosa.—Not even entered as British by Beddard. I have recorded it for several English counties, and for North Wales. It is abundant in my garden in Cumberland, and I had specimens from Malahide in 1893, as well as written descriptions. I believe the Irish form differs from the continental in some particulars, but there is no doubt about the worm being Irish and English.
- A. veneta**, Rosa.—Dublin and Louth. Not entered as British by Beddard, though he records my paper in *Proc. R.I.A.*
- A. rosea** (Savigny).—Formerly entered as *A. mucosa*. Tipperary and Malahide.
- A. Georgii**, Mich.—Co. Clare.<sup>1</sup> (Not recorded as British by Beddard).
- Lumbricus rubellus**, Hoffmeister.—Cork, Kerry, Tipperary.
- L. castaneus** (Savigny).—Same as *L. purpureus*. Cork, Kerry, Antrim, Tipperary.
- L. papillosus**, Friend.—Unknown at present out of Ireland. Received first from co. Dublin. Later from Cork with spermatophores, Kerry and Tipperary.
- L. herculeus** (Savigny).—Takes the place of *L. terrestris*. Received from Cork, Tipperary, and Kerry.

Ireland, therefore, at present possesses seventeen well defined species of Earthworm, and I am convinced that at least two or three other species could be found if those parts of the country from which specimens have never yet been received were carefully worked.

I have received specimens from the Mitchelstown Cave, but while it was easy to identify *Allurus*, the others were too small and immature for determination, though there did not seem to be any ground for supposing them to represent new species.

From time to time there have reached me, among the many interesting consignments which I have received from a large band of willing co-workers, a number of specimens not usually classed as Earthworms, but still belonging to the great oligochaet order. The publication of Mr. Beddard's monograph having necessitated the searching up of old notes, records, and specimens, I have found some facts which have never yet been published relating to these lesser species of Worms. It is my wish and purpose, therefore, to work out this material, and I shall be grateful if collectors will supply me with specimens as before. They are to be found in the ooze of rivers, ponds, lakes, and ditches, in wells, reservoirs, and tanks, among decaying matter and debris, and generally distributed where there is moisture enough to enable them to live. They vary

<sup>1</sup> *Irish Nat.*, vol. iii., 1894, p. 39.

in colour from white and cream to yellow, red, green, and dirty brown, and from a quarter of an inch to three or four inches in length, generally no larger round than a thread. They may be sent in wide mouthed bottles or tins with damp moss, but should not be packed in earth, as they are too delicate to endure the battering which results from their transit when so dispatched. If the specimens are decidedly aquatic, the moss may be well saturated with water when a well corked bottle is used. Here is an entirely new field for working naturalists, and one may reasonably hope that the present year will add many interesting species to the Irish fauna.

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## OBITUARY.

GEORGE EDWARD DOBSON, M.D., F.R.S.

We regret that pressure on our space has so long delayed reference to the death of this distinguished zoologist of Irish birth, who passed away on November 26th, 1895, at the age of fifty-one. After an exceptionally brilliant course in arts, natural science, and medicine at Trinity College, Dublin, he entered the Army Medical Service in 1868, and after twenty years' activity, mostly spent in India, was obliged to retire on account of ill-health, with the rank of Surgeon-Major. He was the highest British authority on the small Mammals:—Rodents, Insectivores, and Bats. In 1876 he published a monograph of the Asiatic Chiroptera, and two years later the British Museum Catalogue of that order. He projected a magnificent monograph of the Insectivora in which anatomical and systematic studies were to be combined, but, to the great loss of science, only the first two parts ever appeared (in 1882-3). Some years ago he presented some of his most valuable type specimens of Insectivores and Bats to the Dublin Museum.

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## THE BOTANICAL SUB-DIVISION OF IRELAND.

Mr. Praeger wishes it known that he has retained the block from which the map of Ireland divided into vice-counties was printed in our last issue, as it may be useful to naturalists working out the distribution of plants or animals in Ireland; and he will be glad to arrange for supplying any number of copies to those desiring them.

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## OBSERVATIONS ON THE DEVELOPMENT OF MELANISM IN *CAMPTOGRAMMA BILINEATA*.

BY WILLIAM F. DE V. KANE, M.A., F.E.S.

[Report to the R.I.A. Flora and Fauna Committee].

MANY species of Lepidoptera are polymorphic, and exhibit an instability of character in the imaginal stage which appears to arise from constitutional tendencies rather than immediate environmental influence. Their varieties are not restricted to locality, but occur in the same brood with the type, and in wide distribution. *Luperina testacea* and *Apamea didyma* may be cited as typical examples of this heterogeneous polymorphism.

There are other species, however, which, while showing considerable instability of coloration and pattern in most localities, apparently respond more or less directly to external influences, and produce topomorphic varieties. These last offer peculiar opportunities for studying the influence of environment and natural selection in stereotyping aberrations into local races, or eliciting new forms. The Geometer *Campptogramma bilineata* is a notable example in point. It is one of the most widely spread and numerous of our common species. Feeding on low plants and grasses, it is in no way restricted to locality by the necessities of food supply, and its constitution apparently enables it to acclimatise itself over a wide distributional range, being found in North Scandinavia, as well as in Syria and Siberia. In almost every British locality the yellow ground-colour is variable in strength of tint in different specimens, and the pattern of dark waved lines is sometimes distinctly marked, but often almost obsolete, producing a rather unicolorous form. Similarly the white waved lines are sometimes strongly represented, and often quite absent. The median band often present, especially in the females, is also very variable in strength, and a well known aberration occurs in which its exterior edge is darkly shaded, and defined sharply externally but suffused internally. The inner margin of the band in some examples is also similarly shaded. This form with its various phases I shall call the "banded aberration." It occurs very widely, but is usually somewhat scarce.

A second form which I took some years ago at Dursey Island and Ballinskelligs Bay, Co. Kerry, has the whole ground-colour of the fore-wings, and in a less degree that of the hind wings darkened, closely approximating to suffused specimens described by the late Mr. Jenner Weir from Unst, one of the Shetland Islands, but more melanic. This I shall call ab. *infuscata*. Mr. G. H. Carpenter in a subsequent year got another specimen also at Dursey Island which confirms its localisation there, and indicates that my specimens were not the result of any particular seasonal influence. In the year 1892, however, on the same coast I got 20 examples of a most remarkable local variety, with all four wings of a uniform sooty black, a trace of yellowish being perceivable on the hind wings of one or two only. No typical or intermediate forms were seen, and subsequent searches have proved that this melanic form has wholly superseded the type in that locality. It may be described as follows:

Var. *isolata*.—With all the wings of a sooty black, upon which the waved strigæ and median band are marked in darker tone. The hind wings in some instances are shot with a yellowish tone. The body and underside of the wings are also of a sooty black. The size is above the average, being in many examples  $1\frac{1}{2}$  inches from tip to tip, which is a proof that the blackening is not a result of dwarfing or diseased conditions.

In 1893 I secured about forty examples, but in the following summer very few were to be had, but I got a batch of ova from some females. The larvæ were healthy and fed freely on grass and I left them in the care of a friend, but most unfortunately the experiment was not conducted to a successful issue, and no moths were bred. Through this misfortune I fear the opportunity of procuring good specimens has been lost, as the race seems to have come to an untimely end. The place of their occurrence is a small rock-islet off the coast of Kerry. Formerly there were considerable tracts of sward between the rocky heights, and *Silene maritima* as well as a limited number of other maritime plants were to be found in the crevices and ledges. But the winter of 1893-4 was fearfully stormy in those parts, and all the headlands of Kerry were perpetually swept by enormous Atlantic waves, which breaking on the cliffs dashed floods of water high into the air; the salt brine was carried by the fierce gales over heights 100



feet above the sea-level in some instances, so that the islet in question must have been continuously soaked by the deluge of sea-water, and a hot dry season succeeding in 1894, the thrift and grass became brown and dead, and the *Silene* showed no signs of life. By careful searching only a few *C. bilineata* were to be found on the rocks, from some of which I secured ova, the fate of which I have already narrated. At the end of June, 1895, I could find no specimens; and only in one sheltered nook a little grass had sprung up. Some *Silene*, however, had sprouted again from the roots and produced foliage and flowers, and a little Sea Camomile and other small sea-plants had also survived. It is therefore to be feared that this interesting race has been extirpated, unless perhaps a few individuals may have survived the famine by feeding on the plants above-mentioned. There is also a chance that on other larger islands the variety may exist. It now remains for me to analyse the circumstances and environment which have given rise to this extreme case of melanism. The cliffs and islands which are found on this part of the coasts of Cork and Kerry are of a dark slate formation, and in some cases of dark conglomerate. I have taken a considerable series of *Camptogramma bilineata* from various points of this coast-line, and find the ordinary bright yellow type frequent, but among them unusual numbers of the banded form, and also numerous specimens with the dark scaling of the waved lines much increased, and an evident tendency toward darkened suffusion, producing a great variety of dingy and dark striated aberrations.

The deepest mainland form, that of ab. *infuscata*, is rare, and occurs with the rest, and not isolated, at Ballinskelligs Bay and Dursey Island. This shows a further advance toward melanism, and is in excess of any previously noted in the British Islands, as stated (*in litt.*) by Mr. Barrett, to whom I sent the first specimen taken. In it the yellow forewings of the type are darkened throughout by the mixture of dark scales, giving them a dark yellowish brown hue, with the central band and outer margin more darkly shaded; the hind wings being either a dingy brown or dull yellow. In all the transitional aberrations taken (i.e., between the type and the *v. isolata*), the hind wings were variable and apparently responded partially only in a small number of instances to the

melanic tendency. I have specimens from Unst which are similar to some of the Kerry coast forms, but are not so dark as *ab. infuscata*. No remarkable aberrations occur inland at Killarney or Kenmare, but on the shores of Dingle Bay, about Dingle and Sleah Head, a large proportion of very striking banded and suffused forms are to be found. On the coast of Donegal and at Killary Bay clouded forms occur also. It would therefore appear that a tendency to dark suffusion shows itself in the vicinity of the dark rocky shores of the south-west, from Bantry Bay to Valentia on the mainland; and when isolated the phenomenon becomes accentuated to an extreme degree, and a stable melanic variety arises and wholly supersedes the type. It is not difficult to imagine the stress of the environment in an island such as I have described. The herbage is sparse and the turf close-shaven by the wind, affording little or no shelter for moths to hide in, and small in comparison with the rock-surface. It is haunted by bats and insectivorous birds such as Rock Pipits, Wheatears, and the smaller gulls, which are most active in pursuit of insects, both larvæ and imagines. These no doubt thinned out the paler immigrants from time to time as they were conspicuous on the dark rocks, the darkest escaping in greater proportion, and surviving to continue the progeny. Probably also similar catastrophes to that of 1893, perhaps in less degree, occurred, by which the stock was almost eliminated, so that a close in-and-in breeding resulted in the selected race. The conclusion, therefore, I have arrived at is, that on the rocky portions of the mainland this species is acquiring a melanic tendency as a protective adaptation, and that isolation on a small area out at sea, and a severe struggle to maintain their existence has brought about the survival of the most melanic forms. On the pale grey limestone tracts of the Co. Clare forming the shore of Galway Bay, and in the Aran Islands I noticed that this species had assumed a very washed-out and patternless form, a protective adaptation in the opposite direction. Those who lay much stress on moisture as a factor in the production of melanism, over and above its influence in temporarily darkening rock and tree surfaces, will doubtless be inclined to point to the great rainfall for which Kerry is notorious. And indeed no more crucial test could be produced than the results

observable on the lepidopterous fauna of that county. Yet I found on the east slope of Mangerton, where the recorded annual rainfall often considerably exceeds 60 in. as against about 46 in Co. Cork and 41 in Co. Sligo, that the normal typical coloration prevailed, and likewise at Killarney; while darkly clouded forms seem to be strictly localised on the coast, which militates strongly against the theory in respect of this unstable species. If we accept the view I have put forward as to the selective agencies at work in producing these melanic forms, the inquiry suggests itself whether in similar localities the same influences have affected other species in like manner.

Owing to the dangers and difficulties which beset the collector in such rugged and inaccessible spots I have not very much evidence to produce. But remarkable examples are not wanting. We should remember however that the Geometridæ from their habit of resting with outspread wings on rock faces are likely to be more pliable than Noctuæ in assuming protective coloration, and of these I have been unable to secure any examples on the islands on the south-west coast, except a few *Melanippe fluctuata* from Dursey, dark forms, but not numerous enough to be accepted as evidence. Probably very few immigrants would be able to survive the selective ordeal. Dursey Island is easily accessible, but being separated from the mainland by only a narrow sound, and being some three miles in length, and having a large proportion of grass and herbage in comparison to cliff and rock, does not afford a field in which the selective agencies referred to exercise a very severe test. If it were possible to explore carefully the fauna of such places as Sherkin Island off Baltimore, The Cow, The Bull, the two Hogs off Kenmare Bay, The Skelligs, Puffin Island, Inish-na-bro, Inishtearaght, Inishvickillaune, etc., the result would, I am sure, prove of the utmost scientific interest. I append a few results of my attempts in this direction on three of them. *Agrotis lucernea* is extremely black. *Hadena oleracea*, darker than usual, with the stigma reduced in size and dark yellow, and the white subterminal line attenuated. *Dianthœcia cœsia*, very dark, but *D. nana* (one specimen only taken) typical. *Dianthœcia capsophila*, however, shows remarkable melanism in the three examples captured. The ground-colour is very

black, with the usual white pattern obliterated excepting pale outlines round the stigmata, and greyish discontinuous traces on the costa, subterminal band, and nervures, not however inclining to ochreous as in *D. carpophaga*. This is a form of great interest, as in all my experience of this species hitherto I have found it but slightly variable in colour and markings round the Irish coast. That a purely maritime species (in Great Britain), maintaining a fairly constant character in its distribution over all varieties of our rock-formations and climatic conditions, should here develop well-marked melanism would suggest the operation of some special local influence. But on the cliffs of the mainland opposite, of similar rock, a few miles distant only, I have taken specimens of the type. Isolation therefore, as in the case of *Camplogramma bilineata*, seems to be the chief probable factor at work. *Xylophasia monoglypha* also offers remarkable testimony in the same direction. Hitherto I have been unable to detect any topomorphism in the occurrence of the varieties of this polymorphic species. But on two of these islands I found no pale forms among over forty examples secured. Most belonged to the v. *brunnea*, Tutt, and varied to black forms. A few were of paler brown with the whitish markings usually present in the commonest forms reproduced in paler tone of the ground colour. The melanochroism is most apparent in the absence from this series of any grey marked specimens.

*Camplogramma bilineata* shows a tendency to develop dark scaling not only on the cliffs of Kerry, but also in the vast tracts of bog and moor of Connemara. It is not found in the wet swamps, but occurs on the broken banks of cut-out peat, and on dry heather slopes of rising ground. Near Aasleagh and Glendalough the varieties of the banded form with black edges are very striking and numerous, and with them clouded and black striated forms are frequent, similar to those of Unst. A parallel phenomenon is presented by the dark variety *scotica* of *Melitæa aurinia*, which, in Ireland, I have only noticed to occur on the margins of heathery bogs of ample extent; while the very brightly coloured v. *præclara* affects green marshes and wet pastures. It therefore seems probable that a proportion of the variable species that occur in any dark moorland

district (if we exclude from our consideration such as are strictly confined to heathery habitats) may be expected to assume dark characters for protection, as I have noticed is the case with *Cidaria immanata*. If this prove to be so, it would in part account for the greater abundance of clouded forms in Scotland, as compared with England (exclusive of smoke-stained districts).

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include a pair of Polecats from A. H. Cocks, Esq., a Tawny Owl from J. Boland, Esq., a monkey from Miss Meldon, a Kestrel from H. K. Richardson, Esq. 4,129 persons visited the Gardens in January.

JANUARY 28th.—The Annual meeting was held at the Royal College of Physicians, when the Report and accounts for the past year were submitted. The financial condition of the Society is satisfactory, the income for 1895 being larger than that for any year since 1882. Reference is made to the loss sustained by the Society in the death of Dr. V. Ball, who acted for so many years as honorary secretary, and a hearty tribute is paid to the work which he did in improving the Gardens. During the year two islands have been built in the lake; these will afford a welcome nesting-place for the water-fowl. In the excavation left on the lake shore by the removal of material for these islands, a rockery and goat-house is to be formed. But one litter of Lion cubs (two males and a female) were born in the Gardens in 1895, but these are thriving. Ten Puma cubs, in three litters, were born during the year; of these, five have died and two are weakly, but the last litter (of three) are doing very well. The fine Burchell's Zebra, which had lived twenty-one years in the Gardens, died of old age in October. Another serious loss is that of the female Ostrich, which died of a ruptured aorta. Anthropoid Apes are at present represented by a fine male Chimpanzee and a male Gibbon (*Hylobates hachmarus*). The latter is an exceptionally rare and valuable animal, no European having ever studied it in its native haunts. A white-tailed Gnu, one of the most interesting of South African Antelopes, has been obtained by exchange from the London Gardens. The appendix to the Report contains some valuable suggestions for the further improvement of the Gardens, such as the enlargement and ventilation of the Anthropoid house and the removal of the reptiles now housed there to new quarters in the Aquarium. A new paddock for Marsupials and another for Llamas and Camels are also contemplated at some future time.

## DUBLIN MICROSCOPICAL CLUB.

JANUARY 16th.—The Club met at Dr. FRAZER'S, who exhibited microscopic sections made from bone pins of large size found in a fragmentary state and bearing evidences of exposure to strong heat causing charring. They were obtained by E. Crofton Rotheram, Esq., in recent explorations of cairn R<sup>2</sup> at Slieve na Calliagh, Co. Meath. Some of these portions of bone are figured in the *Journal of the Royal Society of Antiquaries of Ireland*, vol. v., 1895, p. 313, by Mr. Rotheram. The bone implements had sharp points and blunt semi-conical heads, and may have been used for pins. Fragments of similar objects (three in number) were obtained by Colonel Wood-Martin some years since from a cairn in Co. Sligo, and are figured in his work on the "Rude Stone Monuments of Sligo." Dr. Frazer had examined these, and was induced to believe they were of Cetacean origin, but the re-examination of his former preparations and sections made from the Co. Meath find demonstrated that they were all obtained from the antlers of the Red Deer, once so widely distributed in all parts of the country, and now almost extinct. Dr. Frazer likewise exhibited careful drawings of all the fragments obtained in Sligo and Meath. No less than eleven of the bone implements were found at Lough Crew cairn judging by that number of the blunt semicircular top portions discovered amongst the fragments.

PROF. G. A. J. COLE showed a section of a remarkably unaltered and scoriaceous volcanic bomb from the Silurian tuffs north of Clogher Head in the Dingle promontory. In this region a handsome series of bombs occurs, precisely resembling those of the Petit Puy-de-Dôme, in Auvergne; they have been preserved without infilling of their cavities, and present a remarkable contrast to the other volcanic rocks interstratified with them.

PROF. T. JOHNSON exhibited *Hyella nitida*, Batt. *in litt.*, a shell-perforating alga, new to science, found on the Merrion strand this last December, after the storm which caused the Kingstown life-boat disaster. The *Hyella nitida* was shown accompanied by *Conchocelis rosea*, Batt., both of which were gnawing away the Razor-shell. The differences between the two species were pointed out.

MR. A. VAUGHAN JENNINGS showed a specimen of the Foraminiferal genus *Ramulina* growing within a chamber of the large Foraminifer *Carpenteria raphidodendron* Möbius. The slide was from the collection of the late Dr. W. B. Carpenter, and had in 1880 been the subject of a paper in the *Journal of the Royal Microscopical Society* by the late Dr. Martin Duncan, who described the *Ramulina* as a calcareous sponge and gave to it the name of *Mobiusispongia parasitica*. The specimen might be regarded as raising the question whether any of the Foraminifera have the power of boring through calcareous shells; but in the case in question it is more probable that the *Ramulina* was at first growing on the outside of the *Carpenteria* and was subsequently enclosed by the rapid growth of the latter. A note on the subject was communicated to the Linnean Society in June, 1895.

DR. C. HERBERT HURST showed preparations of the auditory organ situated in the swollen basal joint of the antenna of the gnat (*Culex*) which he described and figured in the *Trans. Manchester Micros. Soc.*, 1890.

PROF. A. C. HADDON showed preparations illustrating the nauplius and cypris stages in the development of *Balanus balanoides*.

MR. R. J. MITCHELL exhibited a microscopic preparation and microphotograph of *Melobesia farinosa*! The distinction of some of the species of *Melobesia* is based on minute characters in the structure of the thallus; the use of microphotographs in indicating these microscopic differences was noted.

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#### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 7th.—Mr. JOSEPH BARCROFT lectured on "The Properties of the Surface of Liquids."

FEBRUARY 4th.—Mr. S. F. MILLIGAN lectured on "Antiquities, Social Customs, and Folk-lore of Tory, Inismurray, and the South Islands of Aran."

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#### BELFAST NATURALISTS' FIELD CLUB.

JANUARY 25th, BOTANICAL SECTION.—The proceedings commenced with an account of the vascular structure of plants by Rev. C. H. WADDELL, who showed how the various forms of vessels formed the skeleton of plants, while at the same time serving as a system of circulation.

Mr. R. LLOYD PRAEGER then gave a very complete account of the various species of British ferns, illustrated by a fine set of mounted plants, which were handed round. He pointed out the means of distinguishing some of the closely allied species which are often mistaken by amateurs. Among the most interesting were some plants of Adder's-tongue with several fertile spikes, and some fronds of *Hymenophyllum* grown under glass, which had produced several years' innovations from the ends of the old fronds instead of dying down as usual.

GEOLOGICAL SECTION.—Mr. PRAEGER gave an address upon "The Glacial Series at Belfast and Dublin—A Contrast." The subject was of special interest, as the Club is investigating the glacial geology of the district, whilst Professor Sollas and Mr. Praeger are working out the Dublin drift deposits. Mr. Praeger described the beds in Wexford as being of late Pliocene age, the ancient sea-beach at Ballyrudder being our earliest glacial beds, being overlaid by lower boulder clays. Marine shells are much more abundant in the Dublin series than in the north; fossils, derived from Lias, being also singularly plentiful in beds at Kill-o'-the-Grange. The splendid series of sands and gravels about Dublin were described, which overlie, and are intercalated with boulder clay, Mr. Praeger suggesting their being probably represented in the North by the sands and gravels of Neill's Hill and the Dundonald Valley, which, he thought, should be thoroughly investigated. The existence of an upper boulder clay, less hard and more sandy and earthy, with plentiful marine shells in places, was mentioned as being now accepted in the metropolitan district, although local geologists fail to find such a dia-

tion in the Belfast neighbourhood. This clay contains fewer large boulders than the lower boulder clay beds. Mr. Praeger concluded by referring to an investigation into the historical succession of our northern fauna, which indicated an almost arctic climate, ameliorating slightly in the boulder clays, and showing a distinctly southern facies in the estuarine clays and raised beaches, whilst dredgings in this century show a recurrence of colder conditions.

In the subsequent discussion Mr. Praeger mentioned that although perfect shells with the valves still united had been found near Dublin as well as in the north, yet they are very rare, the usual condition being much broken and worn. Specimens were handed round for inspection, as well as a selection of rocks found in the glacial beds about Dublin, which Mr. Praeger subsequently presented to the Club. Amongst them were a Cushendall rock and the well-known Ailsa Craig rock. Miss S. M. THOMPSON expressed a hope that rocks with riebeckite might even yet be found in Co. Down, as a series of very diverse-looking erratics recently submitted to Prof. Cole all proved to contain that mineral; some of these fragments were found in the bed of boulder-clay in the banks of the stream between Divis and Black Mountain, mentioned in the January number of the *Irish Naturalist*, whose elevation is found not to be as much as was at first supposed (1,300 feet), but whose precise height has yet to be determined. Mr. L. M. BELL drew attention to the great difference between the boulder-clays in Antrim and Down, the latter being much looser in texture, resembling the upper boulder-clay described by Mr. Praeger. A collection of rock-specimens was presented by Miss M. K. Andrews.

JANUARY 31st.—A special meeting was held in the Museum—the President (Mr. F. W. LOCKWOOD, G.E.) in the chair, when Mr. W. GRAY, M.R.L.A., delivered his lecture, "To Galway by Sea and Land," being an account of the Excursion last summer of the Irish Field Clubs and the Royal Society of Antiquaries to Galway.

FEBRUARY 18th.—The President in the Chair. Mr. W. H. PATTERSON read a Paper on "Gaelic Charms, Incantations, and Curses."

#### DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 10th.—The Chair was taken by the President (Prof. G. A. J. Cole, F.G.S.) There was a large attendance of members and friends. After the signing of the minutes, the Vice-President (Mr. N. COLGAN) took the Chair, while Prof. COLE delivered his address on "Some Problems in the Geology of Co. Dublin and Co. Wicklow." He said that by indicating how many points of interest still remained unsettled in the geology of Co. Dublin and Co. Wicklow, he hoped to attract some of the energy of the Club towards the study of these matters in the field. He dwelt on the possibility of the discovery of fragmental, but serviceable, organic remains in the slates of Bray or Howth; on the dubious position of *Oldhamia*; on the desirability of checking and adding to the old determinations of species from the Ordovician limestone of Portrane; and on the paucity of graptolites hitherto discovered in the associated shales. The minerals of the contact-zone along the flanks of the Leinster granite may attract other observers; and the suggestion, made



by Prof. Sollas, that the granite is a laccolitic mass overlying the Howth and Bray series, requires further investigation. The zones in the Carboniferous Limestone have yet to be indicated by a study of the fossils on various horizons; and attention was called to the blocks of older rocks found embedded in the limestone; finally, the author referred to the difficulties raised by the abundant shelly gravels associated with the glacial epoch. He himself was inclined again to urge, as he had done in an early number of the *Irish Naturalist*, that the shells in these gravels represent a late Pliocene (Astian) submergence, and that they were brought into their present positions by the action of glacial and other streams during the cold period that succeeded.

REV. MAXWELL H. CLOSE, in a happy and effective speech, reviewed the history of many of the controversies that had been touched on by the President. He described the interesting discovery of well-rounded quartzite and granite boulders in the Carboniferous Limestone at Stillorgan, during the making of the reservoir there, the other records being granite boulders on the south of Dublin, and pieces of Ordovician schist, unrounded, at Blackrock. Mr. Close described himself as a sceptic, in the true sense of the word, with regard to the causes which had laid down the shelly gravels as we now find them. He was quite unconvinced, however, by Prof. Carvill Lewis, who urged, when in the field with him at Ballyedmonduff, that the gravels had been pushed uphill before a gigantic glacier. Mr. COLGAN and Mr. PRAEGER also discussed the paper, after which Prof. COLE replied.

MR. H. LYSTER JAMESON then read his account of his explorations of the caves at Mitchelstown and Enniskillen, undertaken on behalf of the Royal Irish Academy Fauna and Flora Committee. The paper, which was of much interest, and will shortly be published *in extenso* in our pages, was prefaced by some remarks on the animals obtained, by Mr. G. H. Carpenter; the subject-matter of his communication will appear in Mr. Jameson's paper. A short discussion ensued. The following were declared elected members of the Club:—Miss Dixon, Rev. C. W. Follis, B.A., Joseph Maguire, B.L., Miss Sweeny.

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#### CORK NATURALISTS' FIELD CLUB.

FEBRUARY 10th.—The President (W. H. SHAW) in the chair. A very interesting paper was read by Mr. WM. MILLER—"The Climate of Cork," and a lively discussion followed.

PROFESSOR HARTOG read a note on Mr. Rousselet's method of preserving Rotifera. He pointed out the need of keeping specimens for comparison of microscopic organisms, as is done for larger animals and plants, in order to avoid the doubt due to imperfect descriptions and sketches. As examples he cited the cases of *Hexarthra*, a Rotifer with six articulated limbs, so described by Schmarda as to render it impossible to say whether it is or is not identical with Hudson's genus *Pedalion*, and of *Plasoma*, a genus founded by Herrick twelve years ago, and since described under no less than *five* other new generic names! The first requisite is to stupefy the active animals; this is conveniently done by

first fishing them out into clean water, and then adding drop by drop the following solution of cocain :—

A. Cocaine Hydrochlorate, 1 gram.

Water, 50 cc.

Methylated spirit (without petroleum), 12 cc.

This solution keeps indefinitely.

B. Solution A, 4 cc.

Water, 6 cc.

To be made as required.

The solution must be added gradually at intervals of a few minutes. When the animals are sufficiently sluggish the addition of a drop or two of osmic acid solution  $\frac{1}{2}$  per cent. fixes them. They must then be removed by a medicine dropper to clean water, and thence to a cell containing a 2 to 2 $\frac{1}{2}$  per cent. solution of commercial formalin (also called "formol" and "formal"—a solution of 40 per cent. formic aldehyde in water; or equal volumes of  $\frac{1}{3}$  per cent. mercuric chloride and  $\frac{1}{3}$  per cent. sodium chloride). The cells used are the hollowed glass slides to be obtained from any optician. The cover is sealed down with Miller's caoutchouc cement, and finished with a ring of asphaltum, &c. (See Journal of the Quekett Microscopic Club, vol. v., ser. ii., March, 1895). Five slides of Mr. Rousselet's preparation were shown :—*Asplanchna Brightwellii*, *Synchata tavina*, *Cyrtonia tuba*, *Pedalion mirum*, and *Plasoma Hudsoni*.

The SECRETARY called members' attention to Mr. Praeger's article in current number of the *Irish Naturalist*, and hoped it would prove a stimulus to the botanists in the coming year, and also gave particulars regarding the conversazione, arrangements for which are progressing rapidly. Four new members joined the Club, which has received substantial increase since the lectures under the auspices of the Field Club Union.

#### LIMERICK NATURALISTS' FIELD CLUB.

JANUARY 23rd.—The annual meeting unanimously adopted a suggestion of the Committee, recommending that the Club should cease to hold its meetings in a private room, and admit the public to membership, with the result that an immediate increase of ten members took place, and at least as many more are likely to be added by next meeting, which is to be held in the Board Room of the City Library, kindly given to the Club, free of all charges, for its future gatherings, by the Corporation Library Committee. The Club now numbers upwards of sixty members, and under its new conditions should be capable of doing good work in its hitherto almost virgin locality.

The report of Committee for 1895, mentioned the occurrence of several interesting records, amongst them being a male specimen of the large Footman (*Gnophria quadra*) from Adare, an example of a ground beetle (*Panagæus crux-major*) from Finlough, Co. Clare, this insect being an addition to the Irish list; a Red Squirrel (*Sciurus vulgaris*) from Cratloe Wood; and amongst Lepidoptera the Secretary reported having taken the Holly Blue (*Lycana argiolus*) for the first time in May, 1895.

## FIELD CLUB NEWS.

Mr. R. Welch, of the Belfast Field Club, sends us a second supplement to his Catalogue of Geological Photographs. We have had the advantage of examining this beautiful series, and can say that it includes many views of the highest interest and importance. First come some illustrations of coast denudation, including the remarkable scene in White Park Bay, described by Professor Cole in the *Geological Magazine* for Dec., 1895. Then follow photographs of raised beaches, and of Palæozoic and Mesozoic strata. The Roundstone kitchen-middens come next, and finally we have the beautiful series of mountain views taken in Connemara and Clare on the Field Club Union Excursion, which most of our readers have already seen and admired.

The arrangements for the Cork Field Club Conversazione on March 10th, are rapidly progressing, and the function promises to be a very interesting one. A number of new members have lately joined this Club, which appears to have now firmly taken root, and to have a successful future before it.

In a course of five lectures on Ireland, at the Dublin Coffee Palace last month, three members of the Dublin Field Club have taken part. Dr. M'Weeney lectured on "Invisible Natives"—bacteria; Professor Cole on "The Land and the Landscape," and Mr. Carpenter on "Wild Life in Ireland." The other lectures of the course were "Ancient Irish Crosses" by Rev. D. Murphy; and "The People of Ireland" by Rev. Canon Carmichael.

In the Royal Dublin Society's course of afternoon lectures, Natural Science is represented by "The Bath Sponge" (Prof. Sollas), "The Glaciers of the Alps" (Rev. Monsignor Molloy), "Irish Animals Old and New" (G. H. Carpenter), "The Food of Plants" and "The Making of Timber" (Prof. T. Johnson).

The Limerick Field Club has now felt strong enough to forsake the protecting wing of the Young Men's Christian Association, and to start on an independent career. The result of this action is to throw the benefits of the Club open to all sections of the public, and as a consequence an immediate rise of membership has taken place. The Corporation Library Committee has generously placed the Board-room of the City Library at the disposal of the Club for its future meetings, free of charge. We have no doubt that on this wider basis the Club will continue to prosper, and will increase in numbers and in activity.

The Geological section of the Belfast Club are arranging for a continuous week's study of geology during the month of March under Professor Cole, F.G.S. The forenoons are to be devoted to field geology, and each evening a class for the study of petrography will meet in the Club's rooms at the Belfast Museum. This new scheme should prove highly valuable, as geological students are well aware of the difficulty of recognising rocks in the field with which they are perfectly familiar in museum collections. This is the third year in which the Club have had the great advantage of studying under Professor Cole.

## NOTES.

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**Mildness of the Season.**—Many reports reach us illustrating the remarkable mildness of the present season. Mr. E. A. Praeger reports a Blackbird's nest with two eggs found at Holywood, Co. Down, on 29th January; at the same date the Rooks at Cultra rookery were busily engaged in building their nests. *Vespa germanica* was observed on the wing at Limerick, as early as 11th February, a specimen having been taken on that date by the Secretary of the Limerick Club. The weather had been very fine and mild for some days previously. Among several reports of early flowers, we may mention that on 2nd February the Scurvy-grass (*Cochlearia officinalis*) was flowering abundantly on Howth, the blossoms set in luxuriant tufts of succulent glossy foliage.

### ZOOLOGY.

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#### INSECTS.

**Death's Head Moth in Dublin.**—A dead but perfect specimen, except for the antennæ, of the Death's Head Moth (*Acherontia atropos*) was found by the children of the caretaker of the now disused Carmichael College of Medicine, Aungier St., Dublin. It lay on the floor of the former dissecting room, and from inquiries as to the dates on which the room was swept, &c., I believe that earlier in this or last year it sought shelter in some cranny and was recently dislodged by the strong winds prevailing about Christmas. The windows are generally open, and in summer the room is much frequented by the children looking for flies, bees, wasps, &c., constantly to be found there dead. Their father, a pensioner, who used to collect butterflies, &c., in the tropics when on service, recognised the specimen and saved it from destruction.

J. ALFRED SCOTT, Dublin.

**Gonepteryx rhamni in Queen's County.**—Miss Bewley captured a fine specimen of this butterfly about the end of August last at Dunmore in the Queen's County, which appears to be a new locality, as Mr. Kane in his catalogue only gives Kerry, Galway, and an island in Lough Ree, Co. Longford (*Entomologist*, vol. xxvi, p. 120). Another specimen is said to have been seen on the wing at the same time and place. This discovery is interesting, as the Queen's County has been known as a habitat for this insect's food-plant, the Buckthorn (*Rhamnus catharticus*), which grows on the banks of the Barrow.

GEORGE V. HART, Dublin.

**An Early Emergence.**—A specimen of *Phlogophora meticulosa* emerged at Howth on the 1st January. The pupa was in a flowerpot in the open air. This bears witness to the mildness of the season.

GEORGE V. HART.

## BIRDS.

**Birds of Connemara.**—In Mr. Witherby's account of Connemara birds in the January issue of the *Irish Naturalist* he states that "a number of Dunlin, some of which were singing beautifully, were flying about in small flocks" on Lough Corrib. I should like to ask Mr. Witherby whether it was beyond doubt the Dunlin (*Tringa alpina*) that he refers to, and not the Ringed Plover (*Egialitis hiaticula*), which is locally called the Dunlin in some parts of England. The islands of Lough Corrib are hardly the kind of habitat for the Dunlin during the nesting season. Several years ago I spent two days on Lough Corrib and its islands for ornithological purposes at the middle of May, and I saw no Dunlins but on every island that had any shingly shore—and I landed on about sixteen or eighteen such—there was at least one pair of Ringed Plovers. Mr. Witherby's other observations relating to Lough Corrib coincide with mine to a remarkable degree; and as the Ringed Plover is fairly plentiful on the islands during the nesting season he can hardly have failed to observe it, as he has noted nearly all the other birds to be expected but he makes no mention whatever of it. Many who know the pleasing whistling notes of the Ringed Plover will probably agree that "singing beautifully" seems a not inappropriate description of them. Altogether it rather looks as though it was the Ringed Plover Mr. Witherby referred to, not the Dunlin; but should it prove to be the latter, it would of course be an occurrence of interest to Irish ornithologists.

Mr. Witherby also states that "on some of the low flat islands of Renvyle the Black Guillemots *seemed* to be laying their eggs under the large boulders scattered about," and that he "saw several at different times fly out from amongst them, but could not reach their eggs." It is well known that various birds occasionally nest in situations very different from the sites usually chosen; and it would be interesting to know whether Black Guillemots were really nesting in the situation described. Can Mr. Witherby or anyone else throw further light on the question? Mr. Witherby says: "Another curious nesting habit I noted was, that the Oystercatchers, which were numerous, invariably nested on the rocks or turf even on islands where there was shingle in every way suitable for them." Perhaps West of Ireland Oystercatchers may have found that it is not always safe to nest on the shingle within possible reach of an unusually high Atlantic wave, and have consequently gone to higher and safer situations. At all events the site mentioned hardly seems an unusual one with these birds in the West of Ireland. In 1894, during the first week of July, on Inishkeeragh—the island between North Inishkea and Inishgloria—off the west coast of Co. Mayo, I found two Oystercatchers' nests containing young birds on small patches of turf among the rocks, near where Arctic Terns were nesting. I identified the nests and young as Oystercatchers by the broken fragments of egg shells about the nests.

J. E. PALMER, Dublin.

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NOTES ON COLLECTING ENTOMOSTRACA,  
WITH A LIST OF THE IRISH SPECIES OF CLADOCERA KNOWN  
AT PRESENT.

BY R. H. CREIGHTON, M.B.

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Entomostraca are found everywhere; they are especially abundant in marshes, the weedy pools on the outskirts of a bog, and in the bed of weeds which exists in most lakes where the deep and shallow waters meet. In the centre of the larger lakes a regular pelagic fauna exists; it has been little studied in the United Kingdom, as it is impossible to collect it without the aid of a boat. The best time to obtain these pelagic forms is at night, when they crowd to the surface in large numbers, even in the middle of winter.

For collecting in the smaller pools, the ordinary muslin net and glass bottle at the end of a stick about four feet long answer well. In larger ponds and in lakes of course they are of no use; here I find Professor Birge's cone dredge (8) a great comfort, as the cone keeps out weeds, insects, larvæ, &c. "It consists of four parts, the body, the cone, the net, and the screw-top. The body is a cylinder of stout tin, strengthened by a wire at each end, four inches long, and four inches in diameter. On top of this is placed a cone of brass netting, five inches high; this is attached below to a circle of tin so that it fits into the top of the body like the cover of a tin pail. The bail of the body is of stout brass wire, the ends passed through the side of the body and enlarged, and the loop of wire shaped so as to fit within the cone and project through a hole in its top, with an eye into which the dredge-line can be fastened. Two cones are provided, one of one-tenth inch mesh and one of one-twentieth inch. The net is of fine cheese-cloth, eighteen to twenty-two inches long, conical, large enough at the base to slip over the dredge-body to which it is tied. It is faced with stout muslin for a distance of two or three inches at each end. At the smaller end it is small enough to fit the screw-top, a tin cylinder one inch in diameter and one inch and a quarter long, with a wire in one end, and on the other a zinc screw-top such as is used on paraffin

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cans." This dredge can be thrown easily twenty yards from the shore and hauled in by the line, thus collecting much more extensively than it is possible to do with the ordinary hand-net. It can be pulled through weeds, and can strain a large quantity of water without getting filled with vegetable debris. When used as a surface net the cone is removed.

Entomostraca are best examined alive in a drop of water, either in a hollow-ground slide or on an ordinary slide, the pressure of the coverglass being taken off by a pellet of wax, or as Professor Hartog suggests, a frond of Duckweed. If unable to examine them at once, remember that they live much longer if kept in the dark.

Mounting permanent specimens is very troublesome. I get the best results by killing with osmic acid, bleaching carefully with chlorate of potash and hydrochloric acid, grading through alcohol, staining with tincture of cochineal or with hæmatoxylin (the latter is very liable to overstain), and mounting in Canada balsam. Prof. Herman Fol advises killing with tincture of iron (steel drops) added to a small quantity of water in which the animal is swimming, and subsequent staining with gallic acid. I have not had much success with this method. Sometimes, more especially with the smaller Cladocera, the osmic acid alone gives sufficient differentiation. Kleinenberg's picro-sulphuric acid is useful for killing, and has the great advantage of being cheap. If you use it, remember to wash out with dilute alcohol, not water.

For preserving specimens for future study glycerine does well for Copepods; the following is a good formula:—glycerine one ounce, proof spirit two ounces, water one ounce, liquefied carbolic acid one dram, mix. They can be examined in this solution without staining, and can be mounted out of it in glycerine jelly. Cladocera are much harder to deal with; I get the best results by killing with osmic acid and grading carefully through 30, 50, 70 and 90 per cent. alcohol; but it is much better, in fact almost essential, to examine specimens of this group alive.

In the following list I have endeavoured to collect all the species recorded from Ireland; they number only 23! In a synopsis of the British Cladocera published in the *Journal of*

the Birmingham N. H. Society in February, 1895, Mr. Hodgson gives a list of 64 British species, of which 31 have been found within 15 miles of Birmingham. In all probability the whole 64, if not more, are to be found in Ireland.

Mr. J. D. Scourfield has given me great aid by kindly naming some of the more difficult species for me. Where no reference follows a locality in this list, the species has been taken there by myself.

#### IRISH CLADOCERA.

- Sida crystallina**, O. F. Müller. This is by far the most widely distributed and abundant Entomostracan in the lakes and ponds of the N. of Ireland; I have found it in all I have examined except those which are liable to be completely dried up in hot weather. My experience is thus directly opposed to Baird's observations in England, viz:—"They do not seem to be numerous in the localities in which I have found them, and indeed are of rare occurrence." (1); Scourfield has recently confirmed Baird's statement in researches conducted at Wanstead Park (2) and in Wales (3). Irish localities are L. Corrib (4), L. Erne (5), L. Melvin, lakes of Donegal, and near Galway (6).
- Daphnia pulex**, Müller. Common in small ponds, ditches, and wells; also near the shore in lakes; L. Erne (5), Donegal, &c.
- D. longispina**, Müller. Near Galway (6); lakes of Fermanagh and Donegal.
- D. obtusa**, Kurz. Common in a pond in the townland of Dunmuckrim, near Ballyshannon.
- D. galeata**, Sars. Only in L. Erne (5) and L. Melvin in this locality; near Galway (6).
- Ceriodaphnia reticulata**, Jurine. Scarce. L. Unshin, near Ballyshannon.
- C. pulchella**, Sars. Mr. Scourfield kindly identified this species for me; it resembles *C. quadrangula*, Müller, very closely. I have found it only in L. Nabrackalan, near Ballyshannon.
- C. megalops**, Sars. Near Galway (6).
- Scapholeberis mucronata**, O. F. Müller. L. Corrib (4).
- Simocephalus vetulus**, O. F. Müller. Common in ponds everywhere.
- Bosmina coregoni**, Baird. Upper L. Erne (5).
- B. longirostris**, O. F. Müller. Clonhugh Lake, near Mullingar (4).
- B. longispina**, Leydig. L. Bollard, Connemara (7). L. Melvin.
- Lathonura rectirostris**, Müller. L. Bollard, Connemara (7).
- Macrothrix laticornis**, Leydig. Near Belfast, W. Thompson (7).
- M. rosea**, Jurine. Lakes of Connemara (7).
- Acantholeberis curvirostris**, Müller. Bog pools near L. Corrib (4); Connemara (7); near Columbkille Lake, Ballyshannon.
- Drepanothrix hamata**, Sars. L. Bollard, Connemara (7).



- Eurycercus lamellatus**, Müller. Common everywhere in weedy ponds.
- Acroperus harpa**, Baird. Near Galway (6).
- Alonopsis elongata**, Sars. L. Corrib and L. Clonhugh (4); Connemara (7).
- Lynceus costatus**, Sars. Connemara (7).
- L. testudinarius**, Fischer. Connemara (7).
- L. nanus**, Baird. Connemara (7).
- L. affinis**, Kurz. Near Galway (6).
- Graptoleberis testudinaria**, Fischer. Near Galway (6).
- Aleonea nana**, Baird. Near Galway (6).
- Pleuroxus trigonellus**, Müller. Near Galway (6).
- Chydorus sphaericus**, Müller. Common all over Ireland.
- C. globosus**, Baird. Connemara (7).
- Polyphemus pediculus**, De Geer. L. Corrib and L. Bay (4); Lough Columbkille, near Ballyshannon. This species is very local; it appears to swim in shoals usually within a few yards of the shore.
- Bythotrephes longimanus**, Lilljeborg. Very plentiful in Upper L. Erne in 1886-7-8 (5). Rare in L. Melvin, and the individuals are smaller than in L. Erne.
- Leptodora hyalina**, Lilljeborg. Common in Upper L. Erne (5); neighbourhood of Galway (6).

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ON THE EXPLORATION OF THE CAVES OF ENNISKILLEN AND MITCHELSTOWN FOR THE  
R.I.A. FLORA AND FAUNA COMMITTEE.

BY H. LYSTER JAMESON.

(Read before the Dublin Naturalists' Field Club, Feb. 10th, 1896.)

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Early in 1895 Dr. Scharff informed me that Mr. E. A. Martel, the celebrated French explorer of caves, had determined to visit Ireland in July, with a view to investigating some of the numerous caverns with which our Carboniferous limestone is in places riddled.

I at once expressed myself anxious to join him in his explorations, and in due time was informed that the Fauna and Flora Committee of the Royal Irish Academy had done me the honour of making a grant to me for the purpose of further investigating the cave-fauna, already discovered at Mitchelstown by Dr. Wright and Mr. Haliday, and so ably described by Mr. Carpenter in his most interesting paper on the "Animals found in the Mitchelstown Cave" (*Irish Naturalist*, February, 1895).

On July 10th I left Dundalk for Enniskillen, where I hoped to meet Mr. Martel, whose investigations were to commence in that district. At Enniskillen I was met by Mr. Thomas Plunkett, M.R.I.A., who kindly made me his guest while I was there, and whose intimate knowledge of the geology and physical features of the district was of very great assistance to me in my work.

On July 11th I set off for Bohoe, where I was met by the Rev. A. Knight, who acted as my guide.

We first proceeded to investigate the underground river-bed at Bohoe, a winding subterranean watercourse. Beside the outlet was a dry cavern which presumably was once connected with the present river-bed, and has for some reason become cut off. It was only accessible for a short distance, large angular blocks, falling from the roof and walls, having formed an impassable barrier. This grotto must have been inhabited by numerous bats, as the floor was strewn with their

fæces, and also with the rejected wings of insects. The river-course itself, though at the time of my visit dry, is after heavy rains traversed by a mountain torrent, which evidently floods right up to the roof, as debris of all kinds, branches of trees, sods of turf, &c., were jammed into all crevices, even in the roof. Consequently no animals of the typical cave-fauna were to be found.

We entered at the end of the cave where the stream discharges itself, and noticed that just inside the exit, where exposure to weather had enlarged the calibre of the cave, there were two colonies of Daubenton's Bat (*Vespertilio Daubentonii*), clustered together in crevices in the roof like swarms of bees. I captured five specimens with some difficulty; they were all males, and two of them can now be seen in the Science and Art Museum, Dublin.

The invertebrates found in this cave had evidently been accidentally brought in by floods, with the exception of two large spiders, *Meta Menardii* and *Meta Merianæ*, which Mr. Carpenter, who has kindly identified the invertebrates collected, tells me often inhabit the entrances to caves. The other invertebrates were a water-bug, *Velia currens*, and two flies belonging to the genera *Erioptera* and *Molophilus*.

On leaving this cave Mr. Knight invited me to lunch at the Rectory, and, when there, showed me a Bat that he had killed in his room on the previous night. This proved to be the Whiskered Bat (*Vespertilio mystacinus*), another of our rarer Irish species. This specimen, a male, is now in the Science and Art Museum, Dublin. Some time after I left Enniskillen Mr. Knight sent me a specimen of the Hairy-armed Bat (*Vesperugo Leisleri*) taken in his house, a female Daubenton's Bat, and a Long-Eared Bat (*Plecotus auritus*) captured in the dry cavern to which I have already referred.

After lunch we explored Coolarkin, a cave of considerable dimensions, and one which must once have been traversed by a river of large size. All that now remains of the river is a small stream that sinks into the floor of the cave close to the entrance, meeting no doubt some watercourse at a greater depth. But, from the presence of flood-rubbish further in, I infer that in floods a stream of some kind traverses it, though the greater part is always dry. Any stream rising in the neigh-

bourhood could occupy but a small part of the vast capacity of this cave, which is in places fully forty feet high, and fifteen or twenty feet wide. Unfortunately a couple of hundred yards from the entrance further progress was prevented by a heap of fallen debris which completely blocked the way. At the inner end of the passage, where the heap of boulders stopped us, was a burrow, possibly belonging to a Badger, and Mr. Knight's dogs which had accompanied us showed by their excitement that the animal was within. This further supports my belief that this cave is in great part dry at all seasons.

The Invertebrates I found here are all species which occur above ground; they are—a spider, *Porrhoma microphthalma*, which Mr. Carpenter tells me has been found in a coal-pit, occurring also above ground; *Brachydesmus superus*, a blind millipede, which also occurs above ground; *Iulus pilosus*, a typical millipede; *Tomocerus tridentiferus*, a collembolan, found at Mitchelstown by Wright and Haliday; recorded by Packard from North American caves, occurs under stones above ground;<sup>1</sup> *Velia currens*, the water-bug found at Bohoe; a fungus-midge, *Sciara Thomæ*; and four beetles, *Bembidium rufescens*, *Ancyrophorus omalinus*, *Helodes marginata*, and *Coprophilus striatulus*; the last, Mr. Halbert tells me, has not hitherto been recorded as Irish. All these beetles inhabit moist, marshy places, and were probably washed into the cave.

After leaving Coolarkin cave we visited Bohoe church, where Mr. Knight informed me there was an immense colony of bats. We found a number of young Pipistrelles (*Vesperugo pipistrellus*) from a few days old to half-grown individuals, crawling about the floor of the church, having fallen through a hole in the ceiling. There must have been an immense colony in the roof, but unfortunately there was not a ladder at hand to enable me to inspect it. Having collected a number of these young bats I returned to Enniskillen, as darkness was already coming on.

On July 12th, next day, I drove to the Marble Arch, at Florence-Court, and, after collecting a few invertebrates about the grounds, I was met by Mr. Bowles, the keeper, who accom-

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<sup>1</sup> For this and other information respecting the invertebrates found I am indebted to Mr. Carpenter.

panied me to the caves. In the Marble Arch cave, which is a favourite resort for tourists, I collected a few invertebrates which, like those collected on the previous day, were species which occur above ground.

This cave is, I may here remark, in its upper part dry, the river that has carved it out having found a passage on a lower level, and appearing as a spring some distance in. Here I took *Porrhoma microphthalmum*, *Brachydesmus superus*, *Tomocerus tridentiferus*, and *Clivina fossor*, a carabidous beetle.

None of the other Florence Court caves were accessible without Mr. Martel's exploring apparatus, so I had to defer my visits to them till his arrival.

On the 15th Mr. and Mrs. Martel and I drove to the Arch Spring, and Noon's Hole, bringing with us in a cart Mr. Martel's copious equipment of cave-exploring apparatus. This consisted of a canvas boat, some hundreds of feet of rope-ladders, a light portable folding wooden ladder, ropes, axes, compass, barometer, telephone, maps, &c.

We first proceeded to Noon's Hole, which is a vertical shaft or swallow-hole down which a stream precipitates itself. Mr. Martel sounded the shaft with a lead-line and found the depth to be 150 feet. The rope ladders were then got ready and Mr. Martel began his descent; he could not, however, descend more than about 60 feet, as the falling water, which at the time was unusually high, broke over the ladder and rendered further progress impossible. The descent of this chasm would be made possible if the stream could be for a time deflected.

We also explored Poolaneffaran, a pit formed partly by the falling in of the roof of an underground river-bed.

The streams traversing Noon's Hole and Poolaneffaran converge to form the Arch spring, where they discharge themselves through a beautiful grotto, and form a waterfall. In the Arch spring I found *Meta Merianæ*.

On the 16th we visited the Marble Arch, bringing the same equipment. Here we were met by Mr. Bowles and his son, who accompanied us to the caves. Several streams, meeting underground, flow out at the source, under the "Marble Arch," a beautiful natural archway, cut off from the cave.

The first cavern we explored we gained access to by means of an entrance at the bottom of a pit, formed evidently by the falling in of a part of the roof. After exploring several dry galleries and a vertical swallow-hole opening on the hill above us, we found on a lower level the river itself. Further progress was impossible without the boat, as a large and deep pool, an expansion of the underground stream, barred our way. The boat was brought into the cave, its constituent parts filling two large canvas bags, and was put together; by this means we were able to investigate this hitherto unexplored river. A detailed account of this "voyage" would occupy too much space, and no doubt it will in due time be fully described by Mr. Martel. The stream was "navigable" for about 300 yards.

We afterwards investigated some small swallow-holes which mark above ground the course of these streams. The chief stream, the *Monaster*, as it is called, enters upon its subterranean course at *Poolawaddy*.

Above this its course is through a deep narrow gorge, which ends in a cliff, into a cavern in which the stream falls. I was informed that in heavy floods the volume of water in this gorge is so much greater than the cave can quickly drain off that the valley becomes a deep lake.

This day's work completed our Enniskillen explorations.

From the 22nd to the 25th of July I was engaged exploring *Mitchelstown Cave*. I will not attempt any description of this underground labyrinth, as it has now been completely mapped by Mr. Martel, who is publishing in this number of the *Irish Naturalist* a description and plan of it. It was discovered some sixty years ago by the grandfather of the present tenant of the land on which is the entrance; he broke into one of the obstructed swallow-holes when quarrying. This is the only known opening. The so-called "river" is only a little pool of water in a basin of rock. I fully explored it, crossing over to the opposite side of it. I found that its high-water line is marked all round by a calcareous deposit, and, when it is flooded up to this, it empties itself by a small opening, about a foot in diameter, into some deeper and unexplored chamber.

Although no opening is known except the artificial one by which we entered, the presence of a number of specimens of an above-ground staphylinid beetle, *Ancyrophorus omalinus*, all dead, and floating on the surface of another small pool of water (about eight or ten feet in diameter and a foot deep) points to the fact that water has access from the outer world otherwise than by infiltration.

In the passage called the "Mud Cave," which is the deepest part, is a vertical shaft, the walls of which are thickly coated with fine red extremely sticky mud, so that descent without ropes would be impossible; I tried to get down, but the mud, sticking to my boots in large masses, threatened to pull me down more rapidly than would have been pleasant, so I had to leave it. This shaft has never been explored, but as it is in the deepest known part of the cave I feel pretty certain that if it could be followed it would be found to lead into some deeper passages, and perhaps to the bed of the river that must in former times have drained the cave. Mr. Martel, however, does not attach much importance to this pit, but he has very generously made me an offer that, if I wish to carry out further explorations, he will lend me some of his ladders. About four or five hundred yards west of the entrance is a swallow-hole, which opens on the side of a hill overlooking the valley north of the caves. This the guide informed me has once or twice been partly explored, but he could tell me nothing about it, except that he believed there was a river in some of the passages. It is not known to communicate with the other cave. The man who drove me from Mitchelstown to the caves informed me that there was a large spring a couple of miles south of the cave, but I could get no further information about it. The dip of the strata is towards the south.

The invertebrates I collected at Mitchelstown have all been identified by Mr. Carpenter; they are--

#### MITES.

*Gamasus attenuatus*; found in several parts of the cave, chiefly under paper and other refuse left by tourists.

#### SPIDERS.

*Porrhoma myops*; discovered by Mr. Carpenter in 1894 and recorded in his paper.

*Leptyphantes pallidus*; new to the Irish fauna; Mr. Carpenter tells me it is a rare species which has been found by Pickard-Cambridge in Dorsetshire, at roots of heather; also in caves in France and Bavaria; unlike the former species it has large eyes. Both these species occurred in the driest parts of the cave, under stones, and one or two specimens (? species) in webs among the boulders.

#### MYRIAPODA.

*Brachydesmus superus*; found also in some of the Enniskillen caves.

#### COLLEMBOLA.

*Tomocerus tridentiferus*; see remarks on this species under Coolarkin Cave.

*Sinella cavernicola*; occurred everywhere; on the whole I found this species frequenting drier spots than the *Lipura*. Mr. Carpenter tells me that my series of *Sinella* shows the species to be very variable in its antennal joints.

*Lipura Wrightii*; in almost every nook and corner of the cave, dry or damp, outnumbering all the other species.

#### BETLES.

*Ancyrophorus omalinus*; mentioned before, probably washed in.

*Trechus micros*; taken alive under stones.

Besides these "natives" of the cave, as with the exception of *Ancyrophorus* they may all more or less be called, I found a frog, a specimen of *Pterostichus vulgaris* (beetle), and a fungus midge belonging to the genus *Sciara*; these had evidently wandered in, and got lost in the darkness.

A small mollusc, taken in some numbers, has been identified by Dr. Scharff as *Hyalina contracta*, this is the second British record; first found at Killarney by Dr. Scharff; occurs in Sweden, Germany, France, and Switzerland; all the members of this genus live in concealed localities.

When an attempt is made to group together the various animals collected at Enniskillen and Mitchelstown, in relation to the physical conditions of the caves they were found in, it appears that they fall into several divisions.



(i.) Species inhabiting the entrances to caves, near light, using the cave as a convenient hiding-place; such as the two species of *Meta*, perhaps *Leptyphantes pallidus*, and bats.

(ii.) Species which have wandered into the caves, accidentally, perhaps, or have been washed in by floods, and to speak "fish out of water;" examples of such are the bugs and crane-flies from Bohoe; *Iulus*, *Velia*, *Sciara* beetles from Coolarkin; *Clivina fossor* from the Marble Arch and the frog, *Pterostichus*, *Sciara*, and *Ancyrophora* from Mitchelstown.

(iii.) The *Troglodytes*; only found in Mitchelstown: *Lipura*, *Sinella* and *Porrhoma myops*.

(iv.) Those species which do not fall under any of the above groups seem to me to form a division intermediate in position between the last two, and in most cases inhabiting conditions which present conditions intermediate between Bohoe and Mitchelstown caves, which I may safely take as the extreme ends of my series. Such are *Tomocerus tridentiferus*, *Brachydesmus superus*, and *Porrhoma microphthalmia*, which seem equally at home above ground and underground. These creatures seemed quite at home in Coolarkin, and in the part of the Marble Arch cave, and I see no reason to suppose that *Brachydesmus* and his companions in darkness may not have lived and multiplied there for many generations, undisturbed by any such catastrophes as the floods that characterize the Bohoe cave.

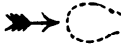
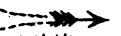


While fully aware of the great gap that exists between the cave-fauna of this type and that of Mitchelstown, I have no reason to doubt that at one time the Mitchelstown fauna was one somewhat of this type, consisting of a few animals which got into the cave and had to make the most of it; the isolation and probably much greater age of the Mitchelstown fauna may account for their specialization, if so, provided that among the many unexplored caves of Ireland we can find some presenting conditions intermediate between those we find in Coolarkin and in Mitchelstown. We may almost hope to fill up some of the gaps in the history of the evolution of cave-faunas.

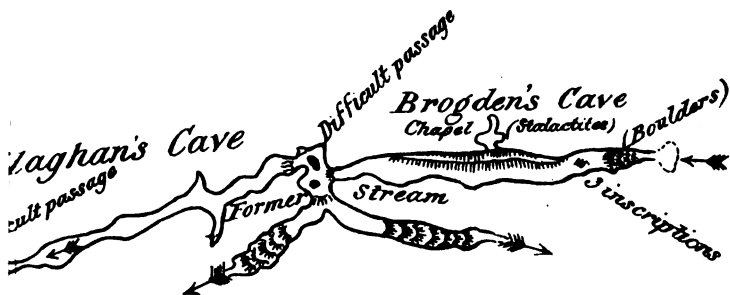
# MITCHELSTOWN CAVE

Surveyed by E. A. MARTEL,

24th JULY, 1895,

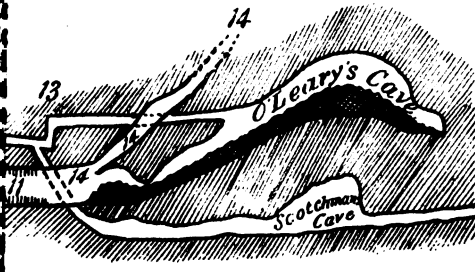
Total length over 1½ mile.

Inlet of percolating waters	...	
Outlet do. do.	...	
Slopes	... ..	
Boulders or narrow clefts		



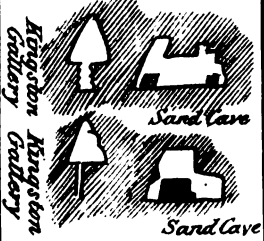
- 1 L4
- 2 B4
- 3 H4
- 4 H4
- 5 D4
- 6 C4
- 7 F4
- 8 F4
- 9 G4
- 10 B4
- 11 F4
- 12 H4
- 13 C4
- 14 B4

## Vertical Section of O'Leary's Cave, &c



Double Scale

## Two transverse Sections of Sand Cave & Kingston Gallery



Double Scale



## MITCHELSTOWN CAVE.

BY E. A. MARTEL,

President of the Société Spéleologique, Paris.

### PLATE 2.

THE most celebrated and the largest cave in Ireland is in the county of Tipperary, in the south of the island; it is that of Mitchelstown, and is situated twelve miles east of this town.

It was discovered on the 2nd of May, 1833, by a stone-breaker, named Cowden: it is referred to in various descriptive works, and frequently visited by tourists; but it has never been completely described, and the plan of it remained unfinished.<sup>1</sup> It was supposed to contain a subterranean river, and many unexplored passages.

On the 24th of July, 1895, I spent six hours visiting all the accessible corners, and drawing out the short topographical survey here given, which will prevent the necessity of a long analysis. My survey does not offer any new peculiarity, and I will confine myself to a brief indication of the principal features. Hollowed out under a hill which overlooks the surrounding plains, this cave does not seem to be in connection with any actual river.

The cave of Mitchelstown has been formed, like others, by the drainage of superficial waters, at an epoch when they were much more abundant than they are in our days. In the interior the galleries offer two different aspects; some of them, the largest, have served and serve still as swallow-holes for the waters from without; they are—1st, the Entrance Gallery, which is the highest, being 13 yards in altitude at the mouth; the orifice of this gallery was discovered, by chance, in the working of a quarry; 2nd, the double avenue, with parallel branches, of the Kingston Gallery and Sand Cave,<sup>2</sup> where the effects of the erosion and corrosion have produced the most curious sections (see the two transverse cuts of Sand Cave);

<sup>1</sup> Apjohn: *Journal Geological Soc. of Dublin*, vol. i., 1833, pages 103-111.

Rev. Canon Courtenay Moore: *Journal of the Cork Historical and Archaeol. Soc.*, January, 1894.

*Dublin Penny Journal*, 27 Dec., 1834.

<sup>2</sup> Eighty yards long, and not forty-one, as stated by Rev. Courtenay Moore.

3rd, the west side of the hall called the House of Lords ; 4th, the long eastern corridor which retains, clearly marked, the traces of the passage of a subterranean stream (O'Callaghan's Cave and Brogden's Cave); 5th, and lastly, several fissures situated at the south-west angle, and near O'Leary's Cave. Each of these parts is terminated by an ascending slope, ruins of vaults, or rubbish washed in from the exterior, which obstruct them completely, as I have already seen in the ancient draining passages, now stopped up, of Bramabiau, France, of Adelsberg, Austria, etc. They are filled-up swallow-holes. The other fissures, generally narrower, and situated in the lower parts of the cave, have conducted these waters no one knows where, either to some undetermined and distant outlet, or even into the depths of the terrestrial shell ; they are rendered impenetrable sometimes by broken pieces of stone, as at the extremity of Garret Cave, sometimes by the narrowness of the clefts, which become more and more contracted in the southern part of the cave ; this last disposition is exactly like that of the large grotto of Cro de Grandville, or of Miremont, in the Dordogne (see "*Les Abîmes*,"<sup>1</sup> chap. xx.), and we ask ourselves if, like the latter, the cave of Mitchelstown has not served as a receptacle for some great lake of ancient times, which has emptied itself into it. The lowest part of the cave is, at most, thirty-three yards below the level of the entrance, and not one hundred yards as is stated in the guide book.

The checkered disposition of the *diaclasses* (upright joints, generally perpendicular to the joints of stratification) is remarkable in the southern portion (see plan); three sets of fissures perpendicular to each other have there cut out large polyhedrons of rock, often quite cubic, the right-angled interstices of which have let out the waters that have gradually widened them out ; in depth they get more contracted the more they branch out ; besides they have been in a great measure coagulated by the clay, which comes either from the outside or from the chemical decomposition of the interior rock which has become corroded.

The Well (No. 8) marked in the Gallery of Distaffs is impracticable on account of the glutinous mud with which it is covered.

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<sup>1</sup> E. A. Martel: *Les Abîmes*, Paris: Delagrave, 1894, in 4to, 570 pp., 100 engravings, 200 plans, and 20 plates.

The rock, according to Mr. Kinahan, is the same (Carboniferous) as at Cong, where the actual waters probably circulate in a network of crevices of this kind. We comprehend why the galleries of absorption are nearly all in the southern part of the grotto (except Garret Cave) when we remark that such is the general direction of the dip (at  $40^{\circ}$ ) of the calcareous strata.

Certain diaclasses have been widened out into distaff shape and communicate with each other under the low strata which have not been carried away, as at the source of Marble Arch cave near Enniskillen, County Fermanagh.

There are no longer any traces of running water in Mitchelstown Cave, at least in summer; the so-called "river" is a pool of stagnant water ten yards long by half a yard or one yard in depth and width, which has taken refuge in an impervious hollow; there is another basin near the hall of the Four Courts; both are produced by infiltration; their temperature is  $10^{\circ}$  Cent., the air of the grotto being (in two different points)  $10.5^{\circ}$  Cent.

One will remark on the plan, and on the vertical section of O'Leary's Cave, the indescribable entanglement of three stories of superposed galleries; they communicate by a very narrow "chimney." The subterranean waters have accomplished there a singularly complicated work of mining.

From a picturesque point of view the cave of Mitchelstown is much inferior to those of Adelsberg, Dargilon, Padirac, Han-sur-Lesse, etc. Its highest vault is only ten yards high; the galleries of Kingston, Sand Cave, and the Cathedral are nevertheless very remarkable in form. The most part of the calcareous concretions do not deserve the attention that the guide-book demands for them; and unfortunately, the prettiest stalactites, which would look well in any cavern, are situated in Brogden's Cave, the access to which being very difficult, is quite impracticable to tourists. At the cross-way marked on the plan "*difficult passage*," the local guide who alone accompanied me, and who had only been there once, when a child, twenty-five years before, completely lost his way; we were obliged to have recourse to the compass and to the plan I had drawn out, to find the passage again. It is a great pity, for the little lateral chamber in Brogden's Cave

which I name "the Chapel," is a real gem, provided with the thinnest of curtains, and the finest needles of brilliant white carbonate of lime. In spite of the restricted dimensions, there is a marvellous corner there, which has not its equal in all the rest of the cave, even in the hall called "Cust's Cave," which is also pretty well ornamented. It was supposed that this gallery of the ancient stream (O'Callaghan's and Brogden's Caves) had never been explored to the end: this is not correct. I found, at a few steps from the extremity, on a ledge of the vault, three inscriptions: "Raymond, May, 1840"; "Brogden (whose name has been given to the last corridor), 5th October, 1868"; the third was illegible. So that all the grotto was known (except some little clefts in the south-west, into which I crawled with great trouble and without any result). But it is very possible that the talus of broken stones which blocks up the end of Brogden's Cave, is not a real end, but that a partial falling in of the vault has only obstructed the gallery; it would be very interesting to make a clearing there to seek if there does not exist a prolongation of the beautiful gallery of the dried-up stream.

To sum up, three things are remarkable in Mitchelstown Cave:—

1st. Its ramification in every direction, and the infinite subdivisions of its central part.

2nd. Its extent, which attains and even exceeds, including all the passages, one mile and a quarter; this must be the longest cave, yet known, in the British Isles.

3rd. Its blind fauna. It is the only grotto in England, Scotland, or Ireland, where, up to the present time, there have been found animals peculiar only to caverns.<sup>1</sup> Mr. H. Lyster Jameson occupied himself during several days in the month of July, 1895, in collecting specimens, and he has the intention of making a further study of them.

The cave of Mitchelstown, even in the parts that are shown to the public, is not at all easy to go through; the Chimney and all the parts round about it (O'Leary's Cave) are nearly impracticable to ladies.

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<sup>1</sup> See G. H. Carpenter: Animals found in Mitchelstown Cave, *Irish Naturalist*, February, 1895, Dublin; and *Bulletin de la Société de Spéologie*, No. 1, 1895, p. 44.

It appears that there have never been found in it any bones of animals no longer existing, and this fact is explained by remarking the absence of any known large natural opening. This is plausible; nevertheless, for want of serious excavations the question cannot be considered as decided.

Peasants told Mr. Jameson, that on a hill, situated at about 400 yards from the entrance of the cave, there exists a natural well (abyss), which had only been insufficiently explored, but where, nevertheless, a current of water had been met with. It would be a good thing to verify and complete this indication.

Finally, the cave of Mitchelstown may still be considered as a worthy object for interesting future work and research.

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## BOTANY AT DUBLIN UNIVERSITY.

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**Notes from the Botanical School of Trinity College, Dublin:**  
No. 1, February, 1896. Printed at the University Press.

In this brochure of thirty-four pages we have cheering evidence of the vitality of botanical studies in Trinity College. Two of the three items of which these *Notes* are made up are contributed by Mr. H. H. Dixon, B.A., Assistant to the Professor of Botany, and deal with some points of vegetable physiology which the author has made the subject of observation in the botanical laboratory of the College. The value of these contributions, entitled: "On the Chromosomes of *Lilium longiflorum*," and "On the Nuclei of the Endosperm of *Fritillaria imperialis*," can only be appreciated by the advanced student who is skilled in tracing those mysterious stirrings of life which go on within the narrow confines of the vegetable cell. The third item in the *Notes*, entitled: "The Herbarium of Trinity College: a Retrospect" is from the pen of Dr. E. P. Wright, University Professor of Botany. In this we find a strong human element; for the retrospect deals with the lives and labours of some three generations of Irish botanists, in so far, at least, as these lives and labours were effective in bringing together the important collection of dried plants now preserved in the Trinity College Herbarium. After all, the lives of men, as Mr. Dixon himself will cheerfully admit, stir us more deeply than the lives of vegetable cells; so that even a biologist may be excused for taking a warmer interest in the *Retrospect* than in the laboratory observations.



In the compass of a few pages Dr. Wright traces the history of the Herbarium and the Botanical School for upwards of a century, from the institution of the botanical professorship in 1785, to the foundation of the laboratory in 1893. The most prominent figures brought before us in this rapid survey are Dr. Edward Hill, first professor of the Botanical School; Dr. William Allman, one of the earliest teachers of the Natural System in the Three Kingdoms; James T. Mackay, the well-known author of *Flora Hibernica*; Dr. Thomas Coulter, who made botanical explorations in California and Central Mexico; and, last and most illustrious of all, Dr. William H. Harvey, *facile princeps* amongst British botanists of the century in knowledge of the sea-weeds of the globe. Harvey's indefatigable zeal in building up the Trinity College Herbarium is well shown by some extracts given by Dr. Wright from the memoir published in 1869. No one can read this admirable memoir, almost entirely made up of selections from his wide correspondence, without conceiving a strong esteem, not to say affection, for the gifted Quaker botanist who has done so much to illustrate by his pencil no less than his pen, the flowering plants of the Cape and the marine algæ of Australia and the South Seas.

It would appear from an extract given us by Dr. Wright from Harvey's evidence before the Dublin University Commission of 1853, that the College herbarium then contained upwards of 45,000 species. Since that date the collection has grown considerably and still continues to grow; but as lack of funds and consequent lack of skilled assistance has prevented the thorough arrangement of the herbarium, its actual extent can only be surmised. It is satisfactory to learn, however, that the department of algæ contains all, or almost all the species described by Harvey in his classical works, *Phycologia Britannica*, *Nereis Americana*, *Nereis Australis* and *Phycologia Australis*, and that the large collection of specimens brought together for the preparation of his *Flora Capensis* is in fairly good order. It is now thirty years since Harvey's death brought the *Cape Flora* to an abrupt close, at the end of the *Compositæ*. Is there no rich and patriotic South African to provide the funds for the completion of this work, which it seems hopeless to expect either the imperial or the colonial government to take in hand? The extent of the General Herbarium of Phanerogams in Trinity College is well shown in the rough geographical index given by Dr. Wright. Almost all quarters of the globe appear to be represented in the collection, the only striking blank being Siberia.

In a future number of these Notes we trust that we may find a brief history of the College Botanic Garden at Ball's Bridge.

## OBITUARY.

HARRY CORBYN LEVINGE.

The late Mr. H. C. Levinge, D.L., J.P., who died at his residence, Knockdrin Castle, Mullingar, on March 11th, in his 68th year, was the ninth and youngest son of Sir Richard Levinge, 6th Baronet, and a member of an old Westmeath family, who have been identified with that county for over two hundred years. Though but a comparatively recent recruit to the ranks of Irish botanists, Mr. Levinge did much to further our knowledge of the distribution of the flowering plants of this country. His three papers on the plants of Westmeath in this Journal, the last of which appeared so lately as last February, form highly important contributions to the flora of that beautiful and interesting county, previously almost unexplored; and his wise encouragement of that remarkable self-taught botanist, Mr. P. B. O'Kelly, of Ballyvaughan, resulted in the publication of two plants new to Ireland—*Potamogeton lanceolatus* and *Limosella aquatica*—the discovery of both of which was due to Mr. O'Kelly's keen eye. To the *Journal of Botany* he also contributed occasional notes of Irish plants, his most important paper being that on "*Neotinea intacta* in County Clare," published in 1892. Among those who had the privilege of exchanging botanical specimens with him, Mr. Levinge's plants were famous for the beauty and perfection of the drying, and his herbarium of British plants, to which he devoted much time, was a model of what such a collection should be. Mr. Levinge's devotion to Irish botany, which commenced but a comparatively few years ago, on his return to Ireland after a long period of labour in the Indian Civil Service, was, we believe largely due to the unobtrusive influence and enthusiasm of his friend, A. G. More, who did so much to quicken the activities of a whole generation of Irish botanists.

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**Directory of Irish Naturalists.**—A number of members of Irish Field Clubs well qualified for insertion in the new *Directory* have not yet returned the forms issued with the February number of the *J.N.* They are requested to fill them in and return them without delay, as the list will shortly close. Extra forms may be obtained from the undersigned.

R. LLOYD PRAEGER,  
Sec. Irish Field Club Union

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## PROCEEDINGS OF IRISH SOCIETIES.

## ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Peregrine Falcon from J. C. Carter, Esq. Two Black-backed Jackal cubs have been born in the Gardens. Seven Monkeys, two Turkey Vultures, twelve Pekin Nightingales, a pair of Penguins, a pair of Rose Cockatoos, a pair of Brazilian Caracars, a pair of Visachas, and a Coypu have been purchased.

6,335 persons visited the Gardens in February.

## DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 20th.—The Club met at Mr. ARTHUR ANDREWS'.

Mr. GREENWOOD PIM showed a leaf of *Gladiolus tristis*. The transverse section is, in form, an almost perfectly symmetrical Maltese cross. The tips of the cross, which are somewhat convex, are covered with a thick layer of sclerenchyma, beneath which are one large and two much smaller vascular bundles; other small bundles are found in the parenchymatous tissue of the leaf. The cuticle of the arms is covered with numerous wartlike processes. Towards the base, the leaf gradually expands, and becomes more flattened. This form of leaf is not unique is at any rate extremely rare, although some of the Irises exhibit a distant resemblance, being quadrangular with angles more or less marked. The plant is figured in *Bot. Mag.* I., 578, under name of *G. recurvus*, syn. *G. tristis*.

Prof. T. JOHNSON showed a section of the stem of *Selaginella oregana*, cut lengthwise. Vessels were pointed out, present in the xylem (wood) of the vascular tissue, in addition to the tracheides. *S. oregana* and *S. rupestris* are two species in which Harvey Gibson has recently, in the course of an anatomical revision of the genus *Selaginella*, discovered vessels (cell-fusions), the characteristic elements in the wood of Dicotyledons, and until his discovery not known to be represented in the wood of Ferns and their allies (except in a few cases), where tracheides are the normal elements. The section was made by Miss Sollas from material of a specimen grown in the Royal Botanic Gardens, Glasnevin.

Mr. MCARDLE exhibited the leaf cells of *Sphagnum papillosum*, Lindb., var. *confertum*, from plants which he gathered on Connor-hill, near Dingle, Co. Kerry, in July, 1894. It was very scarce, and grew on damp peat amongst rocks in short, dense tufts. Specimens were identified by Dr. Braithwaite. The inner cell-walls are furnished in a remarkable manner with rows of conical papillæ; in this way and by its large size it approaches closely the rare *S. Austini*, Sullivant, leaf-cells of which were also exhibited from specimens collected by Mr. McArdle on Ard bog, King's County, in September, 1890, and kindly verified by Dr. Braithwaite. The papillæ in *Austini* are larger, extending for some distance into the cells, forming pectinate rows. A drawing of the cells showing the papillæ of both plants highly magnified and specimens of the plants with their peculiar branching were also shown.

Dr. C. HERBERT HURST exhibited a pocket microscope made by Swift, with an addition by Aylward. The instrument is contained in a case measuring  $6\frac{1}{2}$  inches by  $2\frac{1}{2}$  inches by  $2\frac{1}{2}$  inches outside, and weighs, with the case, 1 lb. 9 oz. When set up inclined for use with a zoophyte-trough its area of support is a triangle, the sides of which measure 5 inches, 5 inches, and 6 inches respectively, and the height being only  $7\frac{1}{2}$  inches, it possesses extraordinary stability and is particularly well adapted for use at sea. Aylward's addition is a folding foot with an equilateral triangular area of support, each side of which measures  $4\frac{1}{2}$  inches, fitting the instrument for use in a vertical position for examining objects in a watch-glass or on a slide. The fine adjustment screw is good, and the instrument works well with powers from 4-inch to  $\frac{1}{8}$ -inch.

Dr. HURST also showed *Ascella primordialis*, Hæckel, a specimen taken with the dredge in Rhoscolyn Bay, Holy Island, Anglesey, May 25, 1890. This exceedingly simple calcareous sponge, like another specimen taken the same day, was found attached to the base of a tuft of *Antennularia antennina*.

Mr. MOORE exhibited a pseudo-bulb of a species of *Anguloa* which had been attacked by a Fungus. The Fungus had not yet been identified, and the exhibit was to show the manner in which the pseudo-bulb was attacked and destroyed. The inner tissues were gradually disrupted, and at certain spots the hard epidermal tissues were burst outwards, small irregular yellow masses of fungoid growth coming through the openings.

*Corrigendum.*—In report of December meeting, p. 51, lines 11 and 13, for "leaves" read "hairs."

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#### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

March 3.—The President in the Chair. Mr. CONWAY SCOTT, C.E., lectured on "The Production of Ability."

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#### BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 26.—GEOLOGICAL SECTION.—Mr. F. W. LOCKWOOD (*President*) in the Chair. Mr. J. O. CAMPBELL, B.E., gave an address on the polarisation of light, and its application to micro-petrography. After a short preliminary explanation of the undulating theory of light, the lecturer described the construction of the polariscope and the manner in which the phenomena of polarisation arise. The methods employed by petrologists to utilise polarised light in examining and determining minerals was illustrated by blackboard diagrams, and the practical application of the method to the study of crystals in rock sections was explained. The paper was especially useful in anticipation of Professor Cole's approaching course on field geology, when the evenings will be devoted to a course on the study of rock-sections. Rock-specimens were presented by Messrs. L. M. Bell, R. Bell, J. O. Campbell, and the Honorary Secretary.

**FEBRUARY 29.—BOTANICAL SECTION.**—Rev. C. H. WADDELL described the dermal tissues of plants and the various kinds of hairs and glands. A number of spring flowers illustrating various genera which the members had brought in were then examined.

**MARCH 5.—MICROSCOPICAL SECTION.**—The President of the section, Rev. JOHN ANDREW, opened the meeting by a few remarks dealing with the practical work connected with microscopy. Mr. Andrew introduced a practical lesson on the making of rock-sections for the microscope by a short paper, the points of which were illustrated by specimens of chips in the various stages of preparation. The paper and the practical illustrations of how to proceed were instructive, and may encourage some of our microscopists among the geologists to try their hand. After some conversational remarks, the President called upon Mr. W. B. DRUMMOND, M. B., C. M., to read a short paper, entitled "Hints on collecting marine zoological specimens." Marine field work naturally divides itself into three sections, viz.—The study of the littoral fauna, by shore-hunting; of the surface fauna, by tow-netting; of the fauna of the sea-bottom, by dredging or trawling. The tow-net, dredge, and trawl, and their uses, were described. Also the processes of killing, fixing, hardening, staining, and mounting. In preparing delicate specimens the process of fixing is particularly important, as, if not resorted to, changes in the microscopic appearances occur very rapidly. Less delicate specimens, such as the copepods, may be simply hardened in dilute spirit and mounted in glycerine jelly. The technique of mounting and staining will be found very fully described in Bolles Lee's "Microtomist's Vade Mecum." After the reading of the papers, the members present examined some fine rock-sections of Mr. Charles Elcock, shown by different instruments, but the centre of attraction was around the microscopes of Messrs. James Stelfox and W. S. M'Kee, who were showing working specimens of that very beautiful and interesting little artisan, the *Melicerta*, and other living organisms.

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#### DUBLIN NATURALISTS' FIELD CLUB.

**MARCH 9.**—The PRESIDENT (Prof. GRENVILLE COLE) in the chair.

Mr. R. L. PRAEGER described a pine forest buried below marine clay on the foreshore near Bray.

On the top of the Boulder-clay and glacial gravels is a bed of coarse grey sand, without marine organisms. Overlying this is the old forest bed, a peaty deposit about a foot thick, full of trunks, branches, and roots of the Scotch Fir, and yielding its cones in hundreds. Overlying this is fine blue clay full of marine shells such as are found on muddy shores between tide-marks. This clay is in one place over six feet deep. Above all is the coarse shingle of the existing beach. The various changes of level and conditions, which this series proves, were pointed out, and specimens of the different beds exhibited. The paper will shortly appear in our pages.

A discussion ensued in which Mr. H. L. Jameson, Prof. Johnson, Mr. N. Colgan, and Prof. Cole took part.

Mr. GREENWOOD PIM, M.A., then exhibited an attachment for taking photographs of objects vertically under or over the camera. Prof. T. JOHNSON showed slides illustrating Parasitic Flowering Plants. Mr. R. LLOYD PRAEGER exhibited a calcareous deposit from Brackenstown River. Mr. H. J. SKYMOUR showed a micro-section of nepheline phonolite from Blackball Head, Bantry Bay; and Mr. GREENWOOD PIM exhibited a remarkably fine specimen of *Pinguicula caudata*, a Mexican Butterwort; Mrs. ROSS exhibited named varieties of Daffodils, grown by Miss Curry, Lismore.

CORK NATURALISTS' FIELD CLUB.  
CONVERSAZIONE.

IN the Ball Room of the Imperial Hotel an agreeable re-union, jointly promoted by the Cork Historical and Archæological Society and the Cork Naturalists' Field Club, took place on the evening of March 10th. The attendance was large, both bodies being influentially represented, while there were several visitors, including some from the Dublin Naturalists' Field Club. A musical programme was a feature of the *Conversazione*. Tea was served between 7 and 8.

An excellent and varied series of exhibits occupied the walls and table of the hall. They included the following items:—

Professor G. A. J. Cole, F.G.S.—1. Rhyolitic Lavas, including Natural Glass from the Volcano of Tardree, Co. Antrim; 2. Enlarged photographs of the higher Alps, by the late W. F. Donkin. Professor T. Johnston, D. Sc., Dublin N.F.C.—1. Alpine flowers, prepared by Lady Rachel Saunders; 2. Coloured drawings of Freshwater Algæ, by M. C. Cooke; 3. Rare Irish seaweeds. G. H. Carpenter, B. Sc., Dublin N.F.C.—1. Set of Irish moths, illustrating variation; 2. Insects, illustrating protective coloration and mimicry. R. Lloyd Praeger—1. Flowering plants, Galway excursion, 1895; 2. Rare Irish flowering plants. W. H. Phillips, Belfast N.F.C.—Nature prints of rare varieties of British ferns. Robert Welch, Belfast N.F.C.—Photographs of Galway Field Club Conference and Excursion, 1895. Professor M. Hartog, M.A., D. Sc. Queen's College—Type specimens of Rotifers, prepared by C. Rousselet, F.R.M.S.; 2. Live objects illustrating pond life. Miss H. A. Martin—Siamese flowers, pressed, mounted and named by Mrs. G. H. Grindrod, Bangkok. R. A. Phillips—1. Rare and characteristic plants of Co. Cork; 2. Land and fresh-water shells. J. J. Wolfe, Skibbereen—Some British moths and butterflies. The Misses Chillingworth and Lester—Fifty botanical specimens from Crosshaven, pressed and mounted. W. B. Barrington—Some sea-birds' and waders' eggs. Mrs. J. H. Thompson—Microscopes—live objects. H. Lund—Photographic transparencies—Snapshots on the Field Club. F. R. Rohu—Rare specimens—Black rat, Squacco Heron, white Shrew, &c. T. Farrington, M.A.—Some geological specimens. Telescopical speculums made in Cork in the last century. F. Neale, hon. sec. Limerick N.F.C.—Specimens of *Gnophria quadra*, *Gonopteryx rhamnii*, *Dolomedes fimbriata*, &c. Robert Day, F.S.A.—The flags of the Cork Volunteers, with the medals and regimental decorations of the Irish Volunteers of 1782 and 1796, and other exhibits. Herbert Webb Gillman, V.P., C.H. & A. Society—Colours of the Muskerry cavalry (lent by the owner, Captain

R. Tonson Rye, of Rye Court)—Orderly book of the same corps, 1822-44 (lent by Sir Augustus Warren, Bart., of Warren's Court), and other exhibits. J. P. Dalton—Statue of William III (formerly in the Mansion House, Cork). Allan P. Swan, F.L.S.—Photographs of Micro-fungi, including salmon disease. The Franciscan Fathers—The chalices of the Franciscan Abbeys of Shandon, Timoleague, Buttevant, and Ardfer. A ciborium of Shandon Abbey. The Dominican Fathers—The chalice of the Dominican Abbey of Youghal. W. B. Haynes—Coat of an Irish Volunteer. J. H. Bennett—Galway rent-roll *temp.* Elizabeth; petition of Kinsale fishermen *temp.* Charles I. Miss Hutchens, Bantry—Local Shells, &c. Cecil Words—Rare Books. Greenwood Pim, M.A., Dublin N.F.C.—1. Facsimile of the Book of Kells; 2. Illustrations of British Fungi by General Bland. The Munster Camera Club—Frames of photographic transparencies exhibited by Messrs. W. R. Atkins, J. Bennett, E. Scott, H. Schroter, and C. H. Pearne.

At eight o'clock,

Mr. ROBERT DAY ascended the platform, and formally opened the *conversazione* amidst applause. He said by the very merest accident of birth his name had been placed first upon the programme, and that because the society over which he had the honour to preside was a little older than its twin sister, the Field Club (laughter). He took no credit whatever to himself for the happy union of that evening, as he was away from Cork when all the arrangements were made, and when the idea was conceived by Mr. Copeman. On his having informed him of what had been done, his only regret was that the *conversazione* could not have been continued upon the second day, so that a larger number of the country members of both societies would have been afforded an opportunity of seeing the various collections which have been so generously lent to us for the occasion. In Belfast a Field Club had flourished for a quarter of a century. He was a member of it for quite that period, and he alluded to it because it embraced from its inception archæology and the study of Irish antiquities. What that club had done for the North their dual clubs should do for the South. He feared that the name and claims of the Archæological Society were not so attractive to the general public as were those of the Naturalists' Field Club. He knew a little of the enjoyment of the naturalist, the pleasure of the botanist, the patient study of the student of geology, and the fascination and delight that centred in the revelations of the microscope. But he could claim for the so-called dry subject of antiquities that the objects embraced by it were quite as varied and equally enjoyable. He trusted that the *conversazione* would be the forerunner of similar yearly gatherings, and that the Cork Historical and Archæological Society and the Cork Naturalists' Field Club might travel hand-in-hand together for many years to come. He would now make way for one who was a master in the domain of science and natural history, Mr. William H. Shaw, President of the Cork Field Club.

Mr. W. H. SHAW, B.E., President of the Cork Naturalists' Field Club, followed in an interesting speech, during the course of which he pointed out that owing to its peculiar position this district possessed a flora and

fauna of unique interest, and presented opportunities of research which should be more thoroughly availed of. He mentioned that the flora had been thoroughly gone into by Mr. Phillips, who was second to none in local botanical knowledge and the fauna had also interested him greatly, but the speaker was sorry to say with reference to the physical geography of the district that very little was being done. In conclusion he hoped that further interest would be manifested in the operations of the Cork Naturalists' Field Club, and with reference to the union of the various Field Clubs—Cork, Limerick, Galway, Dublin, and Belfast—mentioned that there were present that evening three visitors from Dublin—Professor Cole, President, Dublin N.F.C., and Messrs. Pim and Praeger.

Professor COLE also spoke, pointing out that large membership of Field Clubs was not so desirable as activity, and directing attention to the splendid field possessed by the Cork Club. Indeed, they in Ireland had several advantages over their brethren in England, where, owing to the large population, everything was practically worked out. In Ireland the Field Clubs had a future, and with added active members their work would become more valuable. With Messrs. Pim and Praeger he was proud to be there that night to represent the Dublin Club, and in the name of that club he greeted the members of the Cork club, and in the name of that club also he should sincerely thank them.

Mr. SHAW then declared the *Conversazione* open.

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## FIELD CLUB NEWS.

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The *Conversazione* organized by the Cork Field Club, of which a report appears on another page, was a pleasant and highly successful function, and one well tended to increase the popularity of the Club. No trouble was spared to ensure success, and the spirit of enterprise which caused the electric light to be specially laid on for the occasion, producing brilliant illumination not only by means of large arc lights in the ceiling, but by numerous portable incandescent lamps among the exhibits on the tables, is deserving of the highest commendation.

It is with feelings of much pleasure that we publish an account of the proceedings which took place at the recent Annual Meeting of the Geological Society of London, when Mr. Joseph Wright, of Belfast, was awarded a moiety of the proceeds of the Barlow-Jameson fund "in recognition of the valuable services he has rendered to palæontology." This honourable recognition of his industry and scientific attainments will cause gratification to Mr. Wright's large circle of scientific friends, and to his fellow-members of the Belfast Field Club, in whose *Proceedings* many of his most important papers have appeared.

The practical course on Irish seaweeds recently undertaken by Prof. T. Johnson is well attended, the class of thirteen being mostly members of



the Dublin Field Club. The first excursion took place on March 17th when, in a steady downpour, a party of nine did "shore-hunting" between Skerries and Balbriggan. The most interesting find was *Prasidula stipitata* in quantity and in full reproduction.

The Committee of the Dublin Field Club have arranged their summer excursion programme as follows:—April 25, Bray and Killiney (geological half-day); May 30, Lambay Island; June 20, Bective and the Boyne; July 10, 11, and 13, Cavan; August 12, Kelly's Glen (half-day); September 5, Brittas Bay, Co. Wicklow; September 20, Woodlands (fungus foray, half-day). The excursion to Cavan, when three days will be spent exploring the many lakes, rivers, and woods of that beautiful county, should prove especially productive, as the district is one almost unworked by the naturalist. The Dublin Club have invited their brethren of Belfast to join forces with them on this occasion, thus providing an opportunity for the renewing of many acquaintances formed last year at Galway.

We extract the following from the official report of the Annual General Meeting of the Geological Society of London, held on February 21st:—

"In handing a moiety of the Barlow-Jameson fund to Dr. G. J. Hinde, F.G.S. (for transmission to Mr. Joseph Wright, F.G.S., of Belfast), the President (Dr. Henry Woodward, F.R.S.), addressed him as follows:—Dr. Hinde, the council have awarded the sum of twenty pounds from the Barlow-Jameson fund to Mr. Joseph Wright, in recognition of the valuable services he has rendered to the palæontology, not only of the Carboniferous rocks in the South, but of the Cretaceous and Post-Tertiary deposits in the North of Ireland, and the glacial deposits there and in Scotland. Mr. Wright is the author of numerous papers in the transactions of the Belfast Naturalists' Field Club on the Irish Liassic and Cretaceous foraminifera and other microzoa; he has also prepared and published many lists of foraminifera from the Scottish and Irish boulder-clay and other post-tertiary deposits. He has done much good work, extending over many years, when resident in the South of Ireland, in connection with the fossils of the Carboniferous limestone, and, both as regards these and the newer deposits of the North, his specimens have been always available to anyone engaged in writing on the fossils. To Davidson, Rupert Jones, Holl, Brady, myself, and others Joseph Wright's cabinet was ever accessible, and his specimens freely lent for study. I trust that this award will serve to express to Mr. Wright our appreciation of his services, and will act as an incentive to him to continue his useful geological work.

Mr. Hinde replied as follows:—Mr. President, it gives me great satisfaction to receive this award on behalf of my friend Mr. Joseph Wright. He is unfortunately unable to be present, and has sent the following letter for communication to you:—I desire to express my sincere thanks for the honour conferred upon me by the council of our society in recognition of my past work, and for their assistance in the further prosecution

of my researches. Working so remote from the head-quarters of the society causes this award to be the more appreciated. I regret I am prevented from being present to receive it in person, but I hope the council will accept this expression of my feelings regarding their approval of my work in a somewhat neglected field. For some time past nearly all my spare time has been spent in microscopically examining the glacial clays for foraminifera. My anticipation as to the occurrence of these organisms in clays laid down under glacial conditions has been fully confirmed, both as regards our local deposits and other British clays, and I cannot avoid thinking that this fact must more or less influence our views on the origin of these drifts."

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## N O T E S .

### BOTANY.

#### FUNGI.

**Cyathus vernicosus—a correction.**—The note in the February number of the *Irish Naturalist* on this subject is scarcely accurate, inasmuch as the plant will be found in the list of Fungi in the Handbook prepared for the meeting of the British Association in 1878. It occurred in a greenhouse in Dublin, and it is interesting to note that Mr. Praeger's specimens were found in a similar situation. This curious little plant may be an addition to the Mycologic Flora of the North of Ireland, as it is not mentioned in Mr. Lett's list published by the Belfast N. F. Club some years ago.

GREENWOOD PIM, Dublin.

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#### PHANEROGAMS.

**Early flowering of *Lathraea squamaria*.**—On the 12th of last month (March) I received from Miss M. Chearnley, of Cappoquin, Co. Waterford, some flowering plants of the Toothwort, which she had discovered the day before growing under a yew tree in the grounds of Tourin, near Cappoquin. Even allowing for the southern position of the station, this appears to be an exceptionally early record for the species, which in Ireland rarely flowers before mid-April. Miss Chearnley's specimens were quite mature, showing well formed capsules on some of the spikes.

N. COLGAN, Dublin.

**Early Flowering of *Hottonia palustris*.**—In a pond in a garden at Dundrum, Co. Dublin, *Hottonia palustris* is already in flower (March 22nd). This is a remarkable case of early blooming. The plants are self-sown, from stock introduced two years ago from the North of Ireland.

R. LLOYD PRAEGER.

## ZOOLOGY.

**“Minglin of North and South.”**—On reading the extremely interesting address of the ex-President of the Dublin Naturalists' Field Club published last month, I feel constrained to question the strict appropriateness of one of the animals selected for special dedication to “typical” members of the Galway Conference as reminders of their respective types of origin. I will not quarrel with the allocation of the Common Frog to the “settler of some generations standing,” inasmuch as the historical introduction of the Frog by Dr. Guithers was perpetrated as far back as 1696. But is it not inconsistent in the next sentence to compare “the English immigrant who has *recently* come to stay” to the Magpie, a bird which, “if tradition is to be trusted,” came to our coast to stay in the year 1670, and which was certainly a spreading though still scarce member of our avifauna in 1700, while in 1743 it had grown so common that war was waged upon it by Irish Statute Law? I would suggest that a fitter ornithological partner for the recently arrived Britisher might be found in the Missel-thrush—“believed to have settled in Ireland (says Mr. More's invaluable List) since 1800,” first authenticated as an Irish bird by Templeton in 1808, and unknown (as such) by sight to Thompson till a specimen was sent him from Fermanagh in 1832. While on this subject I would add that in the Isle of Man, the fauna of which much resembles that of Ireland, both the Frog and the Missel-thrush are, as in Ireland, held to be introduced or recently settled, species; but I have never heard that the Magpie is so regarded there.

C. B. MOFFAT, Dublin.

## INSECTS.

**Irish Hymenoptera Aculeata.**—I was much pleased to see Mr. Freke's paper on our native Aculeate Hymenoptera in the February number of the *Irish Naturalist*. His list will form a most useful basis for future work, and it is to be hoped will induce collectors to attend to these interesting insects.

I am able to add two species to the Irish list, and a few additional localities.

The species new to Ireland are *Calioxys acuminata*, Nyl., and *Bombus soroensis*, Fabr. The former I took in my garden in Armagh on July 6th at blossoms of *Geranium pratense*, and the latter in Mullinure in May. The following are additional localities for the species named:—

*Myrmica laevinodis*.—Armagh, and Scotstown, Co. Monaghan.

*Melinus arvensis*, Linn.—Tynan, Co. Armagh, on the canal bank.

*Halictus albipes*, Kirby.—Armagh and Loughgall, Co. Armagh.

*Andrena clarkella*, Kirby.—Armagh, in Mullinure and at Lowry's Lough, fairly common at Sallows in April.

*A. fucata*, Smith.—Armagh.

*Nomada borealis*, Zett.—Armagh.

As regards *Formica rufa*, L., I do not think that it is indigenous at Churchill, for as far as I can find out it was imported there some fifty years ago, possibly more. It has however taken most kindly to the place and multiplied to an extraordinary extent. I was standing one day looking at them when I noticed a curious crackling sound. After several vain endeavours to discover the source of the noise I found it to be caused by the myriads of ants running over the dry pine needles. This will give some idea of their immense numbers. I should very much like to know if these ants are to be found elsewhere in Ireland and whether they are indigenous or imported.

W. F. JOHNSON, Poyntzpass.

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### BIRDS.

**Migration of Curlews.**—The wails of the host of curlews which passed over Dublin on the night of the 11th inst. (March) must have greeted the ears of a large number of the residents. The night was warm and wet, and the curlews cried in chorus with but little intermission from about 9 P.M. until midnight, and probably for some hours longer. For several years I have taken notice of these nocturnal outbursts of curlew music over our city, and I find that March is the month in which they most generally occur. For instance a very striking "rush" took place in March, 1892, on the nights of the 23rd, 24th, and 25th, as reported by me at the time in the natural history column of the *Irish Sportsman*. On that occasion the wild cries of the birds were not the only evidence given of their passage, for at least one curlew was picked up dead in Sackville-street, having flown with violence against the telegraph wires; and simultaneously with these occurrences notes showing a general migration-movement of curlews were forwarded from Limerick, Liverpool, and other places. Again, in March, 1893, the nights of the 18th and 19th were signalised by similar demonstrations, noticed in Dublin by my brother and myself and doubtless by many others. On all the nights referred to the sky was thickly overclouded,—indeed, I have several times remarked that the breaking up of the clouds has put an end to the clamour, probably because on bright nights the birds fly too high to be easily heard; for in the stillness of the country—and, for that matter, of the Phoenix Park—I have heard them in clear starlight, calling to one another from apparently a very great elevation.

C. B. MOFFAT Dublin.

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**Nesting of Black Guillemots.**—Mr Palmer in the current number of the *Irish Naturalist*, asks whether any one else can throw further light on Mr. Witherby's observation of Black Guillemots nesting "under large boulders scattered about."

When I was in the Lofoden Islands some summers ago, where the Black Guillemot goes by the name of *Testhe* and is particularly common,

breeding in large communities instead of in single pairs, as is so much the case on our western coasts, I invariably found their nests under boulders with which the low islets off the main islands were strewn. The high boulder-beaches were the favourite places, and in seeking the eggs, which we had to do from a commissariat point of view, we found it necessary to reach in arm's length between the boulders before reaching their nests.

W. S. GREEN, Dublin.

**Feathered Pensioners.**—Wintry weather with its accompaniments of frost and snow always brings the needs of our birds specially to our notice, and a few notes upon our feathered pensioners and their ways may perhaps prove worth recording. The winter of 1894-95 was more trying upon our birds than any year since the bitter frost of 1878-9, when Blackbirds, a Gold-crest, and many Titmice came into our bedrooms, in addition to the Robin who habitually frequented the room, eating groats from a dish on the chimney-piece, and drinking out of the water-jug. Those long snowy weeks were very fatal to the songsters, and the diminution in Blackbirds and Song-thrushes was noticeable for years afterwards; Rooks turned carnivorous, and were seen to attack and devour the smaller birds at Carnlough, and about Lisburn; an old nurse who had spent many years in America, saw what she believed to be a "Snowbird." Another day we saw a strange bird with a scarlet crest, which it could erect and depress at will, feeding on the balcony; it may have been an escaped Cardinal-bird. The general rejoicing when at last the thaw came, and green grass was revealed once more, was wonderful, Curlews coming and feeding on our lawn, which no doubt was more rapidly cleared owing to the close proximity of the sea. Opposite our diningroom stands a Laburnum-tree covered with pods, the favourite winter resort of the Finches and Titmice: that winter it was frequented by a handsome Mountain-finch, or Brambling (*Fringilla montifringilla*) who remained for a couple of days only, but last winter we again had one or two of these beautiful birds feeding there for several days. I remember that bitter winter counting seventy Starlings crowded on the tree, shelling the pods, with a watchful eye on our windows, and a firm determination not to lose a moment in attacking any contributions from our table—for Starlings are more than a little greedy! It is very interesting to split a cocoa-nut, and fastening it to the railing of a balcony watch the Coal Tits, Blue Tits, and Greater Tits hammering away at its contents. After some years the Robins ventured to try the unwonted food, and now Sparrows and Blackbirds dig away contentedly, also. We always provide plenty of groats and hemp, but the most interesting study is to put out some new kind of food, and see in what order the birds attack it. Some years ago a whole loaf was tossed upon the snow, and it was ludicrous to watch the famishing Sparrows hopping anxiously round it, with outstretched necks and eager glances, doubtful whether some trap were not intended, whilst the Rooks cawed

questioningly and sidled cautiously towards it, anxious to be assured that all was right. Down came a brisk Blue Titmouse, spied the loaf, and without a moment's hesitation alighted upon it directly and commenced joyfully to attack the abundant supply! I think when the next "Glacial Period" descends upon our northern shores that *Parus ceruleus* will be the last bird to be starved out of its present familiar haunts.

S. M. THOMPSON, Belfast.

#### MAMMALS.

**Irish Hare going to Ground.**—A discussion on the subject of Hares going to ground has recently been going on in the pages of the *Field* newspaper, and among other interesting notes is the following,<sup>1</sup> which although appearing over an anonymous signature ("Aquarius") I can well believe to be true:—"On many Irish mountains the Hares take to natural fissures in the rocks, or to natural water-courses, called by the natives water-brakes, formed by the percolation of the water through the peaty formation overlying the rock or other hard subsoil, often to a depth of several feet. In many localities, as for instance, in the Bannermore<sup>2</sup> chain in Donegal, where there is little covert, the Hares become nearly as subterranean in their habits as Rabbits. In these holes or crevices they seek safely from their enemies or shelter from bad weather, coming to the entrances of their "burrows," if such they may be termed, to bask in the sun, their "seats," as they are termed, being clearly marked. It is supposed that the Hares took to this habit to escape from their chief enemies, the eagles, formerly abundant in these mountains, but now pretty nearly extinct." It has not been my good fortune to have any experience of Hares in an open country like that described by "Aquarius," but my knowledge of them in wooded and cultivated districts, and of what has previously been written on the subject (*vide* Thompson's *Natural History of Ireland*, vol. iv., p. 29, *Field* for Jan. 14, 1882, July 18, 1891, and more recent numbers, and for Scotland, Mr. William Evans' remarks in the *Annals of Scottish Natural History*, Oct., 91, p. 267), leads me to believe that the above remarks are perfectly true. It would be interesting, however, if some reader of the *Irish Naturalist* could confirm them from his own experience.

G. E. H. BARRETT-HAMILTON, London.

#### GEOLOGY.

**The Raised Beach at Fort Stewart, Lough Swilly.**—A further examination of material from this raised beach shows the presence of the following shells, additional to those recorded in my paper on "The Raised Beaches of Inishowen," in the *I.N.* for October, 1895 (vol. iii., pp. 278-285):—*Trochus umbilicatus*, *Littorina rudis*, *Rissoa membranacea*, *R. striata*, *Hydrobia ulvæ*, *Fusus antiquus*.

R. LLOYD PRAEGER.

<sup>1</sup> *Field*, Feb. 8th, 1896

<sup>2</sup> ? Barnesmore, EDS.

**Geology of the Curran, Larne.**—On the 12th December, 1895, Miss S. Thompson, Mr. R. Bell, and the writer visited the new bauxite works at Larne, to investigate the report that some of their foundations were sunk below the lower beds of the estuarine clays and gravels examined and reported upon by a Committee of the Field Club during the Session 1889-90. This report we found misleading. The new siding to the works has been cut through, and the works themselves have been built, mainly upon a raised bank of boulder clay about 300 yards north-west of the Larne Harbour railway station. The boulder clay is of a particularly hard, stiff nature, full of large and beautifully striated and polished boulders mostly of basalt, and is covered by a layer of water-rolled pebbles and coarse stratified sand, almost three feet thick, upon which is a natural land surface with trees apparently from 50 to 100 years old. The altitude of the surface of this bank is at a somewhat higher level than the beds on the Curran, from which it is separated by the two lines of broad and narrow gauge railway and the public road. Although the pebbles and sand are in all reasonable probability of the same age as the raised beach upon the Curran, yet, owing to the separation mentioned above, their exact continuity cannot be absolutely traced, nor their precise position in the series definitely fixed, though in all probability the boulder clay was partly denuded before the gravels were laid down, and the portions of gravels, &c., at the bauxite works represent the shoreward end of the series, deposited against and partly over the boulder clay. The works are now approaching completion, and no exact record has been kept of the deeper foundations such as the tall chimney for instance, but we saw a pit sunk for part of the machinery, at which place the boulder clay is about 11 ft. to 12 ft. deep.

A boring for a well is in progress, and has now reached a depth of 130 feet. On being interrogated, the workmen regretted that a more accurate record of the strata passed through had not been kept, but they reported verbally as follows, in the order of descent:—

1. Gravel with shells.
  2. Black clay (qy. Lias?)
  3. Limestone (qy. a boulder?)
  4. White alabaster and clay.
  5. Red clay.
  6. Blue clay.
- } Keuper marls.

We obtained a sample of the boring at 130 feet depth, and it is clearly a portion of the blue Triassic Keuper marl, a clay with gypsum veins.

From the above noted results we may reasonably infer that the Field Club has had no very serious loss from not having had an earlier opportunity of inspecting the excavations at these works.

F. W. LOCKWOOD, Belfast.

[Miss Thompson writes that "shells" from the black clay (bed No. 2 above) gathered by the workmen, have been sent up by Mr. Close, the architect, and they turn out to be Lias fossils, including fine specimens of *Gryphza incurva* obtained eight feet down in the black mud; showing that Mr. Lockwood's supposition is correct.—Eds.]

## THE GREAT AUK (*ALCA IMPENNIS*) AS AN IRISH BIRD.

BY G. E. H. BARRETT-HAMILTON, B.A.

So little is known of the past occurrences or status in Ireland of the Great Auk, that I think no apology is needed for bringing to the notice of readers of the *Irish Naturalist* the statement of Mr. W. J. Knowles in his "Third Report on the Pre-historic Remains from the Sandhills of the Coasts of Ireland"<sup>1</sup> that he had obtained on the Antrim coast bones which had been identified by Mr. E. T. Newton, of the Geological Survey, as those of the Great Auk. These bones were obtained in the sandhills of Whitepark Bay, Co. Antrim, in conjunction with human remains which Mr. Knowles believes to be those of the earliest Neolithic inhabitants of Ireland. In accumulations of the same age were found bones of the Horse, and of the Dog or Wolf (whether wild or domesticated is uncertain), as well as remains of geese, ducks, and gulls. Mr. Knowles remarks that "from the number of bones [of the Great Auk] which have been found, it must have been a common inhabitant of the North of Ireland at the time when the people of the Stone Age occupied Whitepark Bay and other parts of the coast." In a previous paper<sup>2</sup> Mr. Knowles recorded the finding, in the same locality, of two humeri of the Great Auk, besides bones of *Bos longifrons*, *Cervus elaphus*, Sheep or Goat, Fox, Pig, a small goose, a small gull, and cod. This statement is of such great interest, not only to Irish ornithologists, but to ornithologists in general, that it is a pity that it should be hidden away in a paper which deals with a subject other than natural history.

The only localities given by Professor Newton<sup>3</sup> where bones of the Great Auk have been found are in the kitchen-middens of Denmark, and in similar deposits in Caithness and Oronsay, and in a cave on the coast of Durham. The Irish locality, therefore, makes an interesting addition to our knowledge of the distribution of this bird in past times. Mr. Knowles points out that the "old surfaces of the sandhills, with their shells, broken bones, and implements, are really kitchen-

<sup>1</sup> *Proc. R.I.A.* (3), vol. iii., No. 4, pp. 650-663 (Dec., 1895).

<sup>2</sup> *Proc. R.I.A.* (3), vol. i., No. 5 (1891).

<sup>3</sup> "Dictionary of Birds," article "Extermination," p. 220.



middens, and of the same nature as those of the continent, e.g., in Portugal, and also at various parts along the coast of France, as well as in Denmark. The fauna of the sandhills is wonderfully in line with that of the kitchen-middens of Denmark, and the finding of the Great Auk, which is now extinct in Europe, among the Irish remains, makes the likeness more complete."

As regards the occurrence of this bird on the Irish coasts in modern times, the last authenticated British example<sup>1</sup>, and the last but two which is known to have lived, was taken alive near the entrance of Waterford Harbour, in May, 1834, by a fisherman named Kirby. It was kept alive for some little time by Mr. Jacob Gough of Horetown, in Co. Wexford, but eventually came into the hands of Dr. Burkitt of Waterford, and it is now in the museum of Trinity College, Dublin. The details of the capture of this bird, and of its subsequent history, as given by Thompson<sup>2</sup>, appear to have been somewhat inaccurate, and have been corrected by Mr. J. H. Gurney, jun.,<sup>3</sup> on the authority of Dr. Burkitt. It was afterwards ascertained by Mr. Davies that a second specimen was procured on the Waterford coast at about the same time, but was not preserved.

Besides the above, details of three other occurrences are given by Thompson<sup>4</sup>, but in no case was a specimen forthcoming. One of these specimens was stated, in a note communicated by Rev. Joseph Stopford, in February, 1844, to Dr. Harvey of Cork, no date being mentioned, to have been "obtained on the long strand of Castle Freke (in the west of the County of Cork); having been water-soaked in a storm." In the other case Thompson believed that two birds described to him by H. Bell, a wild-fowl shooter, as having been seen in Belfast Bay, on September 23rd, 1845, were of this species.<sup>5</sup>

<sup>1</sup> Newton, *Op. cit.*, p. 220.

<sup>2</sup> *Proc. Zool. Soc., Lond.*, 1835, p. 79; and "Nat. Hist. of Ireland," III., p. 238.

<sup>3</sup> *Zoologist*, 1868, pp. 1449-1453.

<sup>4</sup> *Op. cit.*, p. 239; *Zoologist*, 1868, pp. 1442-1453; 1869, pp. 1039-1043.

<sup>5</sup> The statement in Sampson's "Survey of Londonderry" (1802) that the *Alca Impennis*, Penguin, "frequents the rocks of that county and of Donegal," evidently refers to the Razorbill, which bird is not mentioned in his list. It is curious that Dr. Pocock describes "the Razorbill or Auk, as big as a Pheasant, with a parrot bill," as breeding at Horn Head in 1752—*vide* Dr. Stokes' edition of Pocock's "Tour in Ireland in 1752," p. 59.

## IRISH CAVES.

BY R. LLOYD PRAEGER, B.E.

In his "Notes on the Irish Caves" (*J.N.*, iv., pp. 57-59, 1895), Dr. Scharff expressed a hope that readers of this Journal would add to the list of caves which he then published, and some additions were promptly made by Mr. Ussher and Mr. James Coleman (*ibid.*, p. 94). And in the last issue of the *Irish Naturalist*, Mr. Jameson has mentioned one or two others. In looking up the literature of this and kindred subjects recently, I met with some further references to caves, which are now given, arranged according to the plan adopted by Dr. Scharff. Only those caves are named which have not been mentioned in the papers quoted. I have not thought it necessary to give many additional references to caves which one or other of the writers named has already referred to.

## Co. CLARE.

Cave at Kiltannon near Tulla.

White, Rev. P., "History of Clare," Dublin, 1893, p. 2.

Caves of Kilcorney.

Foot, F. J., *Geol. Survey Memoir to sheets 114, 122, 123*, 1863, p. 18.

## Co. CORK.

Cave at Cloyne.

Brash, R. R., "Antiquities of Gloyne." *Journ. Kilkenny and S.E. of Ireland Archaeol. Soc.*, n.s. II. 1858-59, p. 258.

Cave at Ballybronock near Castlemartyr.

Croker, T. C., "Researches in the South of Ireland." 1824.

Ussher, R. J., in "Second Report of the Committee . . . appointed for the Purpose of exploring the Caves of the South of Ireland." *Brit. Assoc. Report for 1881*, pp. 218-221.

Cave at Carrigower.

Ussher, R. J., in First Report, ditto, ditto. *Brit. Assoc. Report for 1880*, pp. 209-211; and *Geol. Mag.* (2) VII., 1880, pp. 512-514.

## Co. GALWAY.

The Pigeon Hole, Cong.

Nolan, J., *Geol. Survey Memoir to sheet 70*, 1877, p. 10, &c., &c.

Pollduagh and cavern of Beagh River.

Kinahan, G. H., *Geol. Survey Memoir to sheets 124 and 125*, 1863, p. 7.

Many caves about Coole, most of them still occupied by streams.

Kinahan, G. H., *loc. cit.*, pp. 7-9.

## Co. LEITRIM.

Templepatrick, in upper part of Glencar.

Dermot and Graunia's Bed, Glenarriff.

Wynne, A. B., *Geol. Survey Memoir to sheets 42 and 43*, 1885, p. 28.

**Co. MAYO.**

Caves of Aille.

Symes, R. G., *Geol. Survey Memoir to sheet 75*, 1872, p. 9.**Co. MONAGHAN.**

Rock House, Carrickmacross, &amp;c.

Nolan, J., *Geol. Survey Memoir to sheet 70*, 1877, p. 10.**Co. SLIGO.**

Keishcorran and others.

Cruise, R. J., *Geol. Survey Memoir to sheets 66 and 67*, 1878, p. 13.

Caves on Ben Bulbin.

Caves at Lissadill.

Wynne, A. B., *Geol. Survey Memoir to sheets 42 and 43*, 1885, p. 28.

Kesh Caves.

Gleniffe Caves.

Hardman, E. T., "Limestone Caves of Sligo," in Wood-Martin's  
"History of Sligo," First vol., 1882, appendix A.**Co. WATERFORD.**

Cave at Nicholastown.

Brownrigg, W. B., and Theodore Cooke, "Geological Description  
of the District extending from Dungarvan to Anestown, County  
of Waterford." *Journ. Geol. Soc. Dublin*, IX., 1860, pp. 8-12.

The caves at Anna-Clogh Mullon, Co. Cork, mentioned by Mr. Coleman, *loc. cit.*, are artificial, and should not therefore be included in the list of Irish caves.

In certain districts in Ireland caves are so numerous that any attempt to list them would be futile. Such, for instance, is portion of Co. Fermanagh, concerning which Mr. Thomas Plunkett, in reply to a query, stated that the hills around Enniskillen are riddled with caves, and that he could not attempt a list of them. So also in Cos. Mayo and Galway, in the district that stretches along the eastern shore of Lough Corrib from Cong to Galway, and in portions of Co. Clare, subterranean passages abound, so that the streams are continually disappearing into the earth and re-appearing at other places. But these caverns, being still occupied by the waters by which they were formed, are of course not so interesting to the student of either past or present cave-faunas as the older passages, long since deserted by the streams which excavated them, and subsequently tenanted by troglodytic insects, or roving beasts of prey, or pre-historic man.

## IRISH FRESHWATER WORMS.

BY REV. HILDERIC FRIEND, F.L.S.

ALL true worms may be divided into two great classes or groups, based on the relative number of their bristles or setæ. If they are very numerous they are known as polychæteous worms or Polychæta; if few, they are called oligochæteous worms or Oligochæta. It is true that the rule has exceptions, and some worms belonging to the Oligochæta have more setæ than are to be found in some species belonging to the Polychæta; but then there are other considerations. As a rule the worms with many bristles are marine, and being specially adapted for life in the ocean are quite distinct in form from those belonging to the land and fresh water. Hence generally speaking the Oligochæta are terrestrial, the Polychæta marine. Of the Polychæta I shall for the present have nothing to say, further than this, that very rarely the Polychæta and Oligochæta meet, as one might expect in estuarine and salt-marsh habitats. The true Oligochæta again are separable into two very distinct groups, and the order contains the terrestrial forms and those which are found either in or near fresh water. The terrestrial forms or true earthworms have received considerable notice in these pages, and while we still hope to add a few further species to the Irish list, it may be said roughly that the earthworms of Ireland are well known. Of the limicolous and aquatic species, however, we have heretofore been in absolute ignorance. They are small, not easily discovered, and when found are very difficult to determine, so that one need not wonder that they have been little studied. Now, however, thanks to the labours of Mr. Beddard, we have a Monograph<sup>1</sup> which contains much information for the guidance of the student, and it is to be hoped that before long the aquatic worms of Ireland will be as completely understood as the larger species are.

Thanks to the kindness of my indefatigable correspondent, Mr. Trumbull of Malahide, I have already been able to make a start with the study, and I send a first instalment in order if possible to secure the interest and aid of the large and ready band of co-workers who so generously supplied me with

<sup>1</sup> F. E. Beddard, "Monograph of the Oligochæta." Oxford, 1895.

materials for my former studies. To these and to any new workers who would like to send me material, a few hints may be permitted. Where, it may be asked, shall specimens be sought? We answer, everywhere! The smaller worms are ubiquitous. Being in the neighbourhood of a village in Cumberland the other day, I saw a little gutter flowing on to a piece of waste land. Here some dirty straw and vegetable matter was being saturated with the ooze, a handful of which I picked up, wrapped in paper, and carried home. To my surprise I found that the dirty straws were crowded with a beautiful little red worm new to science, hundreds of which crawled forth from their hiding-place or hunting-ground when the material was laid upon an old dish. The ooze on the margins of ponds, ditches, lakes, and estuaries should be examined, also the roots of grasses and plants in and near the water's edge, the moss and plants on damp rocks or dripping ledges, or wherever there is moisture. Mr. Trumbull has sent me a species, which is probably new to science, from a decaying elm tree, and I have found other species in decaying leaves, among debris, manure, and even in water-tanks, springs and wells. They are usually small, and may be easily overlooked, but a little practice will make collecting easy.

Most specimens may be sent with a small quantity of the earth, or water, moss, leaves, or debris among which they are found, and should either be placed in tubes, bottles, or tin boxes with damp moss. Care should be taken so to pack them that they will not be subject to battering in transit, or the delicate creatures will probably arrive quite dead and unrecognizable. It is of the utmost importance that as many species as possible should be studied in a living condition, as it is only by this means that many of the difficulties relating to the aquatic species can be cleared up.

I will now give an account of those worms which, through the kindness of Mr. Trumbull, I have been able to examine. They were collected at Malahide, April 1st, 1896, and it is important to note the date when collections are made because all worms do not mature at the same time, and we are anxious to ascertain what season of the year yields the best results in the matter of adult forms. Take for example—

*Lumbriculus variegatus*, Müller.—I have never yet seen this in its adult stage, and Beddard says that the reproductive organs have not

yet been properly described, though the worm has long been under observation. This species is, among the aquatics, pretty much what *Lumbricus terrestris* formerly was among the earthworms. If a water-worm was found it was formerly customary to call it *Lumbriculus*, and there was an end of the matter. Beddard gives but this one species, though I am certain we have at least two if not three species already discovered in Great Britain. I have no doubt about the Irish species belonging to Beddard's form (Monograph, p. 214). I had the good fortune to see one of the specimens throw off its tail, just as a crab or lobster will cast a claw, when in danger or irritated, and the question of its regeneration has been the subject of special study by more than one biologist. The *Lumbriculus* is one of the largest and most active of our aquatic worms, being two or three inches long, and as large round as a piece of grocer's twine or a large pin. It wriggles violently if captured, and may be frequently met with in weedy ponds and lakes or wide ditches. It is quite aquatic in habit, and has the setæ in four pairs on each segment. The most beautiful and striking feature is the blind contractile appendages to the blood-vessels, which can be readily seen through the transparent integument. Mr. Beddard (p. 209) gives a figure after Claparède. The pharynx occupies the second, third, and fourth segments, then follows the œsophagus in the fifth and sixth segments, the intestine commencing in the seventh. The intestine can at once be recognized by the presence of special (chloragogen) cells. The body usually appears of a greenish brown hue, and there are as many as 200 segments. In England a second species, nearly allied to this, but I believe as yet unnamed, is found under the strong growths of moss and waterweed which choke the streamlets flowing into our Cumberland lakes. I mention this in the hope that some one living near the lakes of Ireland may be induced to examine similar localities with a view to adding other species to the list.

***Limnodrilus Udekemianus*, Clap.**—I am in doubt about the actual identity of this worm owing to the fact that Beddard's account is meagre, and I am unable to consult the original memoirs of Claparède and Vaillant. It may yet prove a new species, and I therefore give my observations without reference to Beddard's account. Unfortunately an accident with my specimens resulted in their being destroyed before I had completed my study or mounted a specimen for further reference. The setæ, five or six (even up to eight) in each bundle of the anterior segments, are seated on papillæ. About four setæ in the posterior bundles, bifid, the outer tooth being much the larger of the two. Blood-vessel springing from segment 12, dilating in segment 9 (sometimes going back to segment 10 when the worm is in motion). I observed here and there a constriction of the large blood-vessel near the dilatations as if for a valve. Penial setæ wanting. The trumpet-shaped chitinous penis (or penis-sheath) not more than four times as long as broad (resembling that of my new species, *Limnodrilus Wordsworthianus*). Dark chloragogen cells beginning immediately behind segment 5. Spermathecae with short, uncoiled tubes, little, if any, longer than the chamber. Should this eventually prove to be a new species I shall supply figures when I submit the account to the Royal Irish Academy.

**Hemitubifex Benedii** (D'Ud.).—Here again, owing to the imperfect state of our knowledge, and the number of synonyms, I am somewhat in doubt. This is just the worm which I should have named *Tubifex papillosus*, and such is the name given to a species by Claparède which Beddard (p. 261) places under the above heading. It is a wonderfully interesting worm, with capilliform and forked setæ, length about one inch, the first third of the body being about three times as thick as the posterior part. Head very small compared with the segments containing the organs of generation; about 70 segments in all. The body entirely covered with papillæ. Beddard says the papillæ are wanting on the clitellum of *H. Benedii*. I could not, however, find a girdle on my specimens, and as we find setæ wanting on the girdle of many worms when they are adult which possess them invariably in a younger stage, possibly the girdle of this worm discards its papillæ when it becomes adult. This is a point for further observation. The capilliform and forked setæ alike extend through the whole extremity of the worm's body, the capilliform setæ being in the dorsal bundles only. As many as nine or ten capilliform setæ in the anterior bundles, but six or eight is the most usual number, gradually decreasing till at the posterior extremity there is usually only one. Dilating hearts in segments 7 and 8; the dark cells of the œsophagus beginning in segment 5. The forked setæ of the under-side sigmoid, much curved, the outer tooth being smaller than the inner one. While the outer tooth goes almost straight forward, the inner tooth is greatly curved. Blood red; body-segments composed of prominent annuli, three or more to each segment.

In addition to the foregoing I found among the gleanings part of a very pretty lumbriculid about two inches in length, but as the head and important segments were missing I cannot be sure of the species. A later consignment included a white worm found in an old decaying elm tree, which I have no doubt is a new species of *Fridericia*. The brain, spermatheca, and setæ are all so well-marked and characteristic that I propose to describe it for the Irish Academy under the name of *Fridericia ulmicola*. These preliminary remarks will, I trust, suffice to show how interesting a field lies open here for any one who wishes to pursue a new course of investigations.

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NOTES ON A ZOOLOGICAL EXPEDITION TO  
VALENCIA ISLAND, CO. KERRY.

SHORE-COLLECTING AND DREDGING,

BY F. W. GAMBLE, M.SC.,

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Manchester.

At the beginning of April, 1895, Mr. E. T. Browne (Univ. Coll., London), Mr. W. I. Beaumont, and the author paid a visit to Valencia Island for the purpose of making further observations on certain groups of marine invertebrate animals, which we had severally investigated at Professor Herdman's Laboratory, Port Erin, Isle of Man, and also at the Marine Biological Association's Laboratory at Plymouth.

Mr. Browne's object was to examine the composition and seasonal changes of the floating fauna by the aid of the tow-net. The present article is, however, confined to a record of the forms obtained by Mr. Beaumont and myself, by means of shore-collecting and shallow-water dredging in Valencia Harbour and the immediate neighbourhood during April and May of last year. The groups referred to are, chiefly, the Hydroids, Nemertea, Turbellaria, Gephyrea, Nudibranchiate Mollusca, and the Pycnogonida or "Sea-spiders." Since these groups are, for the most part, composed of small and soft-bodied animals, requiring careful observation for their detection, and microscopical methods for their determination, we resolved if possible to fit up a temporary laboratory in which we could examine our captures at leisure, and keep them under observation for some time. We were fortunately able to carry out this resolve successfully.

It is to Prof. A. C. Haddon that we are indebted for suggesting Valencia Island as the base of operations. The advantages which it offers are, a rich fauna close at hand; a well-sheltered harbour, enabling us to dredge under conditions of weather that would have rendered the use of a small boat in a more exposed situation out of the question; and finally it is now easily accessible by the Great Southern and Western Railway. We were also greatly aided in discovering the most



favourable localities, and in many other ways, by the vicar of Valencia (the Rev. A. Delap) and his family, who contributed so largely in making our visit as successful as it was enjoyable.

Accepting Professor Haddon's suggestion, we landed on Valencia Island last April, bringing sufficient apparatus, chemicals, and instruments to stock a small laboratory. Soon after our arrival we obtained the use of the greater part of a conveniently situated house close to the beach. One large room we forthwith fitted up as our laboratory; in another room we stored our tackle and gear; and in a third we laid out the results of the day's dredging and shore-collecting in enamelled dishes. Dredging was carried on almost exclusively in the harbour itself from a small rowing boat. We hope on a future occasion to investigate the fauna of the deeper water outside.

Valencia Island (5 miles long and 2 wide) is bounded by the Port Magee Sound on the south, by the extensive shallow harbour on the north and east, and is open to the Atlantic on the west. About 12 miles out to sea, in a south-westerly direction, lie the fine Greater and Lesser Skellig Rocks. The former is well-known on account of the intactness of the cells, once occupied by the anchorites of the 8th and 9th centuries, which occur upon it: the latter from the fact of its being the chief nesting-place of Gannets in the neighbourhood.

The upper reaches of the harbour, especially that part known as Lough Mark, appear to be largely composed of submerged peat-bog. The harbour itself is shallow, having a depth of 8 or 9 fathoms only in certain spots. The bottom is chiefly mud, and with here and there collections of shells, but it becomes more sandy or gravelly as the mouth is approached. Church Island lies between the harbour and Lough Kay to the north, and we found the shore of this island to be the most prolific locality for shore-work. Indeed at low springs, Valencia Harbour is an exceedingly favourable district for the study of littoral animals.

I will first give a description of the fauna between tide-marks according to the localities we examined, and will then proceed to detail the results obtained by dredging. In considering these notes it must be remembered that our visit

followed upon an exceedingly severe winter, the effects of which could scarcely fail to thin the numbers of certain groups; and secondly, that though we explored a portion of the district very carefully, a number of localities were either not examined, or insufficiently searched.

Beyond the quay opposite our laboratory, a sandy spit is exposed at low tides. In the immediate neighbourhood of the quay and on this spit, *Clava squamata* occurred, the ova of which, at first pinkish in colour, become purple or bright blue when mature. *Coryne vaginata* (with gonophores) was found here, and generally from this point westward to the light-house at the harbour-mouth. *Eolis papillosa* was breeding on the spit itself, and was accompanied by *Elysia viridis*; the Turbellaria, *Leptoplana tremellaris*, *Fecampia erythrocephala*, *Plagiostoma Girardi*; the Nemertea, *Lineus obscurus*, *L. longissimus*, *Amphiporus lactifloreus*, *Carinella annulata*; and lastly, *Dinophilus tæniatus*.

Westwards from the spit lies a long strip of collecting ground in the direction of Glanleam, terminating for practical purposes just beyond some pools, in which the purple burrowing sea-urchin (*Strongylocentrotus lividus*) occurs in numbers. At low spring tides, *Zostera*-beds are here uncovered, and on these and under the loose boulders the following fauna was obtained:—*Actinia equina*, *Anemonia cereus*, *Actinoloba dianthus*, *Sagartia bellis*, *S. troglodytes*, *S. venusta*, *S. nivea*, *Tealia crassicornis*, *Bunodes gemmaceus*, *Corynactis viridis*, and *Cereanthus Lloydii*. The Hydroids were not abundant, and had apparently suffered from the severity of the preceding winter. We obtained, however, on this ground small colonies of a species of *Rhizogeton* very similar to *R. fusiformis*, Agassiz, a genus new to British seas, and hitherto only described from Massachusetts Bay. A number of the commoner species of *Campanularia* and *Sertularia* occurred here, together with *Coryne pusilla* and *C. vaginata*. In the "lividus" pools the creeping medusa *Clavatella prolifera* was obtained, with young budding off from it. The Polyclad Turbellaria, probably abundant here in a good season, were represented by *Stylochoplana maculata*, *Leptoplana tremellaris*, *Stylostomum variabile*, and *Cycloporus papillosus*: the Rhabdocœlida by *Proxenetes flabellifer*, *Proxenosoma marmoratum*, *Macrorhynchus Nagelii*, *Monotus fuscus*,

and *M. lineatus*. Several species of the Nemertine genus *Tetrastemma* were found, including *T. dorsale*, *T. candidum*, *T. vermiculatum*, and *T. melanocephalum* (var. *diadema*). The Annelids were extensively represented on this ground, and *Siphonostoma diplochætos*, *Halosydna gelatinosa*, and a form, apparently *Myrianida maculata* (Clap.) (= *Myrianida pennigera* of Montagu), were noted, the last bearing a chain of buds at its hinder end. A Gephyrean, *Phymosoma papillosum*, Thompson, was dug out of the tide-pools. It has been previously taken by Dr. Kinahan from the coast of Clare, by Dr. Norman in Birterbuy bay, and from Polperro by Laughrin. The Nudibranch Molluscs were abundant. *Archidoris tuberculata* was spawning, *Acanthodoris pilosa* (several varieties), *Goniodoris nodosa* and *Jorunna Johnstoni*, *Polycera quadrilineata*, *Triopa claviger*, *Ægirus punctilucens*, *Eolis papillosa*, a form identical with *E. Peachii*, A. and H., *Æolidella glauca*, *Facelina coronata*, *Favorinus albus*, *Coryphella gracilis*, and perhaps best of all *Antiopa hyalina*, occurred here. The last species has not, I believe, been previously recorded from this coast. In addition, *Limapontia nigra*, *Actæonia corrugata* and *Elysia viridis*, *Pleurobranchus plumula*, and very small *Aplysia punctata*, form the list of Opisthobranchiate molluscs. Of the Pycnogonida, the most interesting form on this shore was *Anoplodactylus virescens*, Hodge, apparently a new species for Ireland, as Mr. G. H. Carpenter, who has kindly examined the collection of Pycnogonida, informs me. *Ammothea echinata*, and *Pycnogonum littorale* also occurred in this locality.

Below Glanleam, the seat of the Knight of Kerry, is a shore composed of boulders imbedded in sand. This, although not so prolific a locality as the last, yielded the following, in addition to many of the foregoing species. NEMERTEA:—*Nemertes Neesii*, *Micrura fasciolata*, *Lineus longissimus*; NUDIBRANCHIA:—*Facelina punctata*. A Decapod (*Xantho rivulosa*) is abundant here, and Kinahan found it when collecting at Valencia (*Nat. Hist. Review*, 1857, vol. iv).

A short walk across the headland bounding the entrance to the harbour on the south, brings one near Murreagh Point to a bay, which at low water affords good collecting. *Myriothele phrygia* and *Corynactis viridis* are the most striking Cœlentera, while *Coryphella gracilis* and *Æolidella glauca* are

the most characteristic Nudibranchs. Church Island, however, is the best locality for shore-collecting, particularly at the lowest spring tides. *Myriothela* is again abundant, *Hali-clystus auricula* clusters on the *Zostera*-beds, and *Caryophyllia Smithii* occurs under stones. The Polyclad Turbellaria occurring on the opposite side of the harbour are here also, and in greater numbers, together with *Nemertes Neesii*, *Cephalothrix bioculata* and the other Nemertea. *Acanthodoris pilosa* and *aspera*, *Jorunna Johnstoni*, *Favorinus albus* and *Pleurobranchus plumula* again occur, with many of their congeners. The Annelids *Polymnia nebulosa*, *Lanice conchilega* and *Siphonostoma diplochætos* are fairly abundant. Lastly, there exists here a rich Echinoderm fauna which we did not thoroughly examine. *Holothuria nigra*, *Cucumaria cucumis*, *Ocnus brunneus* and *O. lacteus* were some of the more obvious forms.

Very different from this fauna is that inhabiting the muddy shore of Lough Mark, which is largely a submerged peat-bog. In the wood a species of *Pholas* burrows, and the Gephyrea *Thalassema Neptuni* and *Phascolosoma tenuicinctum*, McCoy (= *Ph. elongatum*, Keferstein) are present in the peat; the last, which was found originally by McCoy on this coast (*Ann. Mag. Nat. Hist.*, vol. xv., 1845) being very plentiful. *Lamellidoris bilamellata* was found here accompanied by very large specimens of *Facelina coronata* (spawning) and one or two other Eolids, including a stranded specimen of *Lomanotus Genei*, two inches long. *Nymphon gallicum*, Hoek (male with eggs), was the most interesting Pantopod. It is a southern form and was first described by Hoek from the coast of Brittany.<sup>1</sup> In a patch of gravel off Reenglass Point, the purple urchin (*Str. lividus*) occurs. On the shore of the Caher river at Ballycarbery Castle, *Myxicola infundibulum* is plentiful. It may be mentioned that this is a locality for *Bufo calamita*, the Natterjack Toad.

Turning now to the fauna obtained by dredging, it must be premised that as we only had the use of a rowing boat and were not able to dredge effectually outside the harbour, the results were in many hauls not unlike those of shore-collecting at low-springs. We discovered, however, two banks of shells

<sup>1</sup> Hoek, *Arch. Zool. Expt. et Gen.* ix: 1881, p. 445. See also Carpenter, "Pycnogonida of Irish Coasts." *Proc. Roy. Dub. Soc.*, vol. vii. (n.s.) pt. ii. 1893.

(*Pecten maximus*, *P. opercularis*, *Mya truncata*, &c.) which yielded excellent results. The rest of the bottom is covered with vast numbers of *Ascidiella aspersa*, and elsewhere with meadows of *Zostera* rooted in mud, except off Glanleam, where there is a bottom of sand and gravel, containing a limited but well-differentiated fauna.

The Hydroids were not well represented. The abundance and small size of the Medusa of *Corymorpha nutans* in the water of the harbour, argued the presence of the Hydroid in the immediate neighbourhood, but in spite of arduous labours we did not find it. In fact, notwithstanding the presence of several medusæ with known hydroid stocks, none of the latter were obtained. *Halecium Beanii* was dredged once (with gonophores) in the harbour. The two species of *Antennularia* were common, and upon these were young specimens of *Lomanotus Genei*, *Doto coronata* and *D. fragilis*. *Doto pinnatifida* occurred a couple of times on the shelly ground in company with the following:—*Epizoanthus Couchii*; TURBELLARIA:—*Prosthecæus vittatus*, *Oligocladus sanguinolentus*, *Eurylepta cornuta* and the other Polyclads taken in the littoral zone. NEMERTEA:—*Amphiporus dissimulans*, Riches, *Tetrastemma flavidum* (var. *longissimum*), *Carinella aragoi*, *Lineus bilineatus*, *Micrurus fusca*, *M. fasciolata*, *M. purpurea*. ANNELIDA:—*Pontobdella muricata*, *Phascolion strombi*, *Phascolosoma papillosum*. OPHTHOBRANCHIA:—*Polycera ocellata*, *Eolis angulata*, *Coryphæa Landsburghii*, *Cratena amæna*, *C. olivacea*, *Amphorina cærulea*, *Embletonia pulchra*, *Galvina picta*.<sup>1</sup> PYCNOGONIDA:—*Phoxichilus levis*, *A. petiolatus*,<sup>2</sup> *Pallene brevirostris*, and great numbers of *Ammothea echinata*.

On the muddy ground of the harbour *Ascidiella aspersa* itself contains a small fauna. Its test was covered with *Antedon europæa* and riddled by *Crenella marmorata*, while amongst the mud of its attachment, the three species of *Micrurus*, *Siphonostoma diplochætos* and *Phascolosoma tenuicinctum* were found. The Turbellaria and Nemertea were identical with those of the shelly ground. *Amphiporus lactifloreus* however

<sup>1</sup> Prof. Haddon in a list of forms from Valencia, July, 1887, which has kindly communicated to me, notes *G. Farransi*, now, according to some authors, a variety of *G. tricolor* Forbes.

<sup>2</sup> Along with *Anopl. petiolatus*, Kr., we obtained specimens of *A. pygmaea* Hodge. Canon Norman (*Ann. Mag. Nat. Hist.* (6) xiii, 1894, pp. 15) considers the latter to be immature examples of *A. petiolatus*.

occurred here, but not *A. dissimulans*. Among the Annelids *Ammotrypane aulogastra*, Rathke, was common, and a species of *Chaetopterus* occurred a few times. *Philine aperta*, *Ph. punctata*, *Ph. catena* were very characteristic Opisthobranchia.

A word or two remains to be said concerning the occurrence of a species of *Polygordius* in fair numbers on patches of gravel off Glanleam. It is difficult to state which of the known species this approaches most closely, and we hope to investigate the matter further. Comparison with M'Intosh's specimens of *P. apogon* from Bressay Sound in the Shetlands, seems to indicate that our specimens resembled this species more than the others, although the eyes, which are a diagnostic feature of the northern form, were absent. Since the discovery of *Polygordius* at Valencia, we have found it off Port Erin (Isle of Man), and also at Plymouth, associated usually with *Glyceria capitata*, *Embletonia pulchra*, and a few other forms which affect a gravelly bottom.

In conclusion I may draw attention to some of the more interesting forms which fell to our lot while shore-collecting and dredging. In reference to these, previous Irish records have been consulted so far as the time at my disposal has permitted. But the publication of faunistic notes relating to the Irish marine Invertebrate fauna, in many often inaccessible journals and papers, renders this a matter of the greatest difficulty.

Messrs. T. and A. Scott<sup>1</sup> have published descriptions of a new genus (*Lomanticola insolens* n.g. n.sp.) and two new species (*Aplostoma Beaumonti* and *A. hibernica* n.spp.) of parasitic Copepoda which were found respectively in *Lomanotus Genei*, Ver., and in Compound Ascidiars, at Valencia. A species of a genus of Hydroidea (*Rhizogeton* sp.) new to the British seas is in Mr. Browne's hands for description. The Pycnogonid *Anoplodactylus virescens*, Hodge, is apparently new to the coast of Ireland. Of the Nudibranchiate Mollusca, *Amphorina cœrulea* (Mont.), *Antiopa hyalina*, A. & H., *Lomanotus Genei*, Ver., and *Embletonia pulchra*, A. & H., are noteworthy forms, if not new to the coast. The abundance of species of *Micrura*, and the occurrence of *Amphiporus dissimulans*, Riches, are perhaps the more interesting results of Mr. Beaumont's work at the Nemertea. Among the

<sup>1</sup> *Annals and Mag. Nat. Hist.*, Ser. 6, vol. xvi., 1895, p. 353.

Turbellaria, the list of which I fully expect to increase very considerably, *Prostheceraeus vittatus*, Mont., *Oligocladus sanguinolentus*, Lang, and, *Stylochoplana maculata*, Quatref., are worthy of mention. Finally the occurrence of a species of *Polygordius* has, I believe, not before been signalled from the coast of Ireland.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include a Badger from the Earl of Granard, a pair of Peacocks from A. Bell, Esq., a Macaw from V. W. Brown, Esq., and a pair of Herons from E. Blake Knox, Esq. Two St. Kilda lambs, a hybrid calf, and a pigmy calf, have been born in the Gardens.

8,070 persons visited the Gardens during March.

### DUBLIN MICROSCOPICAL CLUB.

MARCH 19th.—The Club met at Mr. W. N. ALLEN'S.

Mr. MOORE exhibited *Nectria aurantium*, Kick. At a previous meeting Mr. Moore had exhibited a pseudo-bulb of an unnamed species of *Anguioa* from South America, which was infested with a fungus. The fungus was the species now exhibited. It is remarkable that several distinct species of *Nectria* have been found growing on Orchids in the houses at Glasnevin. The species in question is uncommon. It had previously been recorded as growing on the Laburnum and Aspen Poplar in Thuringia, and on the Ash tree in Belgium.

Mr. G. PIM showed the æcidiospores of *Puccinia Lapsanae*, Schultze, sent by Mr. Burbidge, from the Trinity College Gardens. The fungus produces crimson spots on the leaves on which nestle the clusters of pale yellow peridia, forming a very pretty low-power object.

Mr. MCARDLE exhibited fertile specimens of *Cephalozia Turneri*, Hook., which were sent to him by Mr. M. B. Slater, F.L.S., of Malton, Yorkshire. They were collected in Maine Co., California, in May, 1894, by Professor Marshall A. Howe, of the University at Berkely.

In Ireland it is one of the rarest liverworts; it was first found by Miss Hutchins near Bantry, Co. Cork, who sent it to Sir William Hooker, and he named it to perpetuate the memory of his friend Dawson Turner; an excellent description and figure of the plant is given in his grand work on the "British Hepaticæ." From the date 1811, when it was collected by Miss Hutchins, we have no record that it was found again until 1873, when it was collected in small quantity at Cromaglow,

Killarney, by Professor Lindberg. In England it is known to grow in one station in Sussex, rare and local in France, found also in the Canary Islands (Webb) near Tangier, Africa (Salzman.) This curious and pretty plant is remarkable in having pectinato-dentate leaves, and in its close affinity to several genera, especially *Anthelia*

MARCH 16th.—The Club met at the house of Prof. GRENVILLE COLM, who exhibited a large section, prepared for the Royal College of Science, from an opal-bearing rhyolite occurring on Sandy Braes, Co. Antrim. Radial chalcedonic groupings occur in clear amorphous opal, the structure being, as usual, well brought out by crossed nicols.

Mr. PIM showed, on behalf of CANON RUSSELL of Geashill, a minute *Nectria*, probably *N. sanguinea*. The perithecia are scattered, somewhat pyriform, papillate, and of a deep red colour; the sporidia are uniseptate and uno-bi-seriate.

Mr. M'ARDLE exhibited a fertile specimen of the rare liverwort *Scapania compacta*, Dumort., which he found last year amongst rocks on the bank of the River Barrow near Borris, Co. Carlow, when collecting for the Flora and Fauna Committee of the Royal Irish Academy. Dr. D. Moore, in his work on the Irish Hepaticæ, states that the only specimens he collected of the true plant are from the neighbourhood of Brandon, Co. Kerry, which were sterile in both places where it was observed growing.

Mr. A. VAUGHAN JENNINGS exhibited a leaf of *Arisarum vulgare* from Bordighera, North Italy, containing the endophytic alga *Phyllosiphon arisari*, Kühn, which is only known on that plant, and only from the Riviera and West Italian coast. A preparation under a low power showed the unicellular (cœnocytic) branching filament spreading through the leaf-tissues, and its contents breaking up in parts into very minute spores. Another slide showed these spores under a high power, when they were seen to be oval bodies with a central nucleus and a bright spot toward each pole. The plant resembles closely a green siphonaceous alga such as *Vaucheria*, but it seems to live to a great extent parasitically on the leaf-tissues, which it destroys. No sexual organs are known; and the method of asexual reproduction differs entirely from that of *Vaucheria*, the immense number of minute spores having almost a fungoid aspect.

Mr. G. H. CARPENTER showed specimens of the minute crane-fly *Molophilus ater*, Mg., recently collected by Mr. J. N. Halbert, near Roundstone. This species, probably common in hilly and northern districts, is of interest on account of the great reduction of the wings in both sexes.

Mr. HENRY J. SEYMOUR showed sections of a hornblende schist from Killiney. The rock occurs just north of the garden wall of Killiney Park, near the junction of the granite and slate. In the slides a schistose structure is clearly seen, and hornblende, a pyroxene, some quartz and numerous plagioclase crystals can be identified. The rock may have been originally a diorite or a pyroxene aphanite. A photo-micrograph of the section taken by Mr. Mitchell was also shown.



## BELFAST NATURALISTS' FIELD CLUB.

MARCH 17th.—The PRESIDENT in the chair. Prof. COLE, F.G.S., read a short paper on the Rhyolites of Co. Antrim. Subsequently the Fifth Annual Meeting of the Microscopical Section was held, the evening being devoted to a display of microscopical objects, and to demonstrations of mounting, &c. The following exhibited—Rev. John Andrew (Chairman of the Section); J. J. Andrew, Miss M. K. Andrews, Miss S. M. Thompson, Mrs. Blair, J. O. Campbell, W. B. Drummond, P. F. Gulbrausen, W. A. Firth, L. Roscorla, James Murdoch, William Gray, A. M'J. Cleland, James Stelfox, W. S. M'Kee, J. Lorrain Smith, Cecil Shaw, H. M'Cleery, Joseph Wright, W. F. de V. Kane, and W. D. Donnan (Sec. of the Section).

BOTANICAL SECTION.—MARCH 28th.—Mr. J. H. DAVIES read an interesting paper on Casuals. It was illustrated by a fine set of mounted plants, kindly lent for the occasion by an old friend of the writer, a Yorkshire botanist, Mr. William Foggitt, who has given considerable attention to this class of plants. Mention was made of the spread within recent years of *Veronica Buxbaumii*, *Silene noctiflora* and *Trifolium agrarium*. *Silene dichotoma*, first noticed in our district two years ago by Mr. David Redmond, has been known to produce 330 capsules on one plant. Many of these plants are brought in with foreign seed, and one cannot but speculate as to the future possibilities of their spreading. Mr. Richard Hanna, who contributed a remarkable list of these alien plants to the recent "Supplement to the Flora of N.E. Ireland," exhibited some which he had collected in the neighbourhood of Belfast distilleries and flour mills.

GEOLOGICAL SECTION.—A week of geological studies, conducted by Professor G. A. J. Cole, terminated on Tuesday, March 24. A paper on the structural details of the Antrim rhyolites, read at the Club's microscopical meeting, fitly commenced the course, lantern slides showing the microscopic characters of these lavas, varied by others of rhyolitic areas in other parts of Great Britain. The first field excursion was to Squire's Hill, where the series of Cretaceous quarries were visited, Professor Cole pointing out and explaining the methods in which the many dykes had intruded through the sedimentary rocks, also drawing the attention of his students to the difference between our Cretaceous series and that of England. A visit to the basaltic quarry led the party across Carr's Glen to the Cavehill quarry, with its great dyke, showing horizontal columns, which traverses the Chalk and the overlying basalt. The second excursion made an early start for Stewartstown, involving a walk of ten miles through fine, rolling country, to Tullyconnell for the Permian strata that are so rare in Ireland, a block *in situ*, nine or ten feet long, with stray fragments in an adjacent cottage garden, being all that here remains. The Castle Farm quarries at Stewartstown furnished fossils from the Carboniferous limestone, some pits in the lower Coal-measures being passed on the

return drive to Dungannon. Friday saw the party walking from Donald through the interesting esker of partially-cemented gravels full of travelled pebbles, by the old road to Scrabo. The intrusive sheets and dykes of Scrabo have acted as a protective skeleton, and preserved the hill and its capping of dolerite when the surrounding unprotected area was denuded away. Saturday was devoted to the rhyolitic area, which has been specially studied by Professor Cole for some years, and magnificent weather favoured the party as they drove from Doagh to Sandy Braes.

After the welcome rest of Sunday, the geologists made a fresh start on Monday, the place selected being Barney's Point, near Magheramorne, where an abundant store of lower Lias fossils was obtained, including *Ceromya gibbosa*. Fragments of Rhætic rocks led Professor Cole to point out that these Liassic beds had probably overridden the lower strata. Walking across the backbone of Islandmagee, the party inspected the fine cliffs at the Gobbins. Yet more splendid weather favoured the final excursion on Tuesday, and the 7.30 train saw ten members on their way to Newcastle. The dykes that traverse the uplifted Ordovician strata (in some cases themselves traversed by later dykes) were inspected under Professor Cole's guidance. Professor Cole subsequently led the party up by Bloody Bridge and Glen Fofanny valley to the ridge above, which led to an explanation of the origin of the great detrital fans, which have hitherto been regarded as moraines. Mr. La Touche, of the Geological Survey of India, also mentioned the making of such fans in the Himalayas in a few hours by a flood. An ascent of Thomas Mountain to inspect the Ordovician rock that overlies the granite—a reminder of the great sedimentary arch under which the latter molten rock accumulated—was the prelude of the final descent through the grounds of Donard Lodge.

APRIL, 1st.—The Secretary's annual report of the section's work was read by Mr. F. W. LOCKWOOD, and, being passed, was sent on to the Committee of the Club. Miss M. K. ANDREWS subsequently gave a brief account of some of the investigations of the Swiss "Gletscher-Kommission" into the results and cause of the remarkable glacier-avalanche that occurred at the Altels on the 11th September, 1895.

APRIL, 6th.—An excursion to Murlough Bay on Easter Monday was carried out. A party of 15 started by the 6.30 train from Belfast, and drove from Ballycastle to Murlough Bay, probably the most picturesque bit of coast in County Antrim. The geology is also of great interest, the most ancient rocks in the county (metamorphic), occurring near sea level, followed by the basal conglomerates of the Carboniferous period. Ascending in altitude and in geological line, the spectator admires the fine slopes of ruddy Trias, upon which rest the interesting pebble beds that indicate the western shores of the great Cretaceous ocean that once rolled between this and the Crimea. A considerable time was spent in searching for the fossils that occur somewhat sparingly in this conglomerate, which is not developed in England. The homeward walk along the noble cliffs of Fair Head fitly introduced the period of volcanic

activity, whose results have made Antrim what it is, preserving many rocks from denudation that have vanished in other parts of our island. The weather was splendid, and a glorious sunset gratified the travellers on the homeward journey.

APRIL 21.—The annual meeting of the Club was held, the outgoing president (Mr. F. W. LOCKWOOD) in the chair. Before the regular business was proceeded with, Mr. WILLIAM GRAY, M.R.I.A., delivered the report of his visit to Dublin, Cork, and Limerick as the delegate of the Club under the auspices of the Irish Field Club Union. A few slight additions to the Club's rules were then agreed to, after which the president called upon the honorary treasurer (Mr. W. H. PHILLIPS) to read the statement of accounts, which were satisfactory, a small balance being to the credit of the Society. The honorary secretary then read the annual report, of which the following is an abstract. The Committee of the Belfast Naturalists' Field Club now lay before the members the 33rd Annual Report. The work of the Club has been steadily carried on during the past year, some good results having been obtained especially by the different sections of the Club, whilst an interesting co-operation with the different other scientific Societies of Ireland has been maintained. The Conference of all the Irish Field Clubs held in Galway during July under the auspices of I. F. C. Union, was a hearty stimulus in this direction. The creation of an entrance fee has acted as desired in keeping the membership of the Club within working bounds without materially affecting the finances of the Club. The membership now stands at 480—32 new members having been elected during the year, and 68 having been struck off. During July the London Geologists' Association visited Belfast, and were officially received and entertained by the Club. During their stay different members of the Club acted as their guides during their excursions, and their programme and arrangements were attended to by the Honorary Secretaries. The Home Reading Union was treated in a similar manner. During March a week's good geological work was done in a systematic way under the instruction of Professor Cole, there being an excursion to different places of interest each day and a class each evening. The Geological Section with Miss S. M. Thompson as Secretary has been most active during the Session. The Microscopical Section has also been fairly active. The Celtic Class having been nurtured to maturity under the sheltering care of the Club has now formed a separate organization, "The Belfast Gaelic League," which is both active and prosperous. The Botanical Section formed during the year under the guidance of the Rev. C. H. Waddell, B.D., has made satisfactory progress, and will doubtless continue to keep this important study in the forefront of the Club's work. This section is the practical outcome of Professor Johnson's course of botanical lectures last session. Your Committee trust that during the coming session more individual research will be done by the members. In conclusion, your Committee express their satisfaction with the lengthened notices of the Club's proceedings given from month to month in the *Irish Naturalist*. The officers were the elected, as follow:—LAVENS M. EWART, M.R.I.A., President; Rev. C. H.

Waddell, B.D., Vice-President; William H. Phillips, Treasurer; William Swanston, F.G.S., Librarian; F. J. Bigger and Alex. G. Wilson, Honorary Secretaries; with the following Committee:—Miss S. M. Thompson, F. W. Lockwood, W. Gray, John Hamilton, W. J. Fennell, S. A. Stewart, R. J. Welch, Joseph Wright, John Vinycomb, and J. St. J. Phillips, Various suggestions in regard to the summer excursions were then taken up and considered. The following new members were then elected:—Charles MacLorinan, LL.D., and Robert Ardill.

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#### DUBLIN NATURALISTS' FIELD CLUB.

APRIL, 21.—The evening was spent in hearing reports on the scientific results of an Easter trip to Connemara, in which a number of members took part. The chair was occupied by the PRESIDENT (Prof. GRENVILLE COLE). Mr. R. LLOYD PRAEGER gave a general account of the week's work, describing the beautiful district of which Roundstone is the centre, and its scientific attractions. Specimens were shown illustrative of the botany of the district, and of the rich shell-sand of Port-na-fedog. Lantern illustrations of the district were also shown, taken from photographs by Mr. R. Welch, Belfast. Dr. HERBERT HURST followed by exhibiting some frog's bones from Inis Mac Dara, a remote islet off the Connemara coast. The opinion was expressed that the frog was not a native of the island, the bones having probably been brought by a bird. Mr. LYSTER JAMESON spoke on the marine zoology of the district, and exhibited the results of dredgings carried out by the party. Mr. J. N. HALBERT described the insect life of the district, and showed a number of rare beetles and moths. Prof. T. JOHNSON spoke on a large collection of sea-weeds which were on exhibition, gathered during the week by a lady member of the party. The various reports mentioned above will appear in our pages when completed.

Subsequently Mr. PRAEGER showed, on behalf of Mr. A. Roycroft, bones, shells, &c., from a kitchen-midden at Lough Shinny, Co. Dublin. The PRESIDENT exhibited in the lantern slides illustrating the esker of Greenhills, Co. Dublin. Rev. MAXWELL CLOSE discussed the origin of these remarkable gravel ridges. The following were elected members of the Club:—Miss L. Allen, Miss M. Allen, J. C. Burlington, Mrs. Coffey, J. de W. Hinch.

APRIL, 25.—The first excursion took place. A party of 36, which swelled to 57 *en route*, took the 1.45 train to Bray, and passing the new harbour, examined the old forest-bed underlying marine clay on the shore at low water, recently described before the Club by Mr. Praeger, who now pointed out on the ground the relations of this deposit to the neighbouring beds. After an hour's work examining the peat and clay, and shore-hunting, the party proceeded by the 4.0 o'clock train to Killiney, while a few remained to collect seaweeds at Bray. At Killiney, under guidance of the President (Prof. Cole) the famous junctions of the Ordovician and granite were visited, and Prof. Cole explained the

geological phenomena displayed. Numerous specimens of the schist full of andalusite crystals were brought away for examination. The party returned to town by the 6.11 train from Dalkey.

## FIELD CLUB NEWS.

The Easter excursion to Roundstone, in which a number of members of the Belfast and Dublin Field Clubs, and others, took part, was an unqualified success. No rain marred the enjoyment of the party, and investigations into the fauna, flora, and archæology of Connemara proceeded steadily. The scientific results, which were laid before the Dublin Club on April 21st, will appear duly in our pages.

A better centre than Roundstone for those desiring a holiday in a beautiful district abounding in interest for the naturalist could not be found. Situated on a sheltered arm of the Atlantic, in the midst of lovely scenery, all sorts of ground are within easy distance for the explorer—bays with a rich marine fauna, high mountains, sandy beaches, rock-pools, extensive bogs, innumerable lakes, and an excellent little hotel.

The Belfast Naturalists' Field Club has received the valuable gift of a large box of geological specimens from Mrs. Smythe, of Tobarcooran, Carnmoney. The collection belonged to the late General W. J. Smythe, R.A., C.B., formerly President of the Club.

## N O T E S.

### BOTANY.

#### PHANEROGAMS.

**Lathræa squamaria** In Co. Down.—It may be of interest to some botanical readers to know that *Lathræa squamaria* is to be found growing in the woods in Lord Annesley's demesne at Castlewella. It is most likely indigenous, as I have found it growing in several of the plantations nearly a mile apart, mostly under Portugal Laurels (*Cerasus lusitanicus*) of great age, also I have found it growing near the Bird-cherry (*Prunus padus*) and under some Elms (*Ulmus campestris*).

It would be interesting to know if *Lathræa squamaria* has been found growing in other districts in Ireland, and where?

T. RYAN, Castlewella, Co. Down.

**Early Hawthorn.**—On 19th April, near Cabinteely, Co. Dublin, I saw a large Hawthorn tree in almost full bloom; there was nearly as much on the shady side as on that exposed to the sun. From the condition of the flowers, it was obvious that some must have been out at least on the 15th inst., if not sooner. Since then I have seen Hawthorn "May" (*sic!*) in various other places, including Rutland-square. Is this not almost a record for earliness?

GREENWOOD PIM, Dublin.

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ZOOLOGY.

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INSECTS.

**Formica rufa, L., in Co. Wexford.**—Though I am not a "formicologist" I have been for many years familiar with the large Wood Ant (*Formica rufa*) as a denizen of old Killoughrim Forest, in the County Wexford; and I forward this note on seeing that the Rev. W. F. Johnson in the April number of the *Irish Naturalist* asks for information concerning its Irish localities, and expresses some doubt as to its indigenoussness in this country.

The great size of this ant, its wood-haunting habit, and the remarkable nest, resembling a hay-cock in shape, which it builds of sticks, grass, leaf-stalks, &c. (or pine-needles where these happen to be accessible to it) are sufficiently distinctive, I hope, to guarantee one who has not scientifically studied the order against risk of erroneous identification.

As to the question of its indigenoussness, the character of the habitat is to my mind practically conclusive. Killoughrim Forest—the main remnant of the old natural wood of Oak, Birch, Hazel, Holly, Guelder-rose, and Broom, which in bygone years covered a great part of the county—is, so far as I have been able to observe, almost completely free from introduced vegetation, while several of our very local but undoubtedly native insects (as *Thecla betula* and *Nisomiades tages*) are apparently confined to this wood, or occur outside its limits only in a few isolated spots, once part of the forest, that still retain the original sylvan character. It seems most unlikely that the ants would be so thoroughly at home as they are, in such a place as this if the species were an imported one. In fact it has grown into an axiom with me that whatever is in Killoughrim is indigenous. Even the Squirrel, now for six years established and common in all the woods of the adjacent parts, declines to be tempted by the only hazel-nuts the district offers to ground whereon he instinctively knows there is neither Beech nor Pine.

I regret to add that the dense scrub which has sprung up in Killoughrim since the last felling of the oaks ten years ago has so obliterated many of the old pathways and open spaces that it is no longer the easy matter it once was to visit *Formica rufa* in her haunts. Spots where I have found, I should say, a dozen Wood Ant's hillocks in village-like juxtaposition are now difficult to identify, and besides the ants themselves shift their ground from time to time.

Despite their defensive capabilities, not ineffective against Man, and stated to be infallible security against the Pheasant and Partridge (see remarks by "A Son of the Marshes" on "Our British Game Birds"), they have at least one formidable enemy in the Hedgehog, and probably though I have no certain evidence of this, another in the Badger; at any rate, even the former animal now and then gives them such a mauling as to compel the abandonment of a site.

I have found a few nests of *Formica rufa* outside Killoughrim Forest, under plantation timber at Ballyhyland, and in other woods not far off; and in these instances I took note of the fact that pine-needles, for obvious reasons lacking in Killoughrim, were largely used in the construction of the tumuli. These outside colonies, probably formed by emigrants from the Forest, in every case have proved curiously short-lived, and last summer I searched all the localities (exclusive of the Killoughrim settlements) without finding a single nest of the Wood Ant.

I will see to securing a few "neuters" of this Ant for authoritative inspection during the coming summer, but meanwhile I have very little doubt that other Irish localities for it will be readily forthcoming—enough, perhaps, to dispense with any special need for corroboration by specimen of my County Wexford record. So interesting and striking an insect is in all probability familiar by sight to many observers ignorant of its scientific name, who, when once attention is drawn to the subject, will be able to add largely to what is known of its distribution.

C. B. MOFFAT, Dublin.

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#### MOLLUSCA.

**Some Slugs from North-West Ireland.**—I have recently received from Miss Amy Warren a small collection of slugs from Ballina, Co. Mayo, and as records from this district are very few, a note concerning the same may be of interest. There are eight specimens referable to the following species:

*Arion empiricorum*, Fér. (immature) (3).

var. allied to *Bocagei*, Simr. (2).

*A. subfuscus*, Drap. (1).

*A. hortensis*, Fér. (1).

*A. fasciatus*, Nils. (1).

The occurrence of forms of *A. empiricorum* allied to Simroth's variety *Bocagei* is most interesting.

WALTER E. COLLINGE,  
Mason College, Birmingham.

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#### BIRDS.

**Spring Migrants.**—I saw two Sand Martins on the 20th March and a solitary Wheat-ear on the 1st April. The latter are our first spring migrants here, and seem later in coming than usual.

W. A. HAMILTON, Ballyshannon.

## THE TERNS OF KILLALA BAY.

BY ROBERT WARREN.

OF the tern family, four species are regular summer visitors to Killala Bay, and breed within the district—the Sandwich, Common, Arctic, and Little Terns; while one, the rare Black Tern, has only once been known to visit the bay.

Up to the summer of 1851, very little was known of the SANDWICH TERN (*Sterna cantiaca*) in Ireland, and was first mentioned as an Irish visitor by the late Wm. Thompson in the *Proceedings* of the Zoological Society of London for 1833 from a specimen shot on the 14th of September, 1832, in Belfast Bay: again, on the 28th of July, 1838, an adult bird was shot opposite "The Grove" and several others were seen there in September, 1839, and during the same month in 1844: while another specimen shot in Strangford Lough on the 16th of August that year was sent to Belfast for preservation; the above being all that was known to Wm. Thompson of this bird on the northern coast. This writer, proceeding to speak of its occurrence on the Dublin coast, mentions a specimen having been shot near Clontarf in October, 1831; and in July, 1834, two more were obtained near the same locality. In September, 1837, several were seen near Howth; and one was seen at Dollymount strand on 11th May, 1842; while from that date up to 1850, individuals were seen every summer, in June and July, between Portmarnock and Malahide, and one was shot on 15th June that year on Ireland's Eye.

The late Mr. J. J. Watters was the first to discover that it bred on the coast, for on 17th June, 1850, when visiting that great breeding-haunt of Terns on the Dublin coast, the Rockabill (now long since deserted), he saw three birds flying about, and found a broken egg on the rocks, and although he saw 70 or 80 Roseate Terns, and at least twice that number of Common and Arctic Terns on the wing, he was unable to identify more of the Sandwich Terns than the three individuals already mentioned, thus showing that these three birds were mere chance stragglers from some larger breeding-haunt of the species, at that time unknown.

The preceding information being all that was known of this tern in Ireland up to the date of the publication of Wm. Thompson's work in 1851, I had the great pleasure of adding

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something to it; for on 7th April the same year I met this beautiful Tern near the island of Bartragh, Killala Bay. Having previously resided in the South of Ireland, it was quite unknown to me, and when the attention of my brother and myself was first attracted by its very peculiar cry (which if once heard can never be mistaken or forgotten), we were much puzzled, as for a long time we could not make out what had uttered it, or from what direction it proceeded. However, chancing after some time to look upwards, we were just able to perceive some birds, wheeling about, and soaring at an immense height, all the time screaming loudly. This wild flight and strange cry, so unlike that of any bird we knew, induced us to watch them closely, and after some time they gradually lowered their flight to the water. Seeing that they were some species of tern, we got into our boat, and having succeeded in shooting a couple, found that they were this lovely tern, and in such a perfect state of plumage that their breasts and bellies had quite a rosy tinge almost as deep as that of Roseate Terns. This peculiar habit of soaring to such a height as to be almost invisible, and wheeling in wide circles, occasionally chasing each other and screaming loudly, is most frequently seen early in the season before they begin to hatch, although occasionally in August and September, a pair may be seen acting in a similar manner, but almost invariably on fine bright days. As these terns remained all the season feeding about the bay and estuary, we were most anxious to find their breeding-station, but although we made many inquiries and searches we quite failed, and what made the failure the more annoying was, that at the time the birds were hatching the male birds were seen daily flying inland in the direction of Lough Conn, with Sand-eels in their bills to feed their sitting mates. Lough Conn, however, was visited twice without our seeing any trace of the Sandwich Tern either on or about the lake, the only birds met with being Blackheaded Gulls and Common Terns. Our search for the breeding-haunt having thus failed, I gave it up for a time, but in May, 1857, I was told of a small lough where a number of small gulls bred, and which was situated close to the residence of the late Mr. Gardiner of Cloona, two miles from the town of Ballina, and about four from the estuary. On visiting the lough I found it to be surrounded on two sides by a turf bo

and on other two by the fields of Mr. Gardiner. It was about 20 or 30 acres in extent and had a wooded island in the centre, having a large quantity of reeds and bullrushes on one end, extending out some distance into the water. A large colony of Blackheaded Gulls were breeding amongst the reeds, and on the tussocks of coarse grass along the margin, while a small colony of Sandwich Terns were located on a low flat mudbank, scarcely above the level of the water. Some of the terns had scarcely any nests, but laid their eggs in slight depressions of the soil thinly lined with a few dried blades of grass, and three, I think (as well as I can remember), was the average number of eggs in each nest. When returning I took half a dozen eggs, and when attempting to blow them found that the greater number were so near being hatched that it was impossible to prepare them for my collection, thus showing that this species breeds much earlier than the smaller species of terns, and in further proof of their early breeding I have seen young birds accompanying their parents about the river and estuary as early as the 24th of June.

The following winter and spring being unusually wet, the level of the lake was raised so high, as to cover the mudbank upon which the terns had their nests, and as the bank continued under water during the summer of 1858, the terns deserted the lake altogether, and removed to the little moorland lough of Rathrouyeen, situated midway between Ballina and Killala, and within 300 yards of, and in sight of the high road between these towns.

This lough is considerably larger than Cloona, and is nearly surrounded by bog, with very swampy shores, except on the east side, and has a considerable quantity of reeds growing on the margin, in some places extending to a small island in the middle of the lake. This island is nearly circular in form, and is about 25 or 30 yards in diameter, and has some tall bushes growing round the outer edge, while the middle of the island is bare, except where some long grass grows.

A very large colony of Blackheaded Gulls have nests all over this island, and amongst the reeds, and on the tussocks along the boggy margin, while a smaller colony of Sandwich Terns breed together on a bare part of the island, as well as amongst the Gulls' nests. This lake and the adjoining land were the property of the late Sir Charles Knox-Gore, who, with the

spirit of a true naturalist, strictly preserved it, and did not allow either Gulls or Terns to be disturbed or molested, and had the long grass and weeds, and some bushes cleared off it to give more space to the birds for their nests, so that now from being so well protected, this beautiful tern has increased in numbers, so largely, that Miss Knox-Gore told me that when visiting the island in 1886, she counted 150 nests of Sandwich Terns, and as the present owner preserves the lake as strictly as the former, there is every probability of this breeding-haunt continuing for many years.

This tern is the earliest of our spring visitors, sometimes appearing in the estuary as early as 20th March ; and appears to be little affected by cold, for during the unusually cold weather of March, 1892, they arrived in the estuary on the 27th, when there were four inches of snow on the ground, and the thermometer indicated six degrees of frost. Up to the present date, Rathrouyeen is the only breeding haunt of this tern in Ireland, of which we have any record, except the deserted ones of Rockabill and Cloona, though of course there may be others unnoticed on some remote and unfrequented parts of the coasts or lakes. There is very probably one on the North Sligo coast, somewhere between Raughly and Mullaghmore, for when I visited Horse Island (that great haunt of the Arctic Tern) in July, 1894, I saw several Sandwich Terns flying about, but saw no trace of their breeding on the island with the Arctic Terns.

When the pairing season commences it is very amusing watching the absurd antics of the males trying to attract the attention of the females. When the tide is out, at low-water, the terns generally assemble on a sandbank to rest after fishing, and there the males strut about amongst the females, with their heads thrown back and wings drooping (almost touching the sand), but after a time if there is no response from the females, who generally look on the performance with the greatest unconcern, one goes off for a little and returns with a Sand-eel in his bill, and commences again strutting about with wings and head in same position and moves about amongst the females, offering the Sand-eel from one to another as he passes along unnoticed, until at last he meets a hen who accepts his offering, and then sits down alongside of her to settle their future arrangements.

**COMMON TERN** (*Sterna fluviatilis*).—A summer visitor, generally appearing in the bay and estuary about the first week in May, and sometimes delaying its visit if the weather is cold and stormy. It is an abundant species and widely distributed during the breeding season amongst the freshwater lakes and sea-shores. Large numbers breed on a low gravelly island near Errew Abbey in Lough Conn, and on another island at the Pontoon end of the lake, while lesser numbers are scattered about the lake, solitary pairs breeding on the stony points of many of the smaller islands. They also breed on islands in Loughs Mask and Carra, also in Mayo, while I have seen a small colony on an island in Lough Gill, near Sligo. Of their marine breeding-haunts the principal one on the North Mayo coast is that of the Inch, a low gravelly island in Killala Pool, where they breed in company of the Lesser and Arctic Terns; a few pairs also breed on Horse Island, near Roughly, Sligo Bay, amongst the crowd of Arctic Terns.

**ARCTIC TERN** (*Sterna macrura*) is not so numerous in the bay and estuary as the Common Tern, and although I had occasionally shot specimens in company of the Common Tern it was not until the past summer that I ascertained that they bred in this locality, when I found them breeding on the Inch with the Common and Lesser Terns. I had in previous years shot birds at the Inch, that from the darkness of their under plumage when seen in flight I took to be Arctic Terns, but in every instance they proved to be the Common; so that I find it impossible to identify an Arctic Tern on the wing by the colours of its plumage. Indeed my experience is, that unless seen close enough to discern the lake-coloured bill, the colours of plumage will not distinguish this bird from the Common Tern. Other means of distinguishing between the two species when flying are the much sharper cry, when alarmed, than that of the Common Tern, and the greater length of the tail feathers, but these are not always perceptible to the observer.

When visiting the Inch on 14th June, 1895, I remarked that several of the Terns emitted the same sharp cries that I had heard previously at breeding-haunts of the Arctic Terns, at other places, but still I could not perceive any difference in appearance between any of the large numbers of birds flying about, until walking over to some nests of the Lesser Terns,

one of the larger species rose off eggs at my feet, and uttering the sharp cry, kept soaring round out of shot. While doing so, the unusual length of its pointed tail feathers, and its excessive wildness (so unlike the habits of the Arctic) caused me to think that it might be the rare Roseate Tern, and being very anxious to identify the bird, or shoot it, I lay down behind a little hillock, about 50 yards from where the eggs were laid on the bare sand, and though after a time the bird returned to her eggs, yet, whenever I attempted to move, or stand up, she always got up quite out of shot, soaring about in wide circles; several times for over half an hour all my attempts failed in obtaining a shot, and her great wildness made me feel so confident that she was a Roseate, that I was more anxious than ever to shoot her. So trying another plan, I put her off the eggs, and then lay down behind the hillock on the chance of obtaining a shot as she circled round; remaining quite still, she lowered her flight, and in one of her circles, coming within range, I brought her down, and to my great disappointment she proved to be an Arctic Tern.

When at the summer assizes of Sligo in July, 1894, a friend told me of a large breeding-haunt of terns on Horse Island, near Raughly, off Brown's Bay, about 12 miles from Sligo, and I gladly accepted his offer to drive me there. Reaching Raughly, we stopped on our way at Artarmon to call on Mr. C. Jones Henry, who very kindly took us in his boat to the island. It is seven or eight acres in extent, and all in pasture. The terns lay their eggs all about the island on the grass, and on the rocks and stones above high-water-mark, all round the island. On landing we were soon surrounded and mobbed by the largest flock of terns that I ever saw. At the least estimation fully 500 to 700 pairs were flying about us, and from their sharp cries all were evidently Arctic Terns. I did not recognise the note of a single Common Tern, and all the specimens we shot were of the first-named species, and the only evidence we had of the presence of Common Terns, was two or three young birds we found running about the rocks. This great flock of Arctic Terns was to me one of the most interesting sights I had witnessed for a long time, and Mr. Henry told us that when he visited the island some three or four years before, the number of birds was far larger, and that when walking on the island, he found it almost impossible to

avoid treading on the eggs, so thickly were they scattered about. We found that only about fifty or sixty pairs had eggs on the short pasture, and on the rocks; not more than half a dozen young birds were seen, although it was so late as the 7th July, but the birds had been much harassed and disturbed by previous visitors taking the eggs out of mere wanton mischief, and leaving them in heaps on the grass. We found one heap of 50 or 60 eggs left near the landing-place, all nearly incubated, and this wanton destruction of the eggs easily accounted for the few nests found by us, and the small number of young birds seen.

William Thompson was not aware of this tern having any inland breeding-haunts, but considered it strictly marine in all its habits, and both Mr. Yarrell and Mr. H. Saunders appear to have been of the same opinion, for neither in the last edition of "British Birds," nor in Saunders' "Handbook," is there any mention of this bird breeding on fresh water within the British Isles.

The first intimation I had of this tern breeding on fresh water, was from my old and valued friend, the late Mr. A. G. More, who, when botanising along the shores and islands of the Mayo lakes, met this bird breeding in company with Common Terns on an island on Lough Carra; and I was also informed in 1891 by Mr. W. H. Good, of Westport, that he met with it breeding on islands, both on Loughs Mask and Carra: which statements I verified, when visiting these lakes in the company of my friend Mr. W. Williams, of Dublin, in June, 1893, for we obtained specimens on both lakes, and brought young and eggs from an island off Cushlough on Lough Mask.

This tern is remarkable for the great extent of its breeding range, which extends from the inland lakes of Ireland, to Smith's Sound in the Arctic regions, as far north as the foot of civilized man has trod; Colonel Fielden of the late Arctic discovery expedition under Captain Nares, having met with this bird near the Alert's winter-quarters on the 16th June, 1876. In August of the previous year, he found eight pairs breeding on a small islet at the mouth of Discovery Bay, and a newly-hatched young bird in a nest surrounded by snow.

The **LITTLE TERN** (*Sterna minuta*) is a regular summer visitor, generally arriving in the estuary during the first or

second week of May, and although I have long observed them about the locality, it was only of late years that I have ascertained their breeding-haunt on the Inch, between Killala and Bartragh (their only breeding-haunt on the North Mayo coast). Here a small colony of ten or twelve pairs, used to breed in company with Common and Arctic Terns, until the past summer of 1895, when their numbers suddenly, and most unaccountably increased, and as they had not sufficient scope on the gravelly Inch, they spread over the adjacent sandy peninsula of Ross. When I visited the Inch on the 14th of last June, I was surprised at the large numbers of these terns, and estimated that at least 60 to 70 pairs were seen all about—both on the wing, resting on the sands, and sitting on their eggs, The birds had spread along the Ross shore for nearly half a mile laying their eggs on the sandy flat, and round the gravelly base of some hillocks, from which the sand had been blown away; no nests had been made; the two or three eggs of each pair lay on the bare sand or gravel. Just across the narrow channel, on the extreme end of Bartra Island, I found four pairs hatching a little above high water mark, and below the line of Bent-grass, the eggs also on the bare sand, and where no birds had ever before been known to breed.

The sudden increase of this tern is very interesting and mysterious, for it cannot be accounted for by any larger number than usual having been reared on the Inch the previous summer. Unless by the desertion of some distant breeding-haunt it is difficult to account for this influx of breeding birds to the Inch and neighbourhood. Besides this North Mayo breeding-haunt, there are several along the Sligo coast; one at Rosses Point, Sligo Bay, where a small colony of eight or ten pairs frequent a little sandy bay off the Rabbit-burrows, another on the northern side of the point in Drumcliffe Bay, where thirty to forty pairs breed on the wide expanse of sand-flat, which extends nearly across the upper end of the bay. This wide expanse of sand is generally bare all the summer, and apparently is only covered by the high spring-tides of spring and autumn; so the terns can hatch and rear their young in safety, for as they lay near the centre of the flat nearly a mile from the land, they are seldom molested, being quite out of the way of either cockle-pickers or bait-diggers. A third breeding-haunt is situated three or four

miles further north, near Raughly, in Brown's Bay, where a dozen pairs frequent a flat at the base of the sandhills, and lay on the bare pasture between the tufts of bent grass.

The BLACK TERN (*Sterna nigra*).—So rare a species in Ireland has only once come under my notice as a visitor to Killala Bay, and it was by the merest chance I came across it as I was fishing for Sea-trout near Bartragh on the 12th of October, 1859.

My boat was anchored in the channel between Baunross and a wide stretch of sand-banks left bare by the ebb-tide, and while fishing I remarked a group of four or five small terns resting on the sand-bank close to the channel, but at first, thinking they were young Common Terns, I paid no attention to them. However, after a while they rose from the sand, and began hawking after some flies, and the very sudden and adroit twists and turns they made in the pursuit of their diminutive prey showed they were birds strange to me. I at once got up my anchor and rowed after them, and as they were not at all shy I easily succeeded in shooting a pair of Black Terns in the first season's plumage. This little party, a family of terns, were evidently on their way south from their breeding-haunt, but whether they were bred in this country on some remote bog or mountain lough, is difficult to say, for there is no record of the Black Tern having ever bred in Ireland.

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#### NOTES ON THE ROCK POOLS OF BUNDORAN.

BY J. E. DUERDEN, A.R.C.SC. (LOND.),  
Curator of the Museum, Kingston, Jamaica.

In addition to the notes in the *Irish Naturalist* for January, 1895, upon the "Rock-pools of Bundoran," I find I have a few other observations which removal from Ireland has prevented from further amplification. This latter occurrence may perhaps be considered sufficient apology for their disconnected nature; while the fact that some of the specimens were collected and handed to me by Prof. Johnson renders it obligatory upon me to present them.

In examining the Hydroids the greenish, somewhat flask-shaped tests of the Protozoan *Folliculina ampulla*, Mull., were met with on the stems in considerable numbers.



The sponge *Hymeniacion celata*, Bowk. (*Cliona celata*, Grant), occurred perforating the hard Carboniferous limestone near the Fairy Bridge at the eastern end of Donegal Bay.

The patches at the surface exhibited a very characteristic appearance, and upon splitting the rock it was found to be closely perforated by the sponge for a depth of two or three inches. A well-known boring sponge, *Cliona* is commonly found inhabiting oyster and other shells all round the coast, but only occasionally is it met with in limestone. Bowerbank records it thus only from the limestone rocks around Tenby.

Among the Crustacea, a single specimen of the small Isopod, *Dynamene Montagui*, Leach, was obtained by Prof. Johnson from amongst the sea-weeds. It has previously been recorded from Bantry Bay.

Many specimens of the Sea-Hare, *Aplysia punctata*, Cuvier, were met with in the shallow rock-pools west of Bundoran, and also near Aughrus Point. Most were in the act of laying their strings of brown-pink spawn. The majority were of a uniformly dark olive green colour, while others were sprinkled with small opaque white patches over various parts of the body. Mr. Garstang has shown (*Journ. Mar. Biol. Assoc.* (n.s.) vol. i., No. 4, 1890, p. 403) that this species changes with growth from a violet, purplish, or rose-red colour, through brownish-red and brown to olive-brown or olive-green. The rock-surface of the pools in which the present specimens were found was coated with the pink *Lithothamnion polymorphum* to which the dark *Aplysia* offered a great contrast.

Prof. Johnson found the rare Nudibranch, *Hermæa bifida*, Montagu, while examining the weeds collected at low-water. It was living upon *Halurus* (*Griffithsia*) *equisetifolius*, to which the lake-red colour in its dorsal papillæ presented a remarkable resemblance. This protective or warning resemblance to the objects upon which Nudibranchs live has lately been the subject of various papers by Prof. Herdman, Mr. Garstang, and others. *Hermæa bifida* has been the object of some of Mr. Garstang's experiments at Plymouth (*Journ. Mar. Biol. Assoc.* (n.s.), vol. i., No. 2, Oct., 1889, p. 173) where it is interesting to find that the creature, which there was also collected by Prof. Johnson, lives upon the same Alga as at Bundoran. It is shown that its colour is purely adventitious, being determined mainly by that of the food within it undergoing digestion.

I obtained one specimen of the small greenish Nudibranch, *Hermæa dendritica*, Ald. and Hane., living amongst the green Algæ *Bryopsis* and *Codium*. Kept in captivity it laid a characteristic round mass of spawn. It refused to live upon the *Codium*, and in a few days lost most of its green colour, becoming yellowish brown. Garstang's experiments show that this species entirely avoids the red sea-weeds, upon which its colour would render it conspicuous.

Many examples of the Nudibranch, *Eolis coronata*, Forbes, were found living amongst colonies of *Tubularia larynx* collected from the Fairy Caves, their colours harmonising with the light red of the polypites.

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## A SUBMERGED PINE-FOREST.

BY R. LLOYD PRAEGER, B.Æ.

(Read before the Dublin Naturalists' Field Club, March 9th, 1896.)

ONE day in February last, Mr. R. Welch and I strolled along the beach northward of the new harbour at Bray, and just within the confines of the County of Dublin. At the verge of low water, where the slope of coarse shingle gives way to a more level stretch of fine sand and boulders, which is only left dry at spring tides, we noticed some stumps and boughs of trees, and on examining them, found that they were embedded in a compact layer of peat, which dipped southward at a low angle. The peat was full of branches and roots, and of cones of the Scotch Fir. On the southern side it disappeared under a bed of fine blue clay containing sea-shells; to the north, its broken edges overlay a stratum of coarse grey sand, with rounded fragments of granite. We had but cursorily examined the spot when the tide crept up again and soon hid it from view.

Here evidently was a geological story to be unravelled; a long history lay buried with this old peat-bed under the mud and shingle which the sea had heaped upon it; and it was for us to read that history, if we could. Thus it came about that in two days' time we again visited the place, and Mr. Welch secured several excellent photographs of the deposit; and a little later, selecting a spring-tide, Mr. Lyster Jameson and I went down and thoroughly examined the spot, and determined the extent of the different beds and their relative position and

thickness. What we found may be shown in the form of a section north and south along the beach (fig. 1). The newest

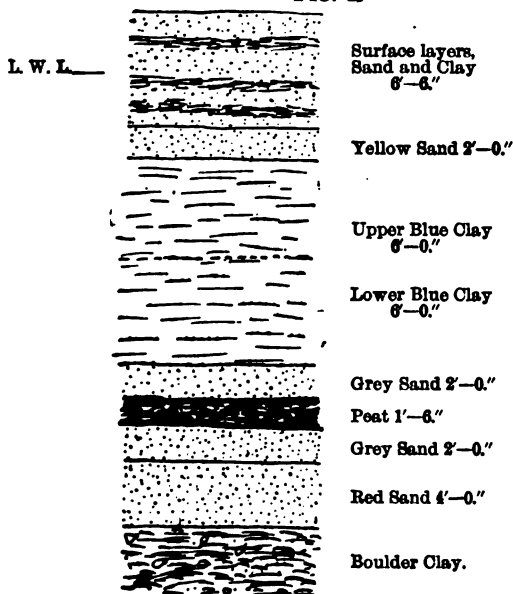
FIG. 1.



bed is the blue marine clay, which may be well seen in the space lying inside of the crescent-shaped heap of large boulders which forms a conspicuous object on the shore at low water about a quarter of a mile north of Bray Harbour. The clay is extremely fine and tough, and is full of the shell *Scrobicularia piperata*, a species whose habitat is between tide-marks on mud-flats and in estuaries. In most cases the pairs of valves are still in juxtaposition, and upright, showing that the shells are lying undisturbed in the place where they lived and died. With this shell was the well-known *Tellina balthica*, which lives in similar situations; and a specimen of *Littorina litorea*, the Common Periwinkle, was also found. We had not brought excavating implements with us, but with the aid of a broken coal-shovel, kindly lent to us by the nearest resident, we found that towards the southern extremity of its area the bed of clay is at least six feet thick. Especially in its lower portion, the clay contains fir-cones and fragments of wood, washed out of the underlying peat. The peat-bed was next examined. Careful excavation round a selected stump, a large one standing almost upright, revealed the fact that it was firmly rooted in the peat; the spreading branching roots so characteristic of the Scotch Fir could be clearly traced from their junction with the trunk to their interlaced extremities. Although it was evident that various plants had contributed to the formation of this old forest-bed, no other species could be identified in the short time at our disposal. The peat rested abruptly on a couple of feet of coarse grey sand, in which no organic remains were detected. A little further on, the glacial sands and gravels that form the upper part of the fine coast section between Bray and Killiney rose out of the shingle, cemented into a hard conglomerate, as they are at other places in the neighbourhood. Beyond this the strand was occupied by a denuded surface of boulder-clay, burrowed by that pretty shell *Pholas candida*.

Two facts in the above description deserve our special attention. Firstly, the trees were *rooted* in the peat, showing that they *grew* there, and were not drifted by currents or carried down by streams. Secondly, the marine shells in the overlying clay *lived* where we now find them. And thus we obtain the key to this little earth-story. Fir-trees do not grow in the sea, nor do marine shells flourish on dry land. These beds of peat and clay tell us clearly of changes in the relative level of land and sea. To appreciate these changes, and to confirm our interpretation of the phenomena before us, we turn to a locality where beds of this kind attain a more extensive development, and can be better studied than on the storm-swept shore at Bray. The greater part of the City of Belfast is built on thick deposits of post-glacial age, and the deep and wide excavations made from time to time in the construction of new docks, have afforded golden opportunities for their investigation—opportunities which have not been altogether neglected. We will take a typical section from the Alexandra Dock Works<sup>1</sup> (fig. 2).

FIG. 2.



<sup>1</sup> See Praeger, "The Estuarine Clays at the new Alexandra Dock, Belfast." *Proc. B.N.F.C.* for 1886-87, *Appendix.*

Here, below some feet of sandy and muddy beds, the recent creation of the River Lagan, we find a bed 12 feet thick of blue clay, which examination shows to be clearly divisible into two zones—an upper clay, exceedingly fine and pure, full of a rich and luxuriant fauna characterized by species which live in from 5 to 10 fathoms of water; and a lower zone, more sandy, which yields in abundance remains of the Grass-wrack, *Zostera marina*, and shells, such as *Scrobicularia piperata*, *Tapes decussatus*, and *Tellina balthica*, that are usually found living with the Grass-wrack on muddy shores between tide-marks. Under these clays we see, intercalated between thin beds of grey sand, a layer of peat, which contains remains of Scotch Fir, Hazel, Alder, &c., as well as bones of the Red Deer, Wild Boar, and Irish Elk.<sup>1</sup> The next bed in order of descent is a fine red sand, a deposit that in many places in the neighbourhood of Belfast attains an extensive development, and which, though its stratigraphical relations have not yet been worked out, there is good reason for supposing to correspond with the sands and gravels which form so important a feature in the glacial series about Dublin. And lastly, this bed of sand reposes on Boulder-clay.

Comparing now this section with the beds on the foreshore at Bray, we will be immediately struck with the exact parallelism. The deep-water clay which forms the uppermost bed of the series at Belfast is indeed unrepresented at Bray, but the others correspond zone for zone, and the clay and peat are even characterized by the same fossils. And we may with advantage carry our comparison a little further. The peat-bed is to be found in many spots in the north-east; and in other places at Belfast, and at Downpatrick, it is to be found underlying thirty feet or more of the blue clay. Again, at Larne, the *Scrobicularia* clay (as we may call the lower zone), which is also very persistent along the north-eastern shores, has, superimposed on it, 19 feet of stratified marine gravels, which contain flint implements of Neolithic age from top to base, though none are found in the clay. At Kilroot, midway between Belfast and Larne, the beds present an appearance exactly like that seen at Bray, for here, near low water-mark,

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<sup>1</sup> Praeger, *op. cit.*, and *Proc. B.N.F.C.* for 1891-92, p. 416.

we have a patch of *Scrobicularia* clay which rests on peat, both lying in a shallow basin in the Boulder-clay, which crops out close at hand. At Ballyholme, again, on the opposite or southern shore of Belfast Lough, the peat may be seen on the shore between tides, with 15 feet of stratified marine gravels overlying it, and Boulder-clay below. Similar instances might be multiplied.<sup>1</sup>

The sections just described throw much light on the beds at Bray, and will assist us to form an idea of their age, and of the conditions under which they were laid down. The peat evidently represents a period when the land stood slightly higher than at present. The cold that characterized the glacial epoch appears to have quite passed away, for the plants and animals of the peat, so far as they are known, point to a climate resembling that which this country at present enjoys. Then came subsidence, and the accumulation of marine clays on the former land-surface. This may have been the period of Palæolithic man; we know at least that it is the zone underlying the lowest which contains Neolithic implements at Larne. It may be noted that the characteristic shell of these clays—*Scrobicularia piperata*, which is present in countless thousands both at Bray and in the many places where this deposit is found in Antrim and Down—while it still lives about Dublin, has become completely extinct in the north-east of Ireland, and many other shells of the clays have disappeared along with it. The Bray series carries us no further, but the deep-water clay and extensive raised beaches that overlie the *Scrobicularia* clay in the North-east are evidence of a further period of depression before the land rose to its present level.

And thus, as we stand on the sea-shore at Bray and gaze along the storm-swept edges of these old beds, we are, as it were, looking down the corridors of time—glancing at a tale, which, though long, occupies but the last page, nay, but the last sentence, of the great book of geological history. The peat tells us of a forest of dark fir-trees, under whose shadow wandered herds of stately Red Deer, and packs of Wild Boars and Wolves, and perhaps the great Irish Elk, while year by

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<sup>1</sup> See Praeger; Report on the Estuarine Clays of the north-east of Ireland. *Proc. R.I.A.* (3) ii., No. 2, 1892.

year the trees shed their cones and needles to form the firm brown mass at our feet. A different chapter of the story is revealed by the fine blue clay, which points to a shallow muddy shore-line, like that which we still find on the Murrough of Wicklow. Immediately above the bed of clay, the broad shingle of the present beach catches our eye, recalling the never-ceasing wear and tear of the ocean, ever carving and levelling, and still making new land out of old; while beyond all, and over all, we catch a glimpse of the villas and spires of Bray, and hear the rattle of vehicles and rumble of trains, to remind us that from the dim twilight of the past, we have emerged into the broad daylight of the present.

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### THE SONG OF BIRDS.

**The Evolution of Bird-Song, with observations on the Influence of heredity and Imitation.** By CHARLES A. WITCHELL. London: A & C. Black, 1896. 5s.

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Mr. Witchell's ten years "scientific investigation of the various features of bird-song" has borne fruit in a volume comprising less than 250 pages—a fact proving that the author possesses in full the faculty of judicious compression. Besides making it his object to acquaint himself as far as possible with the notes of all his feathered neighbours, and to ascertain for each variety of bird-note the kind of occasion on which it is uttered, Mr. Witchell has addressed himself to the task of resolving the songs of birds into their component parts; and his account, given in these pages, of the probable course of development of the phenomena of bird-song, is in the main, well calculated to command general acceptance. Mr. Witchell's theory is not a very elaborate one. The most primitive bird-sounds he believes to have been combat-cries, which passed with more or less of modification into defiance-cries and alarm-cries, while the latter, as employed between members of a family, would form the origin of the call-note. The earliest and of course simplest songs were mere repetitions of the call-note, or sometimes "possibly" (p. 58) of the defiance-cry. (Mr. Witchell might surely, on his own showing, have laid more stress on this latter element; and did he never hear a hen-whitethroat, frenzied with rage at some peril to her new-fledged brood burst into hysterical snatches of her lord's song?) Simple songs would be varied by being more rapidly and "forcefully" uttered, rivalry between male birds occasionally instigating other modifications which, if

agreeable to the females, would tend to become hereditary. Finally, male birds excelling in range of voice would learn new notes from their environment, and develop into more or less accomplished mimics. Mr. Witchell's chapter on the influence of imitation is the part of his book which is likely to be read with most suspense of judgment. It contains some excellent remarks (pp. 192-3) on the difficulty of detecting mimicry—especially when imperfect—and on the general impossibility of subjecting to proof the statements of an observer who claims to have heard particular imitations. No one with the least susceptibility to Mr. Witchell's evident love of nature would question for a moment the strict fidelity of his record—so far, that is, as his observations can be severed from his inferences. But are *casual* resemblances so rare among natural sounds that mimicry may fairly be inferred or conjectured when a heron (p. 182) croaks like a frog (N.B.—the *dead* heron does this automatically); or a landrail (p. 189) salutes his bride in measured tones attuned like munches of a grazing cow? The suggestion by the way of the proximity of the latter kind of animal would be a bit disquieting to the sitting female, and a display of doubtful tact on her mate's part. The following rendering of a thrush's song, in which "a phrase without recognizable mimicry is indicated by an 'O'" will serve as a sample of Mr. Witchell's readiness in detecting what he deems imitative resemblances:—"Frocester, Glos., near the church, 17th May, 1892. Thrush singing:—Golden plover—golden plover—O—crow—corncrake—be quick—O—O—wood warbler's sibilous notes—cuckoo (in rough tones)—O—young starling's cry after leaving nest—O—butcher-bird—be quick—O—O—whitethroat's alarm—great tit (cry)—O—O—end" (pp. 203-4.)

That a few strains are here somewhat too willingly classed as imitations cannot, indeed, be proved but it can be fairly surmised. Sometimes, certainly, Mr. Witchell does make too much of mere similarities between sounds. For instance, the resemblance of the wren's to the hedge-sparrow's song is quite superficial, and requires no such hypothesis as Mr. Witchell offers in explanation,—viz., that both were "derived from some persistent source" (p. 191)—as an alternative to the utterly absurd idea that one of these birds copied the other. The remark, too, that robins, even in winter, often "reproduce *exactly*" the unique and beautiful song of the willow-warbler (p. 207) is startlingly questionable, though here again a slight similarity in cadence is frequently noticed. And surely it was riding a hobby to death to hint (p. 187) that the yellow-hammer's song is a mimicry of the grasshopper's, when on a previous page (p. 48) the same well-known melody had been grouped among those inferior efforts which are obviously "more or less repetitions of the call-note."

C. B. M.



## SOME RECENT NATURAL HISTORY PAPERS.

The last-issued part of the *Proceedings of the Royal Irish Academy*, (3) vol. iii., No. 4, December, 1895, contains several natural history papers of considerable interest. Prof. Sollas writes "On the Crystalline form of Riebeckite," the blue hornblende characteristic of the "micro-granite" of Ailsa Craig, pebbles of which have been found in Irish glacial drifts from Greenore to Greystones. A pebble from Portrane contained cavities large enough for well-formed crystals of riebeckite, whose angles Prof. Sollas was able to measure. The results were slightly but obviously abnormal, and the author suggests in explanation, that "the crystals are far from simple, and may best be regarded as crystal complexes, simulating and making a close approximation to a simple crystal form."

Mr. G. H. Kinahan contributes a paper on "Quartz, Quartz-rock, and Quartzite." His views on the origin of these rocks have been laid before the readers of the *Irish Naturalist* (vol. I., pp. 162, 184.) At the end of the paper is the reference to Mr. W. W. Watts' examination of sinter from Iceland which led to some correspondence from that gentleman published in our last volume (p. 340.)

The third of the local surveys undertaken by the Dublin Anthropometric Committee is described by Dr. C. R. Browne in his important paper on "The Ethnography of the Mullet, Inishkea Islands, and Portacloy, Co. Mayo." After describing the physiography of the districts which are most isolated, Dr. Browne deals with the anthropography, sociology, folk-lore, archæology, and history of the inhabitants. It is needless to say that the information on these subjects is of the greatest interest, the people preserving many curious primitive customs. The original inhabitants seem never to have been driven out, though often conquered, but one or two recent immigrations are known to have taken place. The people of Inishkea differ in many respects from their neighbours of the mainland, and are probably the most unmixed representatives of the original population.

Mr. W. J. Knowles' "Third Report of the Pre-historic Remains from the Sandhills of the Coast of Ireland" is of interest to naturalists for its reference to the abundance of bones of the Great Auk, referred to by Mr. Barrett-Hamilton in his paper in our last month's issue.

Mr. John Hood, of Dundee, has communicated through the Flora and Fauna Committee an important paper "On the Rotifera of Co. Mayo," enumerating 220 species of those highly interesting microscopic animals. There are excellent figures of some of the rarer forms. Two species, *Pterodina bidentata*, Ternitz, and *Eosphora elongata*, Ehrb., are recorded as new to the British Isles. On account of the number of lakes and vast tracts of unreclaimed land, Mr. Hood considers that Ireland should furnish a rich harvest to the rotifer-collector. He gives a list of all the species found in Ireland by Miss Glascott and himself, amounting together to about 275, and suggests, in some cases, the identity of species described as new by Miss Glascott with forms described by previous authors.

Mr. H. H. Dixon contributes two papers on the histology of the vegetable cell. The first, "On the Chromosomes of *Lilium longiflorum*," deals with the number of those bodies formed by the nuclear thread in mitosis. Investigations into the division of the pollen mother- and daughter-cells and of the cells of the embryo-sac are described. Variations in the number of the chromosomes were noticed, a phenomenon which the author believes not to have been hitherto described as occurring in the gametophyte of flowering-plants, prior to the differentiation of the sexual cells. Mr. Dixon's second paper is a "Note on the Nuclei of the Endosperm of *Fritillaria imperialis*." Nuclear division, as observed here, was found to be extremely variable, and forms intermediate between normal karyokinesis and direct division are referred to as of special interest.

In the *Transactions of the Manchester Geological Society*, vol. xxiv., pt. 7, appears a paper by Mr. G. H. Kinahan, "On possible Land-Connections in Recent Geological Times between Ireland and Great Britain." This communication seems to have been suggested by Dr. Scharff's preliminary report "On the Origin of the Irish Land and Freshwater Fauna" (*Proc. R.I. A.* (3), vol. iii., p. 479, *Irish Nat.*, vol. iii., p. 260). Mr. Kinahan maintains that all the Irish plants and animals passed into the country in late Pleistocene times. Apparently he has not taken the trouble to read Dr. Scharff's paper, as in each of the first two paragraphs he attributes to that naturalist the use of the term "Pliocene" in connections where "Pleistocene" was really used, while, a little further on, Dr. Scharff is credited with the statement never made by him that all the lakes inhabited by varieties of the "pollen" (*sic*) communicate directly with the Irish Sea. Mr. Kinahan asks why Dr. Scharff should found his argument on ten mammals only, and "eliminate specially the rat, rabbit, bat, roebuck, and wild cat." Dr. Scharff in his paper plainly said why, because the ten only are undoubtedly indigenous. What naturalist ever included the Roebuck among native Irish mammals? Mr. Kinahan suggests that the land-connections across which the Irish animals and plants came consisted of shoals formed by tide-action, one at the north-east and the other at the south-east corner of Ireland, and adds that such frail bridges would be rapidly washed away. He brings forward, in evidence of the southern drift, the startling statement that the Killiney gravels are largely composed of fragments of Wexford rocks. There is no attempt to answer Dr. Scharff's argument for the Pliocene age of the Irish Fauna, from the existence in Great Britain in Pleistocene times of those animals which are British but not Irish, but which should have found their way to Ireland had Pleistocene land-connections existed.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Hare from Master Ball, and a Hedgehog from Mr. W. M'Donnell. A very fine pair of Burchell's Zebras, three Mona Monkeys, a Wanderoo Monkey, a Siamese Ape, a Nigger Monkey, a Siamese Civet Cat, a Binturong, three Virginian Opossums, a Wombat, a Golden Eagle, and two dozen small birds have been purchased.

18,000 persons visited the Gardens in April.

### CORK NATURALISTS' FIELD CLUB.

The Annual Meeting was held April 21st, when about 25 members attended. Mr. J. H. BENNETT, V.P., occupied the chair. The Secretary read the fourth Annual Report, of which the following is an abstract:—We are glad to report an increase of membership—46 paid-up members, as against 33 of the previous year. We believe this to be the result of increasing interest owing to the union of the Field Clubs, and their growing importance.

The following places were visited during the summer of 1895:—

May 11.—The Lee Valley, with the object of noting the physical geography of the district, under the able guidance of Prof. Hartog, D.Sc., V.P. May 25.—Fota. June 15.—Ballyedmund, Middleton. July 10.—Upton and Innishannon. August 5.—Doneraile Court and Buttevant Abbey. August 24.—Warren's Court, by permission of Sir Augustus Warren, who entertained the party. September 7.—Castlemartyr, Lord Shannon's demesne.

Owing to the Gilchrist Lectures, which our Club, jointly with the Literary and Scientific Society, were instrumental in securing, being held, and also the Extension Lectures, it was deemed advisable not to multiply meetings, and accordingly only three Club meetings were held during the Winter Session:—

November 27, 1895.—Lecture: "The Galway Field Club Conference, 1895," by R. Lloyd Praeger, Hon. Sec. D.N.F.C. and F. C. Union. December 12.—Lecture: "The Scenery of Co. Antrim," by W. Gray, B.N.F.C. February 11, 1896.—Paper by William Miller: "The Climate of Cork," which gave rise to an animated discussion, and is to appear in the *Cork Historical and Archaeological Journal*, followed by "Notes on Rousslet's method of mounting Rotifers," by Prof. Hartog, D.Sc. (which has already appeared in the *Irish Naturalist*).

On November 5th, 1895, your Secretary attended the *Conversazione* of the Dublin Naturalists' Field Club, and on March 10th, 1896, a *Conversazione* was held jointly with the Cork Historical and Archæological Society in the Imperial Hotel, attended by members of the Dublin and Limerick Clubs, and which was most successful. The finances, including a few subscriptions since paid, just about balance for the year.

The following Officers and Committee were elected :—

W. H. Shaw, President ; Prof. M. Hartog, T. Farrington, Miss Martin, J. H. Bennett, J. Gilbert, Vice-Presidents ; J. L. Copeman, Hon. Sec. and Treasurer ; R. A. Phillips, Curator ; D. Franklin, H. Lund, Mrs. Peyton, E. B. Hughes, F. R. Rohn, Committee.

MAY 2nd.—The first excursion took place to Fota, Mr. A. Smith-Barry's demesne, and proved a record one, about 50 members and friends attending. Under the guidance of Mr. W. Osborne Stewart, the grounds were viewed, and the various rare pines and palms with which they abound examined. Some specimens of larvæ, &c., were taken in the ponds, including a "singing" *Corixa*, which seems to have been the first noticed from near Cork, those noted by Mrs. Thompson all coming from the Fermoy district.

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## FIELD CLUB NEWS.

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Lavens M. Ewart, the new President of the Belfast Field Club, is interested chiefly in the archæological side of the Club's work. He is a well-known collector of local prints, &c., and his collection of old maps of the Belfast district is the finest in existence. Rev. C. H. Waddell, the new Vice-President, has for many years devoted himself to botany, particularly mosses and hepatics, and more recently to phanerogams also. The formation of the new Botanical Section of the Club was largely due to his influence.

On the invitation of the Hon. R. E. Dillon, a party of naturalists will spend a week in June at Clonbrock, Co. Galway, exploring eastern Galway and Roscommon. This district is almost virgin ground to the naturalist, and Mr. Dillon's startling discoveries among the Lepidoptera there augur well for the success of the expedition. The publication of the results will be looked forward to with interest.

The Secretaries of the Belfast Club desire us to make it known that a dredging excursion has been arranged for Saturday, July 4, of which they invite members of the various Field Clubs to take advantage. A paddle steamer from the Clyde has been engaged for the occasion. The marine fauna of the waters adjoining Belfast Lough is rich and interesting, and it is intended to plunder the treasures of the Turbot Bank, made famous by the explorations of Hyndman and Waller.

Cheering news comes from Cork, where Mr. Copeman, at the annual meeting of the Field Club on April 21, was able to report a substantial rise of membership, and increased interest in the work of the Club, which he believed to be largely due to the formation of the Field Club Union, and to its influence. The Cork Club has now passed the somewhat trying period of infancy, and naturalists in Ireland will watch with satisfaction its continued progress.

## NOTES.

**Seasonable Notes from Cushendun.**—Swallows appeared here on April 2nd; Wild Anemone in flower, 5th; Hawthorn in flower, 19th; *Cardamine pratense* in flower, 22nd; *Orchis mascula* in flower, 22nd; Cuckoo calling, 22nd; small white Butterfly, 19th; Corncrake calling, May 2nd; *Vicia sepium* in flower, 3rd; St. Mark's Fly, 3rd; Swift, May 9th.

SL. ARTHUR BRENNAN, Cushendun.

### BOTANY.

#### PHANEROGAMS.

**Ranunculus tripartitus, DC., an Addition to the Irish Flora.**—While botanizing on the 3rd of April last among the rocky hills which lie to the south of Baltimore, Co. Cork, I discovered in a small lake not far from the sea a distinct and pretty little Batrachian *Ranunculus*, which Messrs. H. and J. Groves have kindly identified for me as *R. tripartitus*, DC., type. This is certainly an addition to the flora of Ireland and possibly to that of the British Isles also, as, according to the *London Catalogue*, 9th ed., it is represented in Great Britain only by the variety (or species) *intermedius*, Knaf., which occurs in a few of the southern English counties. It is also an addition to the characteristic group of South-west European plants native in Ireland, its foreign distribution being limited to Portugal, Spain, France, South Italy, Belgium, and Germany.

R. A. PHILLIPS, Cork.

**Lathræa squamaria in Co. Down.**—I have within the last thirty years frequently found *Lathræa squamaria* growing in the Tollymore Park woods of the Earl of Roden, a locality which is mentioned in Dickie's *Flora of Ulster*, and Stewart and Corry's *Flora of the North-East of Ireland*. Mr. Ryan will find many Irish localities for this plant given in the above-named books, and also in Moore and More's *Cybele Hibernica* I may mention two Co. Armagh localities that are known to me, Ardmore Glebe, on the shores of Lough Neagh, and the Lower Demesne, Tanderagee, where my daughter found it 7th May, 1896.

H. W. LETT, Loughbrickland.

**Lathræa squamaria.**—In reply to T. Ryan's note (*J. N.*, p. 142). Stewart and Corry's *Flora of N. E. Ireland* says the Toothwort is frequent in Antrim, Derry, and Down, and gives many localities. I have seen it in Tollymore Park. On account of its early flowering in April and May it is sometimes overlooked. In Kerner's *Natural History of Plants*, p. 137, an account is given with illustrations of the structure of this plant, from which it appears not only to be parasitic but also carnivorous in its habits. This interesting and splendidly illustrated work ought to do much to promote a more general knowledge of the life of plants.

C. H. WADDILL.

**Lathraea squamaria** in King's Co.—*Lathraea squamaria* is found growing freely in this county. It is well developed on the lawn of Geashill Rectory under Beech-trees, and quite lately I found it about nine miles from here on a ditch along the road through Clonad Wood. The plant fastens itself to the roots of the Beech by small attachments or discs; but it also grows round the roots, forming a sort of envelope or outer sheath; a section which I have prepared shows well the way in which the cellular tissue of the plant passes into that of the wood.

C. D. RUSSELL, Geashill.

**Lathraea squamaria**.—I see an inquiry in your May number as to the occurrence of *Lathraea squamaria*. It is found at Heywood, near Clonmel; my impression is that it is parasitic upon Elm there. It also grows in Strabane Glen, Co. Tyrone, on the roots of Hazel.

A. H. DELAP, Strabane.

**Allium trifidum**, L., in Co. Cork.—This interesting South European plant occurs in at least two stations in this county. In 1890 I found it (about 20 or 25 plants) in a grassy hollow near Dunkettle on the northern side of Cork Harbour, where it has since continued to hold its own, and this year Surgeon W. G. Axford, R.N., has discovered it at Monkstown, some eight miles south and on the opposite side of the harbour. Though not a native, the occurrence of this species here in a wild state is remarkable, as its British distribution, like that of many other Cork plants, is limited to Cornwall, where it is thoroughly naturalized, and the Channel Islands, while on the continent it is found only in S. France, Spain, and Italy.

R. A. PHILLIPS, Cork.

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## ZOOLOGY.

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### SPIDERS.

**Discovery of the genus Atypus in King's Co.**—A very interesting addition to our Irish list of spiders has been made by the discovery of the tubular nest of a female *Atypus* by Rev. Canon Russell of Geashill, near Tullamore. The specimen was kindly sent by him to the Dublin Museum and has been authenticated by Rev. O. P. Cambridge. Pending the discovery of the maker of the nest the species must remain doubtful, though it will probably be the less rare British form, *Atypus piceus*, Sulz. *Atypus* is the only British genus of the *Aviculariidae*, the family which contains the great "bird-eating" spiders of the tropics and the trap-door spiders of southern Europe. This spider constructs a long silken tube in the earth, but there is no trap-door; the end of the tube protrudes for a few inches above the surface. The nest sent by Canon Russell contained a caterpillar of *Hepialus humuli*, which may have been dragged in by the spider as prey.

GEO. H. CARPENTER.

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### INSECTS.

**Formica rufa**.—This ant occurs sparingly in a wooded glen in the Co. Waterford, near Clonmel, about two miles south of the town.

A. H. DELAP, Strabane.

## REPTILES.

**A stray Snake near Coleraine.**—On the evening of April 22nd, a lady friend called to tell me that she had killed a snake in her garden, which is in the immediate vicinity of Coleraine. It is upon the right bank of the river Bann, and about a quarter of a mile south of the town. She described the reptile's hiss and her own alarm in such a graphic way, that in spite of the legend about our Patron Saint and his expatriation of all Ophidians, the incredulity with which I at first regarded her story gave way, and I accompanied her to the spot and found upon a grass plot in front of her house the newly-killed snake. It is a Ringed Snake (*Tropidonotus natrix*) measuring twenty-five and three-quarter inches in length. In depriving it of its supposed power to do harm she had not used it gently. Nevertheless, though somewhat mutilated, the specimen was well worth preserving, and so I committed it to a bottle of spirits. It is not necessary to say that Ringed Snakes are not native here, but where this one came from, or how it came here, I have been as yet unable to make out.

JAMES BELLAS, Cronbannagh, Coleraine.

## BIRDS.

**Scarcity of Land Rail.**—For some reason the Corncrake is either very late to come or very scarce this year in this district. While the Cuckoo has been here since 15th April, and is plentiful, I have only heard one Corncrake on 14th May, where they usually abound.

C. H. WADDELL, Saintfield.

**Arrival of Spring Migrants in Londonderry District.**—The Chiff-chaff was as usual our earlier visitant; it reached us on 31st March. The Sandmartin and Swallow were much behind their usual time; the former arrived on 12th April, and the latter on 13th April. The Willow Wren was also very late of coming; I did not hear its song until 23rd April. The Cuckoo was first heard on 21st April, and the Corncrake on 22nd April.

D. C. CAMPBELL, Londonderry.

**The Magpie in the Isle of Man.**—Referring to Mr. C. B. Moffat's note in your April number (p. 116), I may mention that the Magpie is an introduced species in the Isle of Man. In the history of the Island by Bishop Wilson<sup>1</sup> (cp. 1698-1755) it is stated—"It is not long since a person, more fanciful than prudent or kind to his country, brought in a brood of Magpies, which have increased incredibly, so as to become a nuisance."

P. RALFE, Laxey, Isle of Man.

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<sup>1</sup>In Manx Society's Publications, vol. xviii. The exact date of the work does not seem to be given.

## THE GULLS OF KILLALA BAY.

BY ROBERT WARREN.

OF the eight species of gulls met with in this locality, five are resident and breed—namely, the Great Blackbacked, Lesser Blackbacked, Herring, Common, and Blackheaded Gulls; one, the Kittiwake, is only a summer visitor, departing after the breeding season is over; while two, the Glaucous and Iceland Gulls, are irregular winter visitors, only occasionally seen.

The GREAT BLACKBACKED GULL (*Larus marinus*), the largest of our native gulls, is common, but not numerous, a few pairs frequenting the estuary and sands of the bay in winter, while two or three pairs of non-breeding birds remain about the sands during summer.

The nearest breeding-haunt to Killala Bay is Doonbrista, the pillar-like rock off Downpatrick Head, near Ballycastle (six miles from Killala), where twelve or fifteen pairs have their nests on the flat, grassy summit, and rear their young in perfect safety, for the rock is quite inaccessible; and strange to say, though perfectly safe from disturbance of any kind, their numbers do not seem to increase, for about the same number of breeding birds are now to be seen frequenting the rock as were observed thirty years ago when I first visited Downpatrick Head. The next breeding-station of this gull on the North Mayo coast is that on the Stags of Broadhaven, fifteen or twenty miles west of Downpatrick Head, where a few pairs breed on the largest of the rocks.

The Stags of Broadhaven are situated about three miles from Portacloy, and are four huge isolated rocks, the largest about 300 feet in height, and give one the idea of four miniature Ailsa Craigs' with sharply triangular outline. A peculiarity of the rocks along that coast, especially at the base of the cliffs, is their broken shattered appearance and their sharp and rugged points and edges, seen appearing along the surface of the water when the tide is low, in some places extending for many yards beyond the cliff's base.

Some years ago the Great Blackbacked Gulls of this locality were nearly exterminated by poison, laid by the tenant

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of Bartragh Island for the destruction of rats. A plague of rats destroying the young rabbits in the burrows, thinned them out considerably, and he, wishing to protect them, laid poisoned meat and fish amongst the burrows on the sand-hills, which the gulls (always on the look-out for dead or dying Rabbits) greedily devoured, and the result was that numbers of both Blackbacked and Herring Gulls were afterwards seen lying dead in all directions about the island ; and for three or four years after very few were seen about the sands.

These great gulls always hovering over the sands and shores, are like vultures, on the look-out for carrion, dead fish, or weakly, or wounded birds. They become a perfect nuisance to the wild-fowl shooter, alarming the birds he is setting up to for a shot ; for the instant he lies down to his gun, the gull, seeing him in such an unusual position, begins to suspect danger, and flies over, and round the punt (out of shot), looking down on the shooter, and giving out his harsh alarm note, which immediately causes the ducks, or Widgeon to be so much on the alert, that the fowler is unable to approach within shooting distance. However, if he does succeed in coming within range, and obtain a shot, any of the dead or wounded birds that escape him are sure to become the prey of the gulls. I well remember on one occasion I knocked down fifteen Widgeon at a shot, while a " dropper " fell dead some distance off, and while I was picking up the dead, and chasing the cripples, a Blackback, that had been watching, and trying to alarm the flock of Widgeon, on seeing the dropper fall, at once made for it, and settling down on the water alongside began tearing the breast, and by the time I had secured my dead and wounded birds, I reached the dropper only in time to find a well-picked skeleton. A dead, or wounded bird is seldom (in winter) found lying on the shore for any time without being clean picked, and many a rare specimen cast up by the sea is destroyed long before the naturalist finds it. I was one day so fortunate as to rescue two fine specimens of the Fulmar from being destroyed by these gulls ; they had been thrown up by the surf on the Enniscrone sands, in so weak and exhausted a condition as to be unable to stand, when I came on the gulls just attacking them.

The HERRING GULL (*Larus argentatus*) is the most numerous of the large gulls on this part of the coast. They have many breeding-stations on the cliffs along the North Mayo coast, from Lacken Bay to Bunwee Head. Small colonies of a few pairs are to be seen scattered for miles along the cliffs, while the large colonies are located on the ledges and shelves of Doonbrista, and Downpatrick Head, at Keadue beyond Ballycastle, between Glenglosera and Belderig, Moistha Island, between the last-named place and Porturlin, on Pig's Island, west of the latter place, and also between it and Portacloy, while a few pairs also breed on the Stags of Broadhaven. In fact, there is scarcely a high cliff anywhere between Downpatrick Head and Portacloy, without some Herring Gulls breeding there, being almost as widely distributed as the Kittiwakes. On the North Sligo coast there is a very large colony—one of the largest I have seen—on Aughris Head, about midway between Sligo and Killala Bays.

The LESSER BLACKBACKED GULL (*Larus fuscus*) is not so numerous as the Herring Gull, and is seldom seen in the bay or estuary, for its chief breeding station in Mayo is at present on Lough Mask; though at one time it bred on Lough Conn, as mentioned to the late Wm. Thompson by Mr. B. Ball, which statement was corroborated to me by my late friend, Mr. Henry Knox, of Palmerstown, Killala, who told me that when he was a young man and fishing on Lough Conn he found large numbers of these gulls breeding on islands in the lake. A pair have of late years been seen every summer about the lake, but the nest was not found; and until last summer no good evidence of its breeding was had, when Mr. H. Scroope, of Ballina, saw a pair of young birds in the nestling plumage, following the old ones, showing that they had been bred somewhere about that lake or the adjacent Lough Cullen.

Mr. W. H. Good, of Westport, told me that this gull bred on Lough Mask in large numbers, on one of the islands, and that odd pairs were scattered about through the lake breeding on some of the smaller islands also, which statement I found correct when visiting Lough Mask with my friend, Mr. W. Williams, on the 19th of June, 1893. The gulls' island is situated on the western side of the lake, opposite the Partry Monastery, and is about 200 yards in length, quite low, and thickly covered with rocks and large loose stones, amongst

which a few bushes and patches of long grass are growing. The gulls make large nests of the dried grass thrown up by the winter's floods, under the bushes and between the stones. Most of the nests (about twenty) had been robbed a short time previous to our visit, and we found only three or four in which the birds had begun to lay, with one or two eggs in each. We also found on the terns' island two gulls' nests, in one of which there were three eggs, and our boatman informed us that throughout the lake many solitary pairs had nests on many of the small islands. In June, 1895, my friend, Mr. R. J. Ussher, visiting Lough Corrib, found this gull breeding in small numbers on the islands about the lake between Cong and Oughterard, and also found a few pairs breeding on Lough Erne, Co. Fermanagh. I have not myself found this bird breeding on the sea-cliffs of Mayo, although when visiting the north coast in May, 1893, I saw a solitary bird flying along the cliffs between Porturlin and Portacloy, but saw no trace of a nesting-place.

The COMMON GULL (*Larus canus*) is not so numerous as the smaller gulls, though it is extending its breeding-range to places where a few years ago none were to be seen. I first met this gull breeding on a small island in Lough Talt, about twelve miles from the sea, in the heart of the Ox Mountains, Co. Sligo, in 1855; only two or three pairs bred on the lough. I saw the nests (one with an addled egg) on a little rocky islet, and some young birds just able to fly, following their parents about the lake. Since that date the gulls have deserted Lough Talt as a breeding-haunt in consequence of boats having been placed on the lake for the convenience of trout fishers, who frequent the water during the breeding-time in May. They disturbed the gulls so much as to cause them to leave altogether.

This was all I knew of the gulls breeding in this locality, until some years later, when I was told of their breeding on Lough-na-Crumpawn (the lake of the stumps) about ten miles from Ballina, between Glenmore and Crossmolina, but thinking the gulls mentioned must be the Blackheaded, I did not visit the lough until the 17th of May, 1882, when in the company of my friends, Dr. S. Darling and his brother James, we drove to Glenmore, and taking a boy as our guide walked to the bog, which was a wide expanse of low peat moor, with

many little loughs and pools scattered all over it. Many of these loughs had little islets, or rather clumps of turf covered with heath and coarse grass. On reaching the first of the loughs, we observed a gull resting on a clump in the middle, but seeing only a solitary bird that flew off at our approach, we had no idea of a nest being there.

Dr. Darling and I went on ahead; James Darling remaining to take another look round, and wading out to the clump of turf, found a nest of dried grass on it containing three eggs. This "find" was most encouraging, for not seeing any gulls about except the solitary one on the clump, we were beginning to fear that our journey would have proved in vain. We then walked on to a group of loughs a quarter of a mile further on, and there we saw two gulls resting on clumps, and in a few minutes we had three pairs of the Common Gull circling round us and screaming, plainly indicating by their anxiety, that at least three nests must be somewhere about the islets on the loughs; but unfortunately for us, owing to the great depth of the soft black mud on the bottom of these loughs, it was quite impossible to wade out to the islands and search for the nests. While walking round the lough, vainly seeking for a passage to the islet, we disturbed a pair of Dunlins, but were unable to find their nest.

Although so far fortunate in finding a breeding-haunt of the Common Gull, yet we had not found the particular lough reported to me, and of which we had come in search. We again questioned the boy, but he knew of no other loughs, nor of one where the gulls built their nests on the tree stumps of an old submerged forest, as had been described to me. So finding the boy of no further use as a guide, we decided on going in different directions over the bog, and, while time allowed, persevering in our search for the missing Lough-na-Crumpawn, "the lake of the stumps." Dr. Darling and I then proceeded to examine some pools about a quarter of a mile away, while James Darling and the boy went off in the opposite direction to a little ridge, from which they could have a better view over the surrounding bog, and perhaps discover the particular lough of which we were in search. Soon after we heard the boy whistle, and saw James Darling run to meet him; we afterwards learned that he had just then come on a Dunlin's nest with four eggs,

We then saw them walk to the top of the ridge, when James Darling whistled, and waving his hat to us, disappeared over the ridge. Not seeing him return we concluded that he had found the lough, so we hastened after him, and on reaching the top, we saw to our great delight, in a hollow about half a mile off, the long-sought for lough easily identified by the tree stumps studding its surface; a number of gulls were flying over our friend, who was wading out through the muddy water to where the nests were. On reaching the lough we soon had eight pairs of *Larus canus* flying over us, and saw eight nests composed of dried grass on the tree stumps; James Darling visited seven of these, six contained eggs; the eighth he was unable to reach, in consequence of the great depth of the black mud on the bottom of the lough.

The foregoing was all the information I had of the breeding of this gull in Sligo and Mayo, until June, 1890, when my friend, Mr. R. J. Ussher, on his way from Belmullet to Ballina, found a large colony of at least fifty pairs breeding on an island in Lough Dohybaun, near Corick, in the last named county. Since then I have met them breeding on Loughs Conn and Cullen, where they had not been seen until a few years ago. On Lough Conn some odd pairs breed on the stony points of the small islands at the upper end of the lake, near Enniscoe and Errew abbey, and are probably scattered all about the lake, for I met them also on the lower end, near Pontoon Bridge; and in Lough Cullen they are scattered about also, while there is a colony of twelve to fifteen pairs on the shores of a small island close to the land, between Garrison Island and the bridge. I have also found the Common Gull breeding on the shores of islands in Lough Mask, but not so numerous as in Lough Cullen.

There is no doubt that these Gulls are extending their breeding-range in this district, more especially to Lough Conn, where fifteen or twenty years ago none were to be seen, when I used to visit the lake in search of breeding birds, and particularly during my close search for the Sandwich Terns, at which time only Blackheaded Gulls, and Common Terns bred about the lake. This gull, during the breeding season, appears to have been more widely distributed throughout the north-west counties than was expected, previous to the visits of my friend Mr. R. J. Ussher, who found them in pairs and

small colonies on the loughs in Connemara, as well as in N.W. Donegal, and Mayo; and probably when Clare is explored, they may be found breeding in that county also.

The **KITTIWAKE GULL** (*Larus rissa*) is very abundant round this coast in summer, but very few are to be seen in winter, and then only a bird in miserable condition is occasionally seen. I have sometimes found birds lying dead on the shore in winter evidently starved to death; any I have shot at that time of year were always in the same miserable state, mere bundles of bones and feathers. This gull breeds in many small colonies along the cliffs extending from Lacken Bay to Downpatrick Head, where there is a very large colony breeding on the shelves and ledges of the head, as well as on those of Doonbrista, the rock on which the Great Blackbacked Gulls breed. The next breeding-haunt is about ten miles further west near Belderig, where many thousands breed on the cliffs between that and Porturlin, and also on the range of cliffs between the latter place and Portacloy; while one of their largest colonies is on Pig's Island, near Porturlin.

The numbers of Kittiwakes, and their numerous breeding-haunts along that line of coast, are really astonishing, and must be actually seen to be realized.

There is also a great breeding-haunt of Kittiwakes on the Sligo coast, Aughris Head (about twenty-four miles from Ballina), where the gulls are in two large colonies, one on a range of cliff about 300 yards long, and the other on one about 50 or 60 yards shorter, and as the shelves and ledges are very regular in their formation, the gulls sitting on their nests can be seen to great advantage, as they appear in long rows, tier above tier, on the face of the cliff. This is the largest colony of Kittiwakes I have yet seen, for although there are greater numbers on the Mayo coast they are more scattered, and not so many are seen at one colony as at Aughris.

The **BLACKHEADED GULL** (*Larus ridibundus*) is the most numerous of our residents, and a few years ago had two large breeding-haunts within two and three miles of Ballina, Cloona, and Rathrouyeen, but the former has been deserted for some years, for after the death of Mr. Wm. Gardiner, who strictly preserved the lough, the new tenant neglected doing so, and in consequence the gulls were so disturbed and harassed by the country boys robbing their nests year after year, that they

left the lake altogether and shifted their quarters to Rathrouyeen, where they now may be seen in thousands. When I first visited Rathrouyeen, over thirty years ago, there were probably not more than between two and three hundred pairs of gulls breeding, chiefly on the small island, where I counted close on 200 nests, while perhaps there were 30 to 50 nests amongst the reeds and rushes about the lake. But now they have overflowed so much that the nests are built everywhere amongst the reed-beds and Bullrushes, and all round the margin of the lake on the tussocks of coarse grass and bunches of rushes; and when any one approaches the shore of the lake the noise of the screaming thousands is deafening. There is also a small colony breeding on a low gravelly island in Lough Conn near Errew Abbey and Enniscoe.

These gulls are the first to suffer from a hard winter and a long-continued frost. In 1894 they suffered more than in any winter that I can remember, and they were so reduced that only a mere tithe of their numbers assembled at their breeding-haunt the following spring. During the severe frost of that winter the unfortunate birds were so hard-pressed for food that they came into the farmyards to feed with the pigs and the poultry; large numbers came into my poultry-yard and piggery feeding on the potatoes and turnips. I fed them every day while the frost lasted, but each morning their numbers lessened by death; one day over a dozen came into the kitchen, and were so tamed by hunger as to feed close round the fire and almost to snatch the food out of the hands of the girl who was feeding them. They even came into the town of Ballina, feeding in the streets and yards of the houses.

The GLAUOUS and ICELAND GULLS (*Larus glaucus* and *L. leucopterus*), being irregular winter visitors, are only occasionally seen, and as I have given an account of those coming under my notice in the *Irish Naturalist* for October, 1892, there is no need of my now repeating the information given in that number.

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## THE PLANTS OF INISMURRAY, CO. SLIGO.

BY R. LLOYD PRAEGER, B.E.

ON June 8th, on the return of the Rockall expedition, the party landed for an hour on Inismurray, famous among antiquarians for its wealth of primitive edifices. Mr. R. M. Barrington and I spent the time in botanizing, and as no botanist has apparently examined this island previously, a short note on its flora may be interesting, even though that flora is poor and devoid of any special interest. The island is composed of Carboniferous sandstone, and is low and flat. Only a portion is cultivated. The rest consists of stunted heath, marshy in places. In the hour spent on the island, I listed 145 species, almost all of which are plants of universal distribution in Ireland.

In the meadows and marshy spots, the Purple Loosestrife (*Lythrum Salicaria*) grew in enormous profusion. It was not yet in flower, but one could imagine the sheets of purple with which these green spots would soon be covered. Among the grass, and on the heaths, three Orchids brightened the ground by their abundance—*O. maculata*, *O. latifolia* (?), and *Habenaria bifolia*. The quantity of the last-named plant, coupled with the almost complete absence of its ally *H. chloroleuca*, was a remarkable feature in the flora of Inismurray; for almost everywhere in Ireland these proportions are reversed. Along the edges of the meadows, and on banks, great masses of Royal Fern grew; it was a surprise to us to find it in such luxuriance in a locality so bleak and wind-swept. The other ferns observed on the island were *Polypodium vulgare*, *Lastrea Filix-mas*, *L. dilatata*, *Athyrium Filix-femina*, *Pteris aquilina*, and *Asplenium marinum*; the last-named grew among boulders on the exposed western shore. A leaf of Sea-Kale, lying in a boggy meadow, made me watch for this plant on the stony shores, but it was not seen. The Golden Rod (*Solidago virgaurea*) grew on dry banks, and in wet places were tufts of *Cenanthe crocata*. The only plants that grew in the few pools and drains were *Apium inundatum*, *Pot. polygonifolius*, and *Scirpus fluitans*; *Peplis portula* was straggling over muddy ground close at hand. The commonest weed in the corn-fields was *Sinapis alba*; *Veronica Buxbaumii* grew with it.



The only roadside plant worthy of mention was *Sagina maritima*. Perhaps the most curious plant of the island was a diffuse form of *Juncus conglomeratus*, the stems of which, instead of growing erect in a compact clump as usual, spread out at every angle, from horizontal to vertical, giving the plant a very strange appearance, and recalling the habit of *Schœnus nigricans*; this curious rush was abundant in damp places with the typical form. Mr. Barrington found *Radiola linoides* and *Carduus pratensis*, two species which did not occur to me.

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CANIS VULPES MELANOGASTER, BONAP., IN  
IRELAND.

BY R. F. SCHARFF, PH.D.

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THIS variety of the Fox is characterised by having the underparts of the body and tail black or dark brown instead of white. A specimen recently acquired by the Dublin Museum has all the underparts of the body and tail greyish black. It is a full-grown rather undersized female, and came from the County Kildare. I had never seen an Irish specimen before, but Mr. Ed. Williams, informs me that he has stuffed several for people in the country.

The chief interest of the occurrence of this variety of the Fox in Ireland lies in its geographical distribution. As far as I know, there is only one previous record of this variety having been observed in the British Islands, viz., in Warwickshire (Bell's "Brit. Quadrupeds," 2nd Ed., p. 231).

Nilsson described it as existing in Scandinavia, and there is also a record from France. But it is distinctly a southern form, and has been observed in Greece, Southern Italy, Spain, Portugal, and in the Mediterranean Islands. We may suppose it to have originated in Southern Europe and then to have spread along the Atlantic shores in times long gone by, when the British Islands were still connected with the continent, for the Fox must be looked upon as probably the most ancient of the British Mammals.

I should be glad if any readers of the *Irish Naturalist* would inform me if they have met with this variety of the Fox.

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## THE MEDUSÆ OF VALENCIA HARBOUR, COUNTY KERRY.

BY EDWARD T. BROWNE.

Zoological Research Laboratory, University College, London.

My friend and colleague, Mr. F. W. Gamble, published in the May number of this Journal a preliminary account of the results obtained by dredging and shore-collecting in Valencia Harbour. It falls to my share to give a list of the Medusæ collected during April and May, 1895.

In selecting the locality on the West Coast of Ireland it was necessary to find a place not only suitable for dredging and shore-collecting, but also for tow-netting, a place well-protected from the swell and storms of the Atlantic. For tow-netting I found Valencia Harbour an exceedingly good place, naturally well-sheltered, and with an excellent pelagic fauna. When the tide was flowing in from the ocean it was only necessary to anchor the boat and to cast the net overboard. By this method the lovely siphonophore *Agalmopsis* could be taken in perfect condition, without the loss of even a swimming-bell. Everyone who has worked on delicate pelagic animals, knows that it is not only important to catch them in perfect condition, but also to be able to examine them very soon after the net has been taken on board. A tow-netting not examined within an hour is usually of little use, as most of the delicate animals are either in a dying condition or dead. The examination of the specimens was greatly facilitated by the short distance of the laboratory from the place for tow-netting.

Only a very few species of Medusæ had been recorded from the West Coast of Ireland, and they conveyed only a vague idea of what might be expected to be found there. As many rare and interesting animals had been taken along the West Coast I naturally expected to meet with a few rare and interesting Medusæ. The species which I collected were not very rare, and most of them I had already seen either at Port Erin, in the Isle of Man, or at Plymouth; but some, even the commonest, were of great importance from a systematic point of view. I was able to collect many early stages and a few complete series showing the development of some of the

commonest Medusæ, and to extend the area of distribution of many species in a westward direction.

I have described in detail many of the specimens collected at Valencia in a paper on "British Hydroids and Medusæ" which was read at a meeting of the Zoological Society of London on March 17th, and will be published in the *Proceedings* of the Society in August.

I intend here to give only a list of species taken, omitting a few doubtful ones which require the collection of more specimens to establish for a certainty their identity.

### HYDROMEDUSÆ.

#### ANTHOMEDUSÆ.

- Margells britannica** (Forbes) [= *Bougainvillea britannica*, Forbes].—Some very large adult forms taken in May.
- Polyocoryne carnea**, Sars.—Only a single specimen taken.
- † **Corymorpha nutans**, Sars.—Very abundant during April and May. The hydroid was not found.
- † **Hybocodon prolifer**, Agassiz [= *Amphicodon fritillaria* (Steenstrup)].—A few specimens found at the beginning of April. Some carried young hydræ in the umbrella-cavity.
- \* **Lar sabellarum**, Gosse [= *Willsia stellata*, Forbes].—Fairly common during April and May.
- \* **Dipurena halterata**, (Forbes) [= *Slabberia halterata*, Forbes].—Only a single specimen taken in April. Miss Delap sent me a specimen taken in the harbour on July 8th, and another on September 6th.
- \* **Euphysa aurata**, Forbes.—Scarce during April, but increased in number during May.
- \* **Tiara pileata** (Forsk.) [= *Oceania episcopalis*, Forbes].—A few early stages seen and some splendid adult specimens taken at the end of May.
- \* **Lizzia blondina**, Forbes.—A few taken at the end of May.
- \* **Margellium octopunctatum** (Sars.) [= *Lissia octopunctata* (Forbes)].—Fairly common during April and May.

#### LEPTOMEDUSÆ.

- \* **Laodice calcarata**, Agassiz.—Three specimens taken in April.
- † **Dipleurosoma hemisphæricum** (Allman) [= *Ametrangia hemisphærica*, Allman].—A few taken in May.
- \* **Tiaropsis multiclirrata** (Sars.) [= *Thaumantias melanops*, Forbes].—Two early stages taken at the beginning of April.
- \* **Euchlota pilosella** (Forbes) [= *Thaumantias pilosella*, Forbes].—Three specimens taken in April and one in May.

\* New to the Irish Fauna.

† Not previously recorded for the West Coast of Ireland

- **Phialidium cymbaloideum** (Van Beneden) [= *Thaumantias cymbaloides*, Van Beneden].—One of the commonest Medusæ in the harbour during April and May.
- **Phialidium temporarium**, Browne.—Fairly abundant throughout April and May, specially the early stages.
- **Saphenia mirabilis** (Wright).—Two specimens taken at the end of May.

Specimens were also taken of Medusæ belonging to the following genera—*Sarsia*, *Cylæandra*, *Obelia* and *Aglantha*.

#### SCYPHOMEDUSÆ.

The complete absence of the Scyphomedusæ during April and May at Valencia is an interesting case in the distribution of pelagic animals at different periods of the year. I did not see a single specimen, not even an early stage. The Misses Delap continued the tow-nettings during the summer. The Scyphomedusæ began to appear about June 11th; some belonging to the genus *Chrysaora* measured a foot in diameter. *Aurelia aurita* appeared about a week later, and *Cyanea* at the beginning of August; the latter was very abundant. A specimen of *Rhizostoma pulmo* was seen on October 10th.

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### FIELD CLUB NEWS.

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We have received from the Secretaries of the Belfast Club particulars of their Dredging Expedition fixed for the 4th July. The steamer will leave the jetty, Queen's Bridge, at 9.45 a.m., and return at about 7 p.m. All facilities will be given for studying the marine forms of life which may be collected, and tea will be provided on the steamer, which contains a comfortable ladies' cabin. As announced in our last month's issue, the Belfast Club generously invite members of other Field Clubs to take advantage of the opportunity. Those who wish to join should send immediate notice to the Secretaries, Rea's Buildings, Belfast. Tickets are 5s. each.

The arrangements for the Field Club Union excursion to Cavan in July are completed, and have been announced to members. The party will reach Cavan at midday on July 10th, and spend the afternoon in examining the Farnham district. July 11th will be devoted to Lough Oughter, and Monday, 13th, to Slieve Glah. It is to be hoped that a large party will take the opportunity of visiting a beautiful and little-known locality.

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## SCROPHULARIA UMBROSA (DUM.) IN IRELAND.

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

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As this somewhat critical species has not hitherto been ascertained to occur in Ireland, the *Flora of Ulster* records for Antrim having been rejected by the authors both of the *Cybele Hibernica* and of the *Flora of North-east Ireland*, its discovery in the county Dublin will be of interest to Irish botanists. In August, 1894, I met with a few plants growing by the side of the Liffey in Lucan demesne, and on making further search in the September of last year, lower down the river, between Knockmaroon and Woodlands, it was found again, and in considerable quantity, on both the right and left banks, associated with its congeners, *S. aquatica* and *S. nodosa*. My suspicions as to the identity of the Liffey plant with *S. umbrosa* (Dum.)=*S. Ehrharti* (Stev.) have been confirmed by Mr. Arthur Bennett, the Rev. E. S. Marshall, and the Rev. W. Moyle Rogers, who have kindly examined specimens. The occurrence of the three species in association on the Liffey banks makes it easy to observe in the field the marked differences which separate them. Intermediate in many points between *S. aquatica* and *S. nodosa*, *S. umbrosa* is yet separable at a glance from either by the peculiar form of its inflorescence. The rigid branches of the lax and widely-spreading cyme are almost filiform in their slenderness. By an error, which has no doubt caused much confusion amongst British botanists, the terms descriptive of the cymes of *S. umbrosa* and *S. aquatica* have been transposed in the 3rd Edition of Hooker's *Student's Flora*, those of the first being set down as *contracted* and of the second as *lax*. Further search along the Irish rivers may be expected to extend to other districts, the range of this interesting plant, which seems fully entitled to take specific rank.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Rhesus Monkey from Mrs. Tisdall, a Herring Gull from Captain Boxer, a Hedgehog from J. Keegan, Esq., a Grey Parrot and an Angolan Vulture from A. H. Hanley, Esq., and a Jackdaw from W. Williams, Esq.

### DUBLIN MICROSCOPICAL CLUB.

May 21st.—The Club met at the house of Mr. GREENWOOD PIM, who showed in the lantern photo-micrographs of various objects, including an ant, sections of basalt, sucker of *Rhingia*, portion of frond of *Hymenophyllum* showing chlorophyll grains and nuclei, group of conceptacles from *Aecidium ranunculacearum*, *Coscinosdiscus*, *Jungermannia*, &c. The negatives were taken with a Leitz microscope, objectives from No. 3 to No. 7 (and in one case a Beck 3-inch). The ocular was used in every case, and the ordinary achromatic single lens of the camera left in situ, according to Mr. Mitchell's plan. No adjustment for difference between visual and actinic foci was made, and the definition left nothing to be desired. The *Aecidium* was taken as an opaque object with light condensed from above.

Mr. MCARDLE exhibited male plants of *Scapania umbrosa*, Schrader, one of the minutest of that group of liverworts, which he collected in some quantity at Anniscaul, Co. Kerry, in 1894. It is generally found in very small quantities amongst the larger Hepaticæ. The Anniscaul plants were found growing in compact tufts on decayed wood. The upper portion of the shoots bear from one to three antheridia in the saccate base of each leaf; the stems and the lower portion of the leaves which cover the antheridia are of a brilliant scarlet colour, which gives the plant a peculiarly handsome appearance; in this way, and by its smaller size, truly serrated leaves which are recurved at the apex, and by the truncate and entire mouth of the perianth, it is easily known from all other *Scapania*.

DR. MCWEENEY showed a cultivation of the mould-fungus *Eurotium herbariorum*, showing the sexually produced reproductive bodies or perithecia. These are small yellow globular bodies containing a number of nearly globose asci, each of which has eight spores. The point of interest is that this mode of reproduction is seldom resorted to by the fungus, save under special circumstances, the usual mode being by asexual conidia produced in a globose head.

### BELFAST NATURALISTS' FIELD CLUB.

MAY 23rd.—Excursion to Armoy and Ballycastle. The party left the train at Armoy, and at once made for the Church, where the remains of the fine old round tower still stand in the graveyard. Leaving the church a short halt was made at the chapel to see a couple of rude crosses in the yard.

The district is full of botanical interest, especially as regards the cryptogamic flora, but the find of the day was the rare Whitlow grass, *Draba muralis*. This is rare as a British plant, and as regards Ireland still more rare. It is stated that one plant was found long since growing on the walls of Blarney Castle, in the south, and Dr. Dickie said it was naturalised on old walls near Belfast, but it does not seem to have been seen by any living botanist in either place. On the walls of an old bridge near Armoyn, however, it is plentiful and luxuriant. *Draba muralis* has also been found on walls of Glasnevin, where it was supposed to have escaped from the Botanic Garden. The occurrences in Ireland of this plant have all been attributed to accidental escapes from gardens, but, if not indigenous, it is more probable that they are still lingering relics of a more extensive cultivation at a remote period.<sup>1</sup>

The ruin of the old church locally known as *Goban saers* was visited; perched on an overhanging ridge, its rude, strong masonry afford evidence of its early building. The ruined fort of Dun Rainey, having been passed and the Mairge crossed, a halt was made at the ruins of the Old Franciscan Abbey of Bun-na-Mairge. In the old abbey the Rev. J. A. S. Woodward, A.M., read a short paper descriptive of the ruins and their history. At five o'clock all assembled in the Antrim Arms, Ballycastle, where an excellent tea was provided by Mr. Hunter.

JUNE 6th.—The Club held their second summer excursion, and a fine afternoon brought the large number of over 100 members together in time to catch the 2.15 train to Carrickfergus, from which station the whole party proceeded to the salt mines at Duncrue, some two miles distant. Here they were met by Mr. Pennall, the courteous representative of the owners, who placed his services at the Club's disposal during the afternoon. The tedious business of lowering the large party into the pit was then begun by the two shafts, down each of which the buckets carried four persons at a time, one of the buckets being raised at the same time that the other was lowered and by the same engine. The depth of the shaft is about 750 feet, so that the mines are considerably below the sea-level. On arriving at the bottom each member was supplied with a candle, and when enough were collected a party was formed, under the guidance of some one of the miners and of one of the geological members, to explore the galleries. A number of Bengal and coloured lights were brought down, which gave an extremely good effect among the vast piers that have been left to support the roof—often forty or fifty feet above the floors—while the crowd of little twinkling lights seen at the far end of one of the numerous drives was most picturesque. So, numerous was the party that the first section was up again before the

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<sup>1</sup> We have seen specimens of this plant recently collected at Newry by Rev. H. W. Lett, on a wall near Messrs. Roger and M'Clelland's nursery—no doubt imported.—EDS.

last was down. At appropriate times Mr. William Gray and Mr. Alexander G. Wilson (Hon. Secretary) briefly described the geological features of the Triassic period and the salt-beds in particular, Mr. Gray explaining the lithological characters and Mr. Wilson giving a *resumé* of some of the recent discoveries of the fauna and flora of the period.

The salt is here worked by being quarried from the matrix, often in an almost pure state, and when raised to the surface in buckets is tipped into a reservoir, from which the brine flows down to the evaporating pans near the town. The best thanks of the Club are due to Mr. Alexander Miscampbell, the Irish Manager of the Salt Union, for his courtesy in allowing the members to visit the mine. On reaching the surface the members walked back to Carrickfergus, some of them loitering in the neighbouring fields, the result of which was the discovery of the "Water Soldier" (*Stratiotes aloides*), and the Wood Vetch (*Vicia sylvatica*). The former plant was a most interesting find, as in Stewart and Corry's flora it is marked as "now extinct" in the three recorded localities, and this is a new station for it, and therefore the only known one in Ulster. The vetch is also rare, but the station has been previously recorded. Those who were not able to go by the earlier train left Carrickfergus by the 8.5 train, thus giving them all time to visit the fine old Church of St. Nicholas, where Mr. W. J. Fennell read a short paper on the architectural features of the building, which was illustrated by a most excellent series of photos and drawings.

The GEOLOGICAL SECTION held an Excursion on 16th May to Squire's Hill, for Cretaceous strata, and basaltic dykes and flows. A considerable number of the usual Chalk and Greensand fossils were obtained, from various horizons, and several photos were taken of the remarkable dykes, from one of which was taken the beautiful junction of chalk and basalt recently exhibited at the Club's meetings by Mr. R. Bell.

Another excursion of the section was held on the 13th June, to Woodburn, for the lower beds of the Cretaceous series. A number of the usual Chalk and Greensand fossils, such as *Ianira*, *Pecten*, *Terebratula Exogyra*, *Rhynchonella*, *Catopygus*, &c., were taken, though none were new to the local list. Those who were also botanists were pleased to see the glen abundant in the Wood Vetch and Guelder-rose in full flower. The beautiful *Equisetum sylvaticum* was also in quantity.

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#### DUBLIN NATURALISTS' FIELD CLUB.

MAY 30th.—Excursion to Lambay Island. This excursion was of exceptional interest. A party of 46 left Dublin at 10.0 a.m. on board the s.s. "Erin's King," and, steaming round the cliffs of Howth, were soon close to the island of Lambay. The water was quite smooth, and the sky, which was cloudy at starting, speedily cleared, and a day of glorious sunlight ensued. The steamer passed close inshore right round the island, and the great colonies of sea-birds, the sheets of wild flowers on the slopes and cliffs, coupled with the brilliancy of sea and sky, formed a scene not



readily to be forgotten. The party were soon ashore in the little harbour, and, under the leadership of Mr. J. E. Palmer, the steep slopes and cliffs of the eastern side of the island were visited. Here the Herring Gulls were breeding in great numbers among the herbage and stones, and care had to be taken not to tread on the dark-spotted brown eggs, or the young birds, equally inconspicuous in their coats of dark mottled down. On the steeper portions, Guillemots and Razorbills were perched in rows beside their large blue and brown eggs, which lay on the ledges of bare rock, and hundreds of Kittiwakes occupied every cranny with their nests of grass. Many of the grassy slopes were riddled with holes made by the Puffins, which, in their beautiful black and white plumage and brilliant red beaks and legs, stood like sentinels at the mouths of their burrows, guarding their solitary large, whitish egg in the nest within. In a deep crevice a Cormorant's nest was visited, in which were three young birds, already nearly fledged. The botany of the island was interesting, and the masses of colour presented by certain species, such as *Lychnis diurna*, *Sedum acre*, and *Silene maritima* were very striking. Enormous groves of the Henbane, *Hyoscyamus niger*, were observed, four feet in height, and covering considerable areas. Close to the coastguard station a rare clover, *Trifolium striatum*, was obtained. The beetles, of which Mr. H. K. G. Cuthbert kindly supplies a full list, included *Badister bipustulatus*, *Bradycellas harpalinus*, *Pterostichus striola*, *Amara amica*, *Trechus minutus*, *Philonthus varius*, *Stenus guttula*, *Helodes marginatus*, *Corymbites cupreus* (type and var. *aeruginosus*), *Grammoptera ruficornis*, *Crypticus quisquilius*. As to Hymenoptera, in the *Chrysis* group, Mr. Cuthbert met with *Chrysis ignita*, L., and *Hedychrum lucidulum*, Latr., and in the Aculeate group, *Megachile maritima*, Kirb. (an addition to the Irish list), *M. centuncularis*, *Andrena fulvicrus*, *A. minutula*, *Sphcodes dimidiatus*, *Odynerus pictus*, *O. parietinus*, *O. trimarginatus*, and *Vespa sylvestris*. The last-named species was nesting in a bank, an unusual circumstance in the case of an arboreal wasp, an instance having been once before recorded by the late Mr. Frederick Smith. A very interesting find of another kind was the occurrence of flint-flakes and cores in low mounds of clay and pebbles near the southern extremity of the island; quite a large series was obtained. Messrs. Greenwood Pim and R. Welch obtained a number of photographs of the birds and their nests and eggs, which will no doubt duly appear on the lantern screen at some winter meeting of the Club. All assembled at the harbour at 6.0, where Miss Gardiner had tea ready. Embarkation being safely effected, the "Erin's King" left at 7.45. The evening was dead calm, and lovely effects of light were enjoyed on the homeward run. The party reached Dublin at 9.45, delighted with all they had seen, and very grateful to Count Considine, by whose kindness they were permitted to explore the island.

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#### CORK NATURALISTS' FIELD CLUB.

MAY 30th.—The third excursion took place, the destination being Ballyphehane Bog and Vernon Mount. Owing to the prolonged drought the bog was practically dry and but few of the moisture-loving plants

for which it is esteemed, were observed. The Yellow Sedge (*Carex flava*) was seen well in fruit, *Sparganium ramosum* was in flower, and some luxuriant specimens of the smooth horsetail (*Equisetum limosum*) 3-4 feet high were collected. In a neighbouring hedge the Guelder Rose (*Viburnum opulus*) was found flowering handsomely. The excursion was well attended and much interest was shown in the collection of plants. Opportunity may be taken to record the presence of *Brassica tenuifolia*, Boiss. (*Diplotaxis tenuifolia* of older botanists), at Haulbowline Island, where it has been found growing plentifully in waste ground by a member of the Club. This plant with a scanty distribution in the south of England has hitherto been only doubtfully recorded from Co. Cork. In the present case its identity has been verified by Mr. R. A. Phillips of Cork.

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#### ROYAL IRISH ACADEMY.

JUNE 22nd.—The Earl of ROSSE, President, in the Chair. Rev. W. S. GREEN read a paper on a visit to the islet of Rockall, which lies in the Atlantic 220 miles from Tory Island, and 178 west of St. Kilda. On the night of the 6th inst., he and his companions reached the rock in the S. S. "Granuaile," which had been placed at their disposal by the Congested Districts Board. The sea was then breaking heavily all around, and attempts made to dredge resulted in the loss of the gear. On the 7th, the sea still running high, the "Granuaile" steamed away eastward, and a trawling was made in 130 fathoms. The gear was badly torn, but some specimens were obtained. The weather showing no sign of improvement, the vessel steered for Killybegs, which was reached on the evening of the 8th. A fresh start was made on the night of the 13th, and on the 15th Rockall was again sighted. Dredgings were made in from 50 to 100 fathoms. The ship remained close to the rock all night, and on the following morning the rock was approached to within twenty yards, but landing was impossible. Every bird on the rock was recognised, and some were shot and picked up. The weather giving no promise of improvement, a course was steered for St. Kilda, a dredging being made on the Rockall Bank. The result of the dredging was very varied, and some valuable specimens were obtained. Over a dozen species of sea-birds were noted on the rock and in its vicinity.

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## N O T E S.

## BOTANY.

## PHANEROGAMS.

**Recent Notices of Irish Plants.**—In the *Journal of Botany* for June, Messrs. E. S. Marshall and W. A. Shoobred publish an important list of plants observed by them during a fortnight's stay in July, 1895, at Clonbur, near the S.W. corner of Lough Mask, and on the borders of Mayo and Galway; a few notes from Kilkenny and Clare are also included. Of the more interesting plants recorded, the following may be mentioned:—*Ranunculus Drouetii*, *Subularia aquatica*, *Polygia oxyptera*, *Agrimonia odorata*, *Filago minima* "not recorded from the West of Ireland" (*Cyb. Hib.*); *Utricularia? neglecta*, *Polygonum maculatum*, *Epipactis atrorubens*, *Potamogeton filiformis*, *Carex aquatilis*, var. *elatior*, Bab., *C. Pseudocyperus*, *Festuca Myuros*, *Lycopodium inundatum*, *Pilularia globulifera*. Some of the above furnish very important extensions of the known range of the several plants. In a long list of *Rubi*, the following are new records for Ireland—*R. erythrinus*, *R. dunmoniensis*, *R. argentatus*, *R. Sprengelii*, *R. Babingtonii*.

The Twelfth Annual Report of the Watson Botanical Exchange Club, just issued, contains references to a number of Irish plants, sent to the Club by the late Mr. H. C. Levinge, and the Revs. C. H. Waddell and H. W. Lett. Few of these call for special remark, but we are glad to see definite confirmation of the occurrence of *Ranunculus floribundus* in the North-east (see *Flor. N.E. I. Suppl.*). Mr. Lett adds *Anthriscus vulgaris* to the Armagh Flora, and some interesting *Rubi* are recorded.

**Flora of North-East Ireland.**—On the 25th May I noticed on Slemish Mountain, County Antrim, the following plants:—*Vaccinium Viti* *Idæa* sparingly on the north face; and *Hieracium iricum*, with the *Vaccinium* and *Habenaria albida* plentiful at the S.W. base. None of these are abundant plants, and the first is very rare in the north-east of Ireland.

H. C. HART, Portsalon, Letterkenny.

**Draba verna at Poyntzpass.**—I noticed this spring on one of the walks in my flower garden a plant very like *D. verna*. In order to make sure I sent it to Mr. Praeger who confirms my determination. It occurs also on the road between this and Poyntzpass and at the railway station. The only other locality in County Armagh is I believe the Sheep-wall at Armagh, but Mr. Praeger thinks it has escaped notice elsewhere from its small size and early habit of flowering.

W. F. JOHNSON, Poyntzpass.

**The Globe Flower in Co. Fermanagh.**—It may interest botanical readers to know that the Globe Flower (*Trollius europæus*) grows in a unquestionably wild state on the shores of one of the large Fermanagh lakes. Mr. Pike of Sydenham Hill, London, first brought the circumstance under my notice.

W. MACMILLAN, Enniskillen.

**Measurement of a Scotch Fir Stump In Fanet, Co. Donegal.**

—In July, 1892, in company with the Rev. A. Delap, I took measurement of a trunk of a Scotch Fir, bared by recent drainage on the shore of Ballyhork Lake, in the "Between Waters," Fanet. The trunk was 3 feet 6 inches in diameter. The root at base of trunk were *in situ*. Obviously the tree had been felled, and the stem was gone. The bark was still on, the peat having been but recently removed. Hazel nuts and oak-wood were in company with the fir. We counted the rings from the centre; he made out 264, and I made them 234.

H. CHICHESTER HART, Portsalon, Letterkenny.

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**ZOOLOGY.**


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**Our Introduced Species.**—I am glad to see Mr. P. Ralfe's note on the introduction of the Magpie into the Isle of Man. I had not previously heard of the fact, though Bishop Wilson is also the principal authority for the introduction (in his time), and rapid increase of the Frog. The marked parallelism between the recorded introductions in these two islands (Ireland and Man) is an interesting piece of circumstantial evidence in favour of the correctness of both records, and therefore strengthens the case for the opinion generally held, but to some extent disputed by Dr. Scharff, that the Frog was really unknown in Ireland till 1696.

C. B. MOFFAT, Dublin.

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**WORMS.**

**Freshwater Annelids: An appeal.**—During a visit which I recently paid to the north of Ireland, I was fortunate enough to find some very interesting forms of freshwater worms. What I saw convinces me that the ponds, canals, and loughs of Ireland will yield many valuable forms, if only they can be carefully worked. In order that I may make my forthcoming reports as full as possible, I want to appeal to all who are interested in the progress of science in Ireland to help me. The work I want my fellow-collectors to undertake is simple, easy, and not unpleasant. I ask all those who are living near, or visit places where there are ponds, lakes, canals, or other sheets of water, to send me wide-mouthed bottles filled with algæ, pond weed, and decaying debris floating about, with just a little water, in the hope that some new forms of *Nais* and other microscopic annelids may be discovered. I found at least one new species among such material in a small branch of Loch Erne, and have no doubt but that others will be forthcoming. Those who do not mind dredging, or putting their hands into the silt by the side of streams, ponds, and ditches or gutters, might also render good service by sending the material thus collected, either in tins or wide mouthed bottles, labelled Natural History Specimens.

HILDERIC FRIEND, Cockermouth, Cumberland.

## INSECTS.

**Entomological Notes from Poyntzpass.**—My earliest captures of lepidoptera were *Phigalia pendaria* and *Hybernia marginaria*, which I took on February 13th in the glebe grounds. A nice specimen of *Selenia illunaria* was brought to me on March 13th. *Bombus terrestris* put in an appearance on March 20th, and *Vanessa urticae* on the 22nd, and on the evening of the same day there was a remarkable swarm of Dor Beetles (*Geotrupes stercorarius*, L.) at the railway station in Poyntzpass. They must have been in great numbers, for two boys brought me about seventy, and the next morning I saw numbers lying on the pathway where they had been trodden on by passers by. I can only suggest as the cause of their assemblage the quantity of cowdung left in that vicinity after the cattle fair. I have noticed these beetles particularly numerous this Spring, I think more so than I ever observed before. Of other early butterflies I noticed *Pieris napi* on April 17th, and *Euchloë cardamines* and *Satyrus egeria* on the 22nd. I saw the first wasp on the wing on April 23rd. Sallows are rather scarce here, and I only obtained the commoner species of *Teniocampa*, viz., *gothica*, *stabilis* and *incerta*.

Among coleoptera I have not met with anything very remarkable in this immediate locality. On February 26, I gathered a bag of moss from one of my fields, the best species in which were—*Bembidium Mannerheimi*, *Encephalus complicans*, *Megarthus depressus*, *Silpha opaca*, *Hister neglectus*, *Emblemus ambiguus*, and *Microtrogus picirostris*. In March I took *Lithocharis ochracea* in a hot-bed at Acton House, and *Olophrum piceum* when digging in the side of a drain in one of my fields. On the shore of the lake at Loughbrickland on April 9th I took a single specimen of *Enochrus bicolor*; the only previous record for Ireland is Mr. Halbert's who took it in quarries near Raheny (*I. N.*, 1894, p. 203). My specimen is lighter in colour than those I have from English localities, but not otherwise distinguishable.

On May 6th I received from Rev. J. Hamilton of Coolmore, Co. Donegal, a box of larvæ, which, on examination, I found to be those of *Meditæ aurinia*. He kindly sent me a further supply, and mentioned that they had appeared in the greatest profusion in that neighbourhood much to the alarm of the country folk. It will be remembered that I reported (*I. N.*, 1895, p. 161), a number of this butterfly being washed up on the beach at Coolmore, and I then supposed that they had been blown across from the opposite side of the bay, but the present capture of larvæ shows that my supposition was incorrect, and that they were in the immediate neighbourhood, probably somewhat further south towards the mouth of River Erne. The larvæ have fed upon Honeysuckle, and pupated, and I hope soon to have a number of nice specimens. On May 7th, in the Lower Demesne at Tanderagee, I captured *Leistotrophus nebulosus*, and Mrs Johnson picked up *Geotrupes sylvaticus*, in both cases only a single specimen was met with. Lepidoptera are now (June) plentiful; and I have captured in my garden here *Charocampa elpenor*, *Plusia festucae*, *P. pulchrina*, *Cucullia umbratica*, &c. I hope as I become better acquainted with this locality to be able to report more interesting captures.

W. F. JOHNSON, Acton Glebe, Poyntzpass.

**Acherontia atropos at Bessbrook.**—On September 26th, 1895, I received a specimen of the Death's Head Moth which had been captured at Bessbrook, and was kindly forwarded to me by Mr. E. McClelland. It is a very fine example, measuring five inches across the expanded wings.

W. F. JOHNSON, Poyntzpass.

**Carabus clathratus, L. in Co. Wicklow.**—In Mr. Carpenter's paper, lately published in the *Irish Naturalist*, on the "Mingling of the North and the South," I find the non-occurrence of *Carabus clathratus* in the East of Ireland is specially commented on. I may state that I captured some of these beetles on the Great Sugar-loaf in Co. Wicklow, in September, 1891, and October, 1892

H. G. CUTHBERT, Dublin.

#### FISHES.

**The Aills Shad in Irish waters.**—A specimen of this rare fish (*Alosia communis*) was caught at Donaghadee early this year, and has been presented to the Museum of the Belfast Natural History and Philosophical Society. Londonderry is the only locality given for the species in Thompson's "Natural History of Ireland."

#### BIRDS.

**Irish Birds.**—In the *Zoologist* for May, Mr. R. J. Ussher writes concerning the reported occurrence of the Gold-vented Thrush and Spotted Eagle Owl in Ireland. The writer gives full particulars, as far as known, of the history of the specimen of each of these birds alleged to have been shot in Ireland, and the evidence which he adduces is strongly in favour of the view that the records are perfectly *bona fide*, and that these two African species were actually shot in this country. Mr. H. A. Macpherson gives an extract from a letter from Major-General Vallancey to J. C. Walker, dated from Cove, January 25th, 1794, and published in Thirteenth Report, Historical Commission, concerning a bird shot in Co. Cork, which from the description Mr. Macpherson suggests may have been the Buff-backed Heron. Mr. H. Chichester Hart in the same number records the occurrence of three Wood Wrens at Carrablagh, Portsalon, Co. Donegal.

**Spring Migrants at Poyntzpass.**—In spite of the remarkable mildness of the season the arrival of these birds was not earlier than usual. The Chiffchaff came on March 24th, the Willow Wren April 8th, the Swallow April 18th, the Sand-Martin April 23rd, the Corncrake April 27th, the Cuckoo April 30th, the Swift May 9th, and the House Martin May 11th.

W. F. JOHNSON, Poyntzpass

**The Grasshopper Warbler in Co. Dublin.**—On the 4th May I saw and heard a Grasshopper Warbler (*Acrocephalus nzevius*) near Templeogue; it was not at all shy, and allowed me to come within a few yards of it without stopping its song. It remained in the same spot for three days.

G. P. FARRAN, Templeogue.

**Stock-Dove in Co. Galway.**—During the week ending April 18th, my steward, who is well acquainted with all local birds, told me several times that he had heard or seen what appeared to be a Wood Pigeon, which uttered an (to him) entirely strange note. It frequented a chain of fir plantations near the house, and in one of these I heard it myself on Monday, April 20th, and at once recognized the note as being that of a Stock-Dove (*Columba œnas*). One morning early that week my steward had a good view of it as it sat "cooing" on an oak tree, and when it flew he could see no white bar on the wing. We heard it frequently until May 1st, on which day I first caught sight of it as it flew out of a tree in a wood. The bird was evidently alone. I see in Seebohm that it is "unknown in Ireland except in the N.E., where, however, it is very rare."

R. F. HIBBERT, Scariff, Co. Clare.

[The Stock-Dove has extended its range in Ireland during the last few years. It has been noticed in Co. Wicklow (*Irish Naturalist*, vol. ii., p. 202), and in Co. Carlow (vol. iv., p. 296). Its occurrence in the far west now noted is of great interest.—EDS.]

**Quail in Co. Cork.**—I heard the Quail near Bandon this evening (31st May). There were two of them crying to each other from opposite sides of a country road, and I have no doubt that they are nesting there. It is said that Quail were once common in the south of Ireland, but I never heard one here before. The unusually warm dry weather probably accounts for their settling.

ALLAN P. SWAN, Bandon.

**Iceland Gull on the Sligo Coast.**—I picked up dead on the strand at Mullaghmore, Co. Sligo, on the 5th June, an adult Iceland Gull (*Larus leucopterus*, Fab.). It had evidently been shot at, as both legs were broken, and there were wounds in its neck and stomach. It was identified by Messrs. Williams of Dublin.

CHARLES LANGHAM, Tempo Manor, Co. Fermanagh.

#### GEOLOGY.

**Submerged Peat-bogs in Co. Donegal.**—Among submerged peat-bogs it may be worth while to note those of Inver Bay, County Donegal. The most conspicuous is on its N.W. shore, a little beyond the old house and wood of Kilmacreddan (?) It is visible enough a low water of springs, and I have found in it fragments of *Pinus sylvestris* and entire Hazel-nuts.

It may here be noted that a considerable depression of the opposite coast of North America seems to have been, geologically speaking, no far from contemporary. Farther away in Bombay Harbour, a forest of trees, of an existing species (*Acacia catechu*) of the Peninsula, was found some years ago, in digging the Prince's Dock, many feet below low water level. The stumps stood upright on their roots, just as they do in many Irish bogs; and the wood was good enough to make beautiful walking sticks.

W. F. SINCLAIR, London.

## THE FIELD CLUBS IN CAVAN.

BY R. LLOYD PRAEGER,  
Sec. I. F. C. Union.

CAVAN, according to the programme issued to all members of Irish Field Clubs, was selected for this year's joint excursion, on account of its being a promising county, which was almost unknown to the naturalist. And, indeed, of all the counties of Ulster, Cavan, the most southern, was the one concerning the flora and fauna of which our knowledge was most incomplete. The party which assembled there on July 10th, therefore, had before them the pleasure which ever pertains to the examination of comparatively virgin soil, although, on account of the highly cultivated character of the greater part of the district, and the extensive draining that has been carried out, no discoveries of a startling nature were anticipated.

It was a bright morning when we left Dublin and rapidly crossed the level limestone plain to the lake district of Westmeath, and thence northwards through undulating ground, and then over the great bog which fills the valley of the Inny, to the rolling Ordovician hillocks of Cavan town. The Belfast party had meanwhile been travelling south-west to join us, and welcomed us on the railway platform, where were also congregated several country members and local friends who had converged towards our rendezvous. Thanks to the joint meetings of the last few years, and the almost constant intercourse between the different Clubs that the Field Club Union has fostered and brought about, the meeting of the Belfast and Dublin parties was no longer a meeting of strangers, as it was on the occasion of the first joint excursion to the Boyne some few years ago, but was more like a meeting of old acquaintances, pleased with the prospect of renewing their friendships. The whole party, in number thirty-six, met without delay at early dinner at the Farnham Arms Hotel, which was headquarters during our stay, and by 2 o'clock we were mounted in brakes *en route* for the woods of Lord Farnham's demesne. The vehicles took us through the deerpark, where under trees the Broad-leaved Helleborine (*Epipactis latifolia*) grew in luxuriance, and I had the good fortune to spot the Bird's-nest Orchid (*Neottia Nidus-avis*) below a great Beech; the former



plant proved to be common in the Cavan district. A brief halt was made at Farnham House, where, by the kindness of the steward, Mr. Hamilton, we visited a mineralogical museum brought together by a former owner, in which there was a remarkably fine collection of ambers. Pushing on, we dismounted in Derrygid wood, with several pretty lakes flanking us on the right and left. The party soon scattered in pursuit of their different hobbies. The continued rains of the past week, which concluded with the torrential downpour of July 8 and 9, had almost drowned the country, and we found all the lakes and streams risen several feet above their normal limit, rendering the search for aquatic and paludose species often difficult and sometimes impossible. The woods did not prove productive, but the stony and often-flooded margin of Farnham Lough, fringed with a scrub of native Birch and Aspen, furnished excellent hunting-ground. There at many points the Buckthorn (*Rhamnus catharticus*) grew, loaded down with green berries. In wet ground the Purple and Yellow Loosestrife (*Lythrum salicaria* and *Lysimachia vulgaris*) brightened the thick growth of grass and sedges, among which the beautiful and local plant, *Carex Pseudo-cyperus* was conspicuous by its abundance. The Great Water-dock (*Rumex Hydro-lapathum*) and Great Spearwort (*Ranunculus Lingua*) were also among the species noted.

The conchologists were well pleased by finding abundance of the land shell, *Clausilia laminata*, which in Ireland is confined to a very limited area in the central portion of the country. Lepidoptera also came in for a good deal of attention. The best species noted were *Uropteryx sambucaria*, *Lasiocampa quercus* var. *callunæ*, and larvæ of *Chærocampa elpenor*. Others took advantage of the picturesqueness of the scene and brilliant light for sketching, and got some pretty "bits," where the tall oaks and dark pines rose above the birchen thickets that fringed the calm waters of the lake. All spent a profitable afternoon, and met at 9 o'clock supper, well pleased with their first experience of Co. Cavan.

Next morning the well-known whistle summoned the party to breakfast at 8 o'clock, and before 9.0 we were out in the brilliant sunshine and off for a long day's exploring. Driving south-westward, the first halt was made at Kilmore Cathedral. There the archæologists came to the front, and discussed

the wonderfully-preserved ornament of the beautiful old doorway, taken from Trinity Abbey on Lough Oughter, and now built into the wall of the recently-erected church, which was carefully examined and its graceful proportions admired. The tomb of the famous Bishop Bedell, in the old graveyard, was duly visited, and also a very fine earthen fort, with a deep fosse, in a meadow adjoining. There I noted the Rough Chervil (*Chærophyllum temulum*), a rare plant in Ireland. When the party were once again brought together, and Mr. Welch had finished photographing the doorway and tomb, we proceeded towards Crossdoney. Near Lisnamandra the geologists, under Prof. Cole, found in a field by the roadside an interesting section, showing a dark andesitic intrusion, baking the overlying Carboniferous sandstones, which are here almost horizontal. Close at hand, a grey eurite appears, probably an offshoot from the pre-Carboniferous granite of Crossdoney. A larger rock-exposure occurs by the roadside close to Crossdoney, where excellent hand-specimens of the biotite-granite were obtained. Thence a short drive brought us to Bellahillan bridge and the Erne, where a brief halt was made. We turned northward now, and having surmounted a couple of steep hills on foot, a rapid drive, with lovely and ever-changing peeps of Lough Oughter, brought us to Killykeen cottage, and lunch, within three minutes of the appointed time, 2 o'clock. Killykeen cottage is situated on a long promontory among the mazy windings of Lough Oughter. Straight opposite a similar promontory, occupied by the woods of Gartnanoul, projects till the lake between is narrowed to the width of a stone-throw. To left and right, the water extends, branching on each side among a series of wooded points and grassy islands. Lunch was speedily disposed of on the grassy sward by the water's edge, and then a movement was made towards the boats, which had been most kindly placed at the disposal of the party by Messrs. H. H. Moore, W. H. Halpin, and Samuel Jones. In these the majority of the party started southward to visit the ruins of Trinity Abbey. A second detachment crossed to the Gartnanoul side to collect in the woods and on the shores, while others elected to explore the woods of Killykeen. On the young Aspens that fringed the water on the Gartnanoul shore Mr. Kane discovered the larvæ of the rare moth, *Cymatophora or*, and a band of

willing helpers assisted him to collect the pairs of leaves between whose fastened-together edges the larvæ were to be found. Almost the whole party eventually met at Clogh Oughter Castle, or Bedell's Tower, a mile to the northward—a massive circular keep, one-half of it now fallen down, standing on an islet in the centre of one of the reaches of the lake. The return to Killykeen was made in time to allow a half-hour's hunt over the bog at Derrywinny, where, on a preliminary visit to Cavan in May, I had noted several uncommon plants. These were all found, and some additional species of interest. The flora of the bog includes the Great Sundew (*Drosera anglica*), Marsh Andromeda (*A. polifolia*), three species of Bladderwort (*U. vulgaris*, *U. intermedia*, *U. minor*), the Frog-bit (*Hydrocharis Morsus-ranæ*), White Beak-rush (*Rhynchospora alba*), Cyperus Sedge (*Carex Pseudo-cyperus*), and Spinulose Buckler-fern (*Lastrea spinulosa*). A drive along beautifully wooded roads brought us back to Cavan. In the evening the tables were cleared, and bottles, jars, collecting boxes, and drying paper took the place of knives and plates, and we had an exhibition and examination of the specimens collected on our first two days. Prof. Cole, Miss Thompson, and A. G. Wilson showed the rock-specimens obtained in the Crossdoney district. W. F. de V. Kane, Hon. R. E. Dillon, and Endymion Porter produced their entomological finds. H. Lyster Jameson had two species of bats, and the rare shell *Clausilia laminata*. W. D. Donnan and I had some flowering plants; and others contributed according to their means. By request, the Dublin President (Prof. Cole) gave a brief general sketch of the geological construction and history of the district. He said that the geology of the vicinity afforded some contrasts, beneath the uniform scenery of rounded hills and intervening little lakes, which are such a feature of Co. Cavan. The floor of the country is formed of Ordovician shales and sandstones, finely seen upon Slieve Glah, and uptilted, as usual, by earth movements prior to the Carboniferous period. At Crossdoney, a biotite-granite, with associated veins of compact grey eurite, penetrates the Ordovician beds, probably as an accompaniment of these same movements. The alteration of the Ordovician shales along the junction had been well seen in several sections. To visitors from Dublin, the comparison with the muscovite-

granite of the Leinster chain, which occurs similarly, made Crossdoney of especial interest. Unconformably on the Ordovicians, the Lower Carboniferous sandstone was laid down, and was succeeded by the great Carboniferous Limestone, which forms the country west of Cavan, and which includes the basin of Lough Oughter. The sandstone, which is only of local occurrence, had been seen below Lisnamandra. The relations of a small exposure of eurite to the adjacent rocks had not been determined in the short time available; but there is little doubt that the eurite belongs to the Crossdoney series, and was cold and denuded before the grey quartzite, now seen close against it, was deposited as a sandbed in the Carboniferous sea. The true position of this eurite is, however, a matter of much interest, as it may, after all, represent a post-Carboniferous intrusion, like the adjacent andesite. The glacial deposits consist of thick boulder-clay, with very little sand and gravel. The boulder-clay capping so many of the hills gives them and their slopes the typical dome-like contour, whether the underlying rock is Ordovician or Carboniferous; but the limestone of the latter period has larger lakes upon its surface, solution doubtless aiding their formation; and the broad hollow of the Erne lies in it, stretching away from Cavan to Enniskillen.

Afterwards, I was called on to give a short account of the Bladderworts and their allies, as these interesting plants had been particularly in evidence that day. Then a pleasant function was performed as Prof. Cole presented to Henry Hanna a prize recently awarded to him by the Committee of the Belfast Club for the best set of twenty-four microscopical slides showing general excellence. Afterwards we returned to our specimens, and until a late hour the crowd of town's-people round the hotel windows showed the interest that the inhabitants of Cavan took in our mysterious researches.

Cavan is notoriously a wet county, and the statement made with some positiveness by local members, that there *could* not be more than two such fine days in succession, proved correct. Sunday morning was gloomy, and after breakfast heavy rain began to fall. But, indeed, if it *had* to rain, the weather was most considerate, for a less inconvenient time for rain during our stay could not have been found. The church-goers were in no way deterred, and a large party started off for Killykeen

in excellent spirits in the very heaviest downpour. We had a six-mile drive in the rain, and a swim in the lake, and as we sat at lunch in the little tea-house, the clouds lifted, and soon the sun came out, and a brilliant and delightful afternoon succeeded. In three boats we rowed northward, and again visited Bedell's Tower, and explored the adjoining lake-shores; and then, leaving a contingent sketching on the margin, we rowed back by a narrow and tortuous channel, only navigable in flood-time, with splendid woods rising on either hand. On one small islet we found, submerged below about six inches of water, half a dozen terns' nests with eggs, showing how great was the flood. We re-assembled at Killykeen for tea, and on the way home had another hour on the bog at Derrywinny, and got further specimens of its interesting plants—including a large quantity of delicious wild Raspberries. Even the approach of darkness did not put an end to scientific enquiry, for long after our late dinner a bat-hunting party set out in the dusk, to scour the district for these little-known mammals.

Our last day (Monday) was finer than ever, and in brilliant sunshine we left the "Farnham Arms" at 9.0 a.m. and drove south-east to the base of Slieve Glah, and by 10.30 our advance guard had taken possession of the summit. Though only 1,057 feet high, this hill looks imposing from any point of view, on account of its isolated position; and for the same reason a remarkably extensive view is obtained from its summit. This day was not exceptionally clear, and yet we could clearly identify no less than fourteen counties. To the east, beyond the fertile fields of Cavan, stretched the plains of Meath and Louth, with the ridge on which Tara stands, and the high ground about Collon clearly distinguishable. To the north-east, a haze or shower hid the mountains of Mourne; but beyond the undulations of Monaghan, Slieve Gullion in Armagh rose faint and blue. Tyrone was probably in view, but we could not identify any particular point. To the north-west stretched the valley of the Erne, and on its southern side the limestone mountains of Fermanagh and Leitrim rose clear and high, with Cuilcagh in the centre. Westward stretched the plains of Roscommon and Longford, with the moat and chapel spire of Granard to the south-west. Southward lay the valley of the Inny, with

Lough Sheelin spread in the foreground, and the limestone hills that overlook Lough Kinale and Lough Derevaragh in Westmeath standing up conspicuously, and far beyond these lay the long blue outline of the Slieve Bloom Mountains, on the borders of King's and Queen's Counties. To the south-east we probably saw Kildare, though it could not be identified, but beyond it the high granite range of Dublin and Wicklow rose wonderfully clearly, its southern end fading into blue dimness, its northern end boldly standing out in the Two-rock and Three-rock Mountains. In the foreground the rolling hills and fertile fields of Cavan spread in every direction, with lakes and woods giving variety to the scene.

The appearance of so large a party on the mountain had thrown the district quite into a commotion, and by this time most of the neighbours had joined us, one old fellow being particularly obliging in retailing information respecting the locality, giving due prominence to the giants, witches, and fairies of both past and present days. Descending the hill to the northward, our party scattered, and several finds were made. The Stag's-horn Club-moss, *Lycopodium clavatum*, was found in considerable abundance, and already in fruit; and Miss Kelsall obtained a single specimen of the Moonwort (*Botrychium Lunaria*). The entomologists took *Acronycta myrica* var. *montivaga*, and larvæ of *Saturnia carpini* and *Eupithecia nanata*. After lunch it was time to return to Cavan, and the bustle of packing was succeeded by a final cup of tea, when many plans for future excursions were discussed, and many invitations exchanged between the members of the different Clubs. The northern party were the first to leave, amid friendly farewells, and they were accompanied to the train by several of the Dubliners, and by Messrs. H. H. Moore and S. Jones, who had been indefatigable in their efforts to assist the visitors, and whose local knowledge proved of the greatest service. An hour later the Dublin members departed, and all reached home delighted with their visit to Cavan, improved in health and spirits by their long days in the open air, and many of them bearing with them material for scientific papers, which will, no doubt, in due course find their way into these pages.

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## HEPATICÆ COLLECTED IN CO. CARLOW.

(For the R.I.A. Flora and Fauna Committee.)

BY DAVID M'ARDLE.

ON the 30th of March last year I joined Dr. R. F. Scharff and Mr. J. N. Halbert,<sup>1</sup> of the Science and Art Museum, at Borris, where they were investigating the fauna; and we were soon on our way to the banks of the River Barrow. In a small plantation amongst granite rocks near the bridge at Graigue, I was fortunate in gathering *Scapania compacta* in a fertile state. The late Dr. D. Moore considered it a very rare liverwort, and the only specimens he collected of it were found in two localities in the County Kerry, in both places sterile. *Scapania æquiloba* and *S. aspera* also grew plentifully amongst the moist crumbling rocks. We returned through the demesne to Borris. The following day was spent collecting on both sides of the river between Ballyluglea Bridge at Borris, and Goresbridge, distant about five miles. Amongst other liverworts I collected *Lejunea flava*, var., and *L. patens*, and on damp rocks in a wood the rare *Lophocolea spicata*. Part of a day spent in Oakwood Park near Carlow concluded this interesting excursion.

In the following list of Hepaticæ I enumerate 33 species and 3 varieties, many of them rare and of botanical interest, such as fertile specimens of *Metzgeria conjugata*, *Jungermania alpestris*, &c. It may be of interest to note that we have no previous list or even a locality quoted for liverworts in the County Carlow that I am aware of. Had our visit been of longer duration I could have pushed on to the Blackstairs Mountains, and possibly I would have been enabled to further extend this list. Hepaticæ are very scarce in the granite districts, but a few genera, such as *Scapania*, *Nardia*, &c., abound. On the limestone formation they are more abundant both in genera and species.

**Frullania dilatata**, Linn.—Wood by the roadside at Graiguenamagh, Goresbridge, Oak Park demesne, on trees, common.

**F. tamarisci** (Mich. L.)—Spreading in large patches on rocks and trees about Graigue, Goresbridge, Oak Park demesne, very common.

**Lejunea serpyllifolia** (Dicks.) Libert.—On a damp bank, Graigue. On trees in the wood near Goresbridge.

<sup>1</sup> Mr. Halbert has published a list of the Coleoptera which he captured, in the *Irish Naturalist* for December, 1895, p. 330.

**L. patens**, Lindberg.—Wood by the roadside, Graigue, and Goresbridge, rare. There is an excellent figure of this plant in Moore's "Irish Hepaticæ."

**L. flava**, Swartz, var.—Damp places amongst rocks about Graigue, and on trees near Goresbridge, rare.

**Radula complanata**, Linn.—Common on the trunks of trees about Graigue, Oak Park demesne, and Goresbridge.

**Lepidozia reptans**, Linn.—Damp places near the River Barrow, Graigue. On decayed wood at Goresbridge, *fertile*.

**Bazzania trilobata**, Linn. (Hook. Brit. Jung., tab. 76; *Mastigobryum trilobatum*, G. L. et N. Syn. Hep., p. 230).—Amongst rocks near the bridge at Graigue, rare.

**Cephalozia bicuspidata**, Linn.—Damp places about Graigue and Goresbridge, very common.

**C. catenulata**, Huben. (Hepaticol. German., 169; Carrington in *Trans. Bot. Soc. Edin.*, vii., p. 449, t. II., fig. 2).—Amongst damp rocks near the bridge, Graigue, rare.

**Lophocolea bidentata**, Linn.—Common.

**L. spicata**, Taylor.—Amongst damp rocks in the wood near Goresbridge, very rare.

**Kantia trichomanes**, Dicks.—Common.

**K. arguta** (N.M.) Lindb. (Eng. Bot. tab. 1875).—Damp bank in wood by the roadside, Graigue, rare.

**Saccogyna viticulosa**, Mich.—On a damp boggy place in wood by the roadside, Graigue.

**Scapania compacta**, Dumort. (*Jungermania compacta*, Roth, Germ. 3, p. 375; Lindenb. Synop. Hep., p. 58; *Jungermania resupinata*, Hook. Brit. Jung., tab. 23, excellent fig.; Sm. Eng. Bot., tab. 2498).—Amongst granite rocks, bank of the River Barrow near Graigue (*fertile*), rare. Dr. D. Moore in his work on the Irish Hepaticæ states this is a rare plant in Ireland; the only specimens he collected were from the neighbourhood of Brandon, Co. Kerry, sterile in both places where it was found growing.

**S. æquiloba**, Dumort. (Carrington, Brit. Jung., p. 81, no. 3, pl. 8, fig. 26).—On rocks near the River Barrow at the bridge at Graigue, plentiful.

**S. æquiloba**, var. near *S. aspera*.—On rocks near the bridge at Graigue.

**S. aspera**, Muller and Bernet. (Pearson in *Journal of Bot.*, Vol. xxx. p. 353. plate 329, 1893).—Amongst damp rocks, side of the River Barrow near the bridge at Graigue, plentiful.

**S. nemorosa**, Dumort.—Amongst damp rocks, side of the River Barrow at Graigue.

**S. undulata**, Linn.—Margin of a stream near the bridge at Graigue.

**Diplophyllum albicans**, Linn.—Damp banks in the plantations about Graigue, very common.

**Plagiochlla asplenoides**, Linn.—Damp banks in Borris demesne and plantations about Graigue, common.

**P. asplenoides**, Linn., var. *minor* (= *P. Dillenii*, Taylor). On rocks, in damp wood, Graigue.

**P. punctata**, Taylor.—Damp banks in a wood at Graigue, rare.



**Jungermania (Lophozia) alpestris**, Schl. (*Jung. alpestris*, Schleich, Exs., cent. 2, n. 59; Nees Europ. Leberm.; II., p. 104; G. L. et N. Syn. Hepat., p. 113.)—Dioecious. Stem strong, creeping or erect from the upper half, simple or divaricately branched near the apex, clothed on the under side with white rootlets proceeding from the often violet-coloured stem. Leaves in two rows, vertical, increasing in size from the base upwards, sub-quadrangle, two-lobed, rarely three-lobed, segments of various depths, acute or obtuse, often widely and shallowly notched at the apex, in some leaves sinus scarcely perceptible. Perichæatial leaves three or four times acutely divided, stipules none. Perianth obovate or obovate oblong, terminal or lateral. Antheridia remarkably large, placed singly at the base of each leaf, which are closely imbricated and saccate at the base, patent at the apex, recurved, of a pale violet colour. Amongst damp rocks near the side of the River Barrow at Graigue. Very rare.

**J. (Gymnocolea) affinis**, Wilson (in Hook. Brit. Fl., II., p. 128; *Jung. turbinata*, Wils., in Eng. Bot. Suppl., t. 2744, nec Raddi).—Quarry bank near Goresbridge.

**Nardia emarginata**, Ehrh.—Amongst damp rocks, side of the River Barrow near the bridge at Graigue. Plentiful.

**N. scalaris**, Schrader.—Amongst damp rocks, side of the River Barrow at Graigue.

**N. hyalina**, Lyell.—Moist bank in a plantation, Graigue. Rare.

**Pellia epiphylla**, Dill. (L.).—Damp places. Common.

**Conocephalus conicus**, Neck.—Banks of the River Barrow. Common.

**Metzgeria furcata**, Linn.—On the trunks of trees about Graigue; Oak Park near Carlow. Common.

**M. furcata**, Linn. var. **fruticulosa**, Dicks. (Lindberg's Monogr. *Metzgeria*; *Jungermania fruticulosa*, Eng. Bot., Vol. 35, tab. 2514. *J. furcata* var. *aruginosa*, Hook., Brit. Jung., 55 et 56). On the trunks of trees in the wood at Goresbridge. A very distinct form growing in compact crisped tufts not unlike some large alga. Fronds tapered near the apex, sharply forked, with the margins shallow and closely recurved, giving the ramuli the appearance of being reduced to the nerve. Colour near the apex a brilliant verdigris green, or blue green apex erect, bearing copious gemmæ.

**M. conjugata**, Dill. (Lindberg's Monogr. *Metzgeria*), Autœcious. Fronds robust, not much elongated, more or less dichotomous, irregularly pinnated or decomposite, linear, narrower in some parts than in others, in transverse section semilunar, hairs longish, stout, often in pairs on margin and divergent. The paucity of hairs and more solid substance of the frond with copious innovations, and above all the autœcious inflorescence abundantly distinguishes this species from *Metzgeria furcata*, which is dioecious, and all other known species of this singular genus. On granite rocks, banks of the Barrow at Graigue (*fertile*), on the trunks of trees in the wood near Goresbridge (*fertile*).

**Riccardia pinguis**, Linn.—Crevices of rocks in a quarry at Goresbridge.

## THE QUAIL IN IRELAND:

ITS PRESENT AND RECENT VISITS.

BY C. B. MOFFAT.

THE re-appearance in 1896 of the Quail has already been reported from the counties of Cork,<sup>1</sup> Tipperary,<sup>2</sup> and Wicklow,<sup>3</sup> and doubtless observers in many other localities have, like myself in Co. Wexford, heard and seen the bird.

The general conditions prevailing this year so strongly resemble those of 1893, when Quails excited attention in a number of localities throughout Ireland, that the return of the birds in 1896 will scarcely cause surprise; but it would be a mistake to make too little of our erratic visitant, for whose next re-appearance on our shores we may have many years to wait.

At the time when the *Irish Naturalist* was founded in 1892 the Quail was looked upon as practically lost to our fauna. There were still a few counties in which it could not be said to have ceased to breed, at least occasionally—(Donegal, Louth, Dublin, Roscommon, and Wexford were those from which Mr. Ussher had recent notes of its nesting); but the localities were very few, and the records therefrom I believe rather meagre. At Ballyhyland (in the last-named county) it had been unknown for many years. In the first number of this periodical Mr. Ussher referred to the rapid decrease in Ireland of the Quail, Golden and Sea Eagles, and Marsh Harrier—all four species being then apparently on the verge of extinction.

Rather curiously, it was in the summer of the same year that the Quail began to put in his appearance again, though the incursion of 1892 was little noticed at the time by ornithologists in this country. I happened, that summer, to spend several whole nights in the fields in the neighbourhood of Ballyhyland, partly for the purpose of improving my acquaintance with a family of Nightjars; and it was on one of these occasions that I first heard the cry of "wet-my-lip" (or "quick-whip-it" as it rather sounds to my ear) with which the Quail is wont to enliven the cool hours. The moon being

<sup>1</sup> See p. 192.    <sup>2</sup> *Field*, July 11th.    <sup>3</sup> *Land and Water*, June 13th.

full, the Quail called incessantly from midnight till twenty minutes before sunrise, at which time, following the Fern-owl's example, he ceased ; though the Grasshopper-warbler, who had been similarly vociferous through the night, still reeled on unwearied. This was in July, and it seems to me more than probable that there was then a nest in the vicinity.

A few months later a number of letters in the *Field* drew attention to the fact that 1892 had been decidedly a Quail-year in England ; but it was not till the next year, when a considerably larger incursion took place, that the return of the birds was at all generally noticed in Ireland. However, in reading the communications on this subject forwarded by different observers to the *Irish Naturalist* in 1893, I was struck by the fact that several of them incidentally mentioned reports of the Quail's having also been heard the year before : so that the Quail-wave of 1892, if not a heavy one, would still appear to have been widely distributed over the British Islands.

At Ballyhyland I found, as might have been expected, plenty of Quails in the summer of 1893 ; but as far as I could ascertain, they were strictly confined to the immediate vicinity of the ground on which I had heard them in 1892. The Quails were sometimes in grass-fields, sometimes in barley, and sometimes in potatoes ; one night a pasture-field in which I stood seemed thick with Quails, emulously whistling all around me in the faint light ; in the day-time also a few were sometimes audible at the same spot ; but no other ground than that occupied in 1892 appeared to contain a Quail. This I think tends to show that our '93 visitation was merely a return in increased force of the wave of '92.

It is to the same ground, again, after a two-summers' absence, that the Quail has returned in June, 1896. In fact it was in crossing the very field (half pasture and half furze-knock) where I first heard its note four years ago, that, as if again in response to the song of my old friend the Nightjar, who was strumming in the heath on one side, I heard in the grass on the other a gentle " quick-whip-it." It was an hour past sun-down, and the bird was of course quite invisible on the ground. I walked up to it, however, when it rose and skimmed for a short distance, to drop again in the dry, dewless grass. This

attachment to a particular spot seems singular in the case of a bird which comes to us only at irregular intervals.

The general similarity which subsists between 1896 and 1893 does not extend to 1892, but the three Quail-years resemble one another in the unusual dryness of their spring months—March, April, and May. I extract from the Ballyhyland register the following figures, showing the rainfall here for each of the spring months for the past twenty years:—

—	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
March, .	3.59	1.22	2.49	4.17	3.68	2.40	1.92	4.56	3.85	3.99
April, .	5.52	3.76	2.68	3.91	2.13	5.87	3.23	1.01	4.12	2.53
May, .	3.97	5.01	1.68	1.09	2.98	3.02	2.52	2.61	2.89	4.08
Total, .	13.08	9.99	6.85	9.17	8.79	11.29	7.67	8.18	10.86	10.60

—	1887.	1888.	1889.	1890.	1891.	*1892	*1893	1894.	1895.	*1896.
March, .	1.76	4.04	1.32	4.26	1.31	1.16	0.56	1.94	3.81	3.04
April, .	1.82	2.51	2.46	1.67	2.87	1.02	0.78	4.67	2.33	0.72
May, .	1.36	3.19	3.85	3.60	3.99	3.75	2.17	4.51	0.45	0.07
Total, .	4.94	9.74	7.63	9.53	8.17	5.93	3.51	11.12	6.59	3.83

\* Indicates the Quail-years.

The above figures as they stand show that the springs of '93 and '96 were the driest of the series, and that, with the sole exception of the Jubilee year (1887), the remaining Quail-year, '92, ranks next. On the whole, they favour the view that unusual drought in spring directs the flight of *Coturnix communis* towards this island; but it may be objected that on this hypothesis we ought to have had Quails in the year of Her Majesty's Jubilee, when, if they came to us, they certainly attracted no special notice.

The similarity in the rain-gauge results for my three Quail-years is, however, far from being fully brought out by the above table; for, on looking closer, I find that in each of those years the greater part of what rainfall we had was enjoyed either early in March or late in May. Now, supposing that the Quail, which crosses the Mediterranean in April, has to select its breeding ground in our latitude by about the middle of

May, the fact of a continuous drought having characterized the preceding 8 weeks might in several ways do much towards influencing its choice. It appears, then, that

In 1892	the rainfall for 8 weeks ending May 11th	was	1'63 ;
„ 1893	„ „ „	May 15th	„ 1'65 ;
„ 1896	„ „ „	May 17th	„ 1'22 ;

and in nearly every other year of the series, including '87, the heaviest of these rainfalls was surpassed in April alone. The only exceptions were 1884, when, however, the 6 weeks ending May 4th were sufficient to produce 2'45 inches, and 1890, when the same 6 weeks produced 4'20. The three years in which I have found the Quail (apparently breeding) at Ballyhyland therefore easily distance all other recent years in the severity of their droughts for the period precedent to the middle of May.

I do not for a moment suggest that extraordinary drought attracts the Quails; it appears to me far more probable that the consequent sparseness of vegetation in their Continental resorts may at such times drive the birds further afield in search of localities where cover and food are more obtainable. If Mr. Howard Saunders is right in including slugs' among the principal ingredients of the Quail's diet, an additional reason for its spreading further in dry seasons is at once apparent.

One can scarcely suppose that any of the ordinary requisites of Quail-life are lacking in Ireland in a normal summer, considering how common the bird formerly was here, many as a rule even staying the winter: during which season, as we learn from Thompson, seven-eighths of its food consisted of seeds of such invariably plentiful plants as Chickweed (*Stellaria media*) and different species of Dock, Plantain, and Knot-grass. True, reclamation of waste land may have reduced its facilities for enjoying this island as a winter home; but the discontinuance of its summer visits remains an apparently insoluble puzzle. The diminished cultivation of wheat is sometimes assigned as the cause; to this view, however, there are several objections, besides the fact that in my

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<sup>1</sup> Thompson found slugs in only one of thirty Quails whose crops he examined; these birds, however, had all been shot in winter or early spring. The one Quail had eaten 11 specimens of that highly mischievous slug, *Agriolimax agrestis*.

(of course local) experience Quails show no partiality whatever for wheat-lands, but, if their distribution indicates a choice, prefer barley. In England, certainly, the Quail's decrease set in long before it did here; and though wheat has never ceased to be extensively grown in that country, Quails, according to Mr. More (*Ibis*, 1865) had more than thirty years ago almost ceased to breed regularly in Britain. Moreover, Quails abounded in Elizabethan Ireland, scarcely a paradise of wheat-growers. The enormous numbers yearly netted on the Mediterranean passage have suggested another explanation, but apparently this cause had not, till quite recently, affected their abundance on the Continent; in 1892 Mr. More (*Irish Sportsman*, May 21) cited evidence to the negative. Still it is refreshing to learn that the French Government now strenuously combats this traffic; giving us additional grounds for hope, that, should caprice of climate again fetch it to nest with us for a few successive seasons, the Quail's lost habit of annually visiting our shores may be re-acquired.

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## A NEW BIRD-BOOK.

**A Concise Handbook of British Birds.** By H. Kirke Swann.  
London: J. Wheldon and Co., 1896. 3s. 6d.

The portableness and cheapness of this little volume fairly justify its claim to serve as a "handy text-book for reference that has had as yet no rivals." It purports to give some account of every species occurring in the British Islands, defining the habitat, or range in the breeding season, of each, with brief descriptions (except where these are held to be unnecessary) of plumage, nidification, and general habits. To fulfil this task within the limits of 208 fcap. 8vo. pages was somewhat of a *tour de force*, and it must be added that the type of the book is good and not overcrowded. The principal shortcomings are such as might, under the circumstances, have been expected. Conciseness frequently degenerates into vagueness, as where a species is merely stated to nest in the "Northern Palæarctic region." The uselessness of this phrase becomes apparent when we find it applied without further detail to the breeding areas of such a heterogeneous assortment of birds as the Merlin, Black Grouse, Lesser Spotted Woodpecker, Tengmalm's Owl, and Jack Snipe! We should certainly be surprised to hear of the last named species nesting either with *Tetrao tetrix*, in the Apennines, or, with *Dendrocopos minor*, in

the Azores. Again, the curiously intercrossed Continental ranges of the Hooded and Carrion Crows deserved some delineation. It is disappointing to find "Europe, excepting extreme north"—at once too little and too much—the sole definition of habitat accorded *Corvus corone*. To come nearer home, it is an encouraging fact that upon the subject of the Irish fauna our author has been at pains to compile his information from the best sources; but here, too, it is to be feared that he has sacrificed too much to compression; e.g., we read that the Blackcap "in Ireland breeds locally in nearly every county." Mr. Ussher in 1894 recorded it as known to breed regularly in four counties and occasionally in five others; there was therefore a wide margin remaining to be filled. Mr. Swann's boiling-down process occasionally also mars his descriptions. The male Crossbill's plumage is described as "suffused with light crimson"; the fine clear yellow, which several ornithologists believe to indicate his full maturity, despite Mr. Seebohm's conjecture that it belongs, perhaps, to "old and barren birds," is not mentioned. The Pheasant is likewise assumed to need no description; although, as the author rightly observes that most of our Pheasants are of hybrid descent, it might have struck him that some mention of the distinguishing marks of a pure-bred *Phasianus colchicus* could not be absolutely uncalled for. Nor would descriptions of the young Pied Wagtail and Blue Titmouse, which differ much from the adult females, have been superfluous. The Black-headed Gull is said to breed "all round our coasts." This is misleading, for its breeding places are generally inland. Among the Jackdaw's nesting sites, rookeries and rabbit-burrows should have been mentioned (by an odd slip this bird's habitat is stated to be the "Eastern Palæarctic region"); and the description of the Willow-wren's nest as "rarely on ground" will surprise many, and possibly puzzle not a few. The author's list of birds does not include *Turdus migratorius* or *Chionis alba*, both obtained in Ireland of late years under circumstances that seemed to indicate actual migration; they might at least have received a place in the Appendix, in which thirty such doubtful "Britishers" as the Golden-winged Woodpecker (*Colaptes auratus*) are decorously shelved. Our author adopts "trinominals" for each of his seventeen sub-species. Thus our indigenous Dipper is *Cinclus cinclus aquaticus* (Bechst.), and "*Loxia curvirostra pityopsittacus* (Bechst.)," is the Brobdingnagian title of the Parrot Crossbill, of which handsome bird it is fervently to be hoped that no new variety needing a quadriminomial appellative will be discovered.

C. B. M.

## THE BELFAST CLUB AND ITS WORK.

**Annual Report and Proceedings of the Belfast Naturalists' Field Club for the Year ending 31st March, 1896.** Belfast :  
Printed for the Club, 1896.

This, the narrative of the thirty-third year's work of the Belfast Field Club, has just been issued. It occupies sixty-six octavo pages, and furnishes interesting reading. From the annual report, we learn that "the creation of an entrance fee has acted as desired in keeping the membership of the Club within working bounds." As a matter of fact, it has had the effect of reducing the membership (which had been steadily rising for many years) from 516 to 480—a result certainly not to be deplored, for, as we took occasion to remark last year, one of the weaknesses of this Society was the strength of its membership. The report contains several items which give evidence of the activity and width of scope of the Club's work. Thus, the Geologists' Association, London, and the Home Reading Union, had, during their visits to the North of Ireland, the hearty co-operation of the local Society, and this means a great deal where long excursions, often to somewhat inaccessible regions, are the order of the day. A hard week's work in geology was carried out under Professor Cole, each day being devoted to field work, each evening to practical petrography. The Celtic Class has now forsaken the sheltering wing of the Club, and has started an independent existence as the Belfast Gaelic League. Nineteen pages are devoted to an account of the excursions of the year. These appear to have been uniformly successful, and we are glad to note at least a slight improvement on last year in the way of scientific results. The next fourteen pages go to the winter meetings, and brief, very brief, abstracts of the papers brought forward. Then follow reports from the Secretaries of the Microscopical, Geological, and Botanical Sections. The Geological Section has again a good deal to show for its year's work, and here, indeed, the energy of the Club appears to be centred. Glacial geology occupies the chief place, and if the listing of erratics, examination of boulder-clays, and general examination of the district is continued systematically, the results cannot fail to throw much light on the Glacial Period in the North-east of Ireland. The "Proceedings" are neatly printed on good paper, but we regret to notice not unfrequent misprints—surely the Committee might avoid such a disfigurement of their publications. The volume is swelled by an 80-page appendix—"A Bibliography of Irish Glacial and Post-Glacial Geology"—which will be noticed in our next number.

R. LL. P.

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## INSECTS COLLECTED ON LUGNAQUILLA AND IN GLENMALUR VALLEY, CO. WICKLOW.

(For the R.I.A. Fauna and Flora Committee.)

BY J. N. HALBERT.

OWING no doubt to the difficulty of access, many of the most interesting parts of the highlands of Co. Wicklow are practically unknown as regards their insect fauna. Probably none of the old collectors possessed a greater knowledge of the county, exclusive of Lepidoptera, than the late A. H. Haliday, to whom, from certain evidence afforded by his collection, it seems to have been a favourite hunting ground. Yet unfortunately he left few systematic notes of his own experiences for the assistance of future workers, resting contented with the recording of a comparatively small number of his captures, as for example, his discovery of the most interesting ground-beetle *Calathus nubigina*, Hal., from the summit of Lugnaquilla. Accompanied by my friend Mr. M'Ardle, I paid a brief visit to this district at the end of last month. The day selected for the attempt seemed at first unfavourable, threatening clouds had gathered and mists hung about the hills, but as we approached Drumgoff the weather fortunately cleared and we succeeded in reaching the summit of the mountain, after a toilsome climb under a scorching sun. We made the ascent by the Clohernagh Brook, which seemed to be the readiest way from the Drumgoff side, although a safer route might be found in a wet season. On the following day we explored the fine old birch and oak wood clothing the eastern side of the valley for over a mile of its extent. This wood seemed to teem with larvæ, and I have no doubt a collector of Lepidoptera would reap a rich harvest by a little hard work, as the possibilities of finding rare species are undoubtedly great. The following list contains the most notable of the Coleoptera and Hemiptera, excluding many common species.

### COLEOPTERA.

**Carabus catenulatus**, Scop.—Slopes of Lugnaquilla. It was decidedly disappointing not to find either *C. glabratus* or *C. clathratus*; no doubt both occur; the latter has been taken by Mr. H. G. Cuthbert on the Great Sugar-loaf.

**Notiophilus palustris**, Duft.—Abundant. Also on summit.

**Nebria Gyllenhal**, Sch.—Abundant, both the red and black-legged forms occurred on the summit.

**Calathus melanocephalus**, L., var. **nubligena**, Hal.—Specimens of the variety occurred both on the summit and lower slopes, having the thorax entirely suffused with black, and having the legs and antennæ pitchy. The type seems to be extremely rare, or absent from the district.

**Taphria nivalls**, Panz.—Common in Glenmalur valley.

**Trechus minutus**, F., var. **obtusus**, Er.—Abundant on summit, where I found one example of the type; all had the wings rudimentary, not exceeding one and a half mm. in length. Type specimens from the lowlands are said to be always winged.

**Patrobus assimilis**, Chaud.—A fine series obtained on summit.

**Philonthus addendus**, Sharp. } Glenmalur Wood.  
**Halyzia xvi-guttata**, L. }

**Byrrius pillula**, L.—Common under stones on the slopes and summit of Lugnaquilla.

**B. fasciatus**, F.—One specimen.

**Phyllopertha horticola**, L.—This insect, the well-known 'June-bug,' simply swarmed in the valley and over the hill-sides. It will probably be very abundant this season in Ireland. A few examples of the dark form were noted.

**Corymbites quercus**, Gyll.—Common with variety **ochropterus**, Steph.

**Dascillus cervinus**, L.—Frequent on Bracken.

**Podabrus alpinus**, Payk.—Common in Glenmalur Valley by sweeping, also beaten off Larch, Broom, etc. All having the elytra black. A local species, has occurred near Dublin, in Tollymore Park, Co. Down, and at Rostrevor (Furlong).

**Telephorus pellucidus**, F.—With preceding, but rarer.

**T. figuratus**, Mann.—Taken by sweeping rushes at the edge of the Clohernagh Brook. Although never definitely recorded, this insect occurs in other localities, but has hitherto passed under the name of *T. hamorrhoidalis*, F. These Glenmalur specimens seem to be quite dark enough to pass for *T. scoticus*, Sharp; but as they do not agree *in toto* with the description of that variety, it is more satisfactory to refer them to the type. (I am indebted to Mr. G. C. Champion for verifying this identification.)

**T. paludosus**, Mann.—In same locality as the foregoing. Not previously recorded from Ireland. Mr. Haliday's collection contains a single example marked as Irish, but bearing no locality label. This is, in all probability, from the same place. The species is found in northern and mountainous districts in Britain.

**Rhagonycha pallida**, F.—Abundant in Glenmalur Wood.

**Donacia discolor**, Panz.—Common in swampy places on the lower slopes of Lugnaquilla.

**Deporaus betulae**, L. } Both abundant on Birch in Glen-  
**Polydrusus cervinus**, L. } malurWood.

## HEMIPTERA.

The following species were taken in Glenmalur Wood:—*Acanthosoma hamorrhoidale*, *Calocoris striatellus* off Oaks, *Cyllocoris histrionicus*, *Harpocera thoracica*, *Phylus melanocephalus*, *Psallus varians*. In the valley and on the lower slopes of Lugnaquilla occurred:—*Velia currens*, *Miris holsatus*, and *Heterocordylus tibialis*, the last abundantly off Broom. The sub-alpine species *Gerris costæ*, H. S., occurred on small bog-pools at a considerable altitude on Lugnaquilla in company with the common *G. lacustris*.

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 NOTES.

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 BOTANY.
 

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**Teesdalla nudicaulis in Ireland.**—On June 28th I had the pleasure of receiving from Mrs. Leebody five specimens of this plant, which she had gathered on 26th inst. on the sandy shore of Washing Bay, on Lough Neagh, in Co. Tyrone. This locality is at the south-west corner of the lake, in a remote and unfrequented place, and Mrs. Leebody reports that the plant grows in abundance there. Although *Teesdalla* is distributed all over England, and in Scotland as far north as Elgin, it has not hitherto been known in Ireland, and furnishes an interesting addition to our flora.

R. LLOYD PRAEGER.

**Lepidium Draba, L.**—In the Journal of Botany for July, Mr. Britten notes the receipt of a specimen of this alien from roadside near Enniscorthy, Co. Wexford. The finder's name is not stated.

**Pinguicula grandiflora, Lam., introduced in Co. Wexford.**—I think it may be of interest to record the successful establishment of a colony of *Pinguicula grandiflora* in Co. Wexford. About half-a-dozen roots were brought from Co. Cork in 1879, and planted in a bog at the foot of Blackstairs Mountain; these have now increased to twenty-seven plants, and they bloom beautifully every year in May. The only butterwort which is indigenous to these parts is *Pinguicula lusitanica*.

E. V. COOPER, Killanne, Co. Wexford.

**Mercurialis perennis in Co. Monaghan.**—Mr. W. F. de V. Kane has sent me specimens of this plant from Bellanode near Monaghan, where it grows in a hedge-bank. It has long been known to grow in the adjoining county of Armagh, but is local and rare in Ireland.

R. LLOYD PRAEGER.

## ZOOLOGY.

## CRUSTACEANS.

**Trichoniscus roseus, Koch.**—This very rare wood-louse I find fairly plentiful among damp cinders and old bricks in a corner of my own yard. Dr. Scharff, who verified the specimens for me, found it under similar conditions in Dublin in autumn (*I.N.*, 1894, p. 26).

R. WELCH, Belfast.

## INSECTS.

**Vespa norvegica, F., at Omeath, Co. Louth.**—I spent June 25th at Omeath, and while searching for beetles on some young fir trees, I nearly ran against a wasp's nest hanging from the branch of a Larch. Having retreated to a safe distance, I watched my opportunity and succeeded in capturing several specimens of the workers, and obtained a male from another nest which had been taken close by. The yellow base of the antennæ showed me that I had got something different from *V. vulgaris*, and on my return home I found that the specimens I had captured belonged to the above species. The wasps were too busy to be vicious, for I stood only about eight feet from the nest while catching them, and none attempted to attack me.

W. F. JOHNSON, Poyntzpass.

## SPIDERS.

**Atypus in King's Co.**—Rev. Canon Russell writes that the *Atypus* tube from King's Co., recorded in the *Irish Naturalist* for June, was found by Mrs. Reamsbotham.

## MOLLUSCS.

**Helix arbustorum.**—During a short visit to Ballycastle, North Antrim, in May, I spent a day collecting at Murlough Bay, and was fortunate enough to find some fine specimens of this beautiful shell among Nettles in the plantation, which I had often searched before without success. Thompson recorded it from Larne, and specimens collected by Waller about thirty years ago, are labelled Drumnasole (near Carnlough). Dr. Scharff tells me that he does not know of any other finds later than those for this district. The three other localities in which this shell was lately found, are in Donegal, Armagh, and Sligo, as recorded in the *Irish Naturalist*.

R. WELCH, Belfast.

**West of Ireland Mollusca.**—Messrs. Edward Collier and Robert Standen contribute to the April number of the *Journal of Conchology* a good paper on the mollusca collected on the Galway excursion of the Field Club Union last year. Mr. Standen contributed to this Journal a full list of the species found, which was published in the special "Galway Conference" number (September, 1895). The present paper is more detailed, and deals particularly with the species and varieties of land and fresh-water shells collected on that excursion.

## BIRDS.

**American Robin In Connaught.**—During a recent visit to Carrick-on-Shannon, I was informed by Mr. C. C. Beresford Whyte that his keeper at Newtown Manor, near Lough Gill, had shot there and preserved a strange thrush with a red breast. On visiting the place, I was shown the bird by Mr. Robert West, whom I found to be a most observant and careful man. I placed him in communication with Dr. Scharff, and the result is that the bird is now in the Science and Art Museum, Dublin, the second example obtained in Ireland; the previous one, also in the Museum, having been shot in Co. Dublin on 4th May, 1891. Mr. West writes about his bird—"The thrush was shot on or about 7th December, 1892, in a large water-meadow very near the shore of Lough Gill, Newtown Manor side, feeding with a similar bird, also with Snipe, Lapwing, Fieldfares, and Redwings. By my diary I find the heavy snow began to thaw on the 5th." Unlike the previous occurrence in May, this specimen was obtained at the end of a very severe period of frost and snow in December.

R. J. USSHER, Cappagh, Co. Waterford.

**Occurrence of the Crane (*Grus communis*) at Inch, Lough Swilly.**—On 24th June, Mr. John M'Connell, of Burtislob House, brought me for identification a fine male specimen of the above species, which he had shot the previous evening on Inch Slobbs. The following are particulars taken by me. Total length, 42½ inches; wing, 22½ inches; expanse from tip to tip, 6 feet 5 inches; bill, 4 inches; weight, 8 lbs. 12 ozs. The plumes were very slightly developed, the red brown warty patch on the top of head was very prominent. The plumage was light gray, tinged very faintly with brown, primaries and secondaries black, latter tinged with gray. This is another rarity added by Mr. M'Connell to the list of Inch birds.

D. C. CAMPBELL, Londonderry.

**The Quail In Co. Monaghan.**—On 26th May I heard the Quail in the neighbourhood of Newtownbutler.

W. MACMILLAN, Enniskillen.

**Cormorants In Co. Donegal.**—Mr. H. C. Hart contributes to the *Zoologist* for June, a note on the nesting habits of the Great and Green Cormorants, as observed by him near Portsalon.

**Razorbill on Lough Neagh.**—Whilst sailing on Lough Neagh yesterday a Razorbill passed flying close to the boat and alighted on the water some 200 yards further.

H. D. M. BARTON, Antrim.

**Stock Doves In Co. Down.**—Some years since I addressed a note to your paper on the subject of these birds being seen and nesting in Co. Antrim. Since that time I have frequently seen them in this locality, but have only now learned that they breed in considerable numbers in the Mourne Mountains, Co. Down. This year I have had reliable information of no less than five nests being found, all of them placed in rabbit holes on the face of a rather steep mountain and within a radius of less than half a mile.

H. D. M. BARTON, Antrim.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a seal from L. Powell, Esq.; a monkey from C. S. Donnelly, Esq.; a pair of Axolotls, and six Japanese Fantail Goldfish from J. B. O'Callaghan, Esq., and a Squirrel from Sergt. Talbot. 12,200 persons visited the Gardens in June.

### DUBLIN MICROSCOPICAL CLUB.

JUNE 18th.—The Club met at the house of Mr. F. W. MOORE, who showed *Sphaerostilbe flavo-viridis*. This species belongs to the same group of Fungi as *Volutella* and *Myrothecium*, species of which had been exhibited by Mr. Moore on former occasions. The present species was found growing on the condensed sap which had exuded from a cut shoot of *Baumontia grandiflora* in a stove house at Glasnevin. The peculiar stem-like structure, made up of a number of hyphæ joined together, was well shown. The conidia-bearing ends formed a roundish structure of small dimensions, of a yellowish green colour. The species is scarce.

Mr. G. H. CARPENTER showed *Chernes phaleratus*, Simon, a false-scorpion new to the Irish fauna, taken at Woodenbridge, Co. Wicklow, by Mr. J. N. Halbert. The species occurs in the New Forest, England, and at Fontainebleau, France.

Mr. HENRY J. SEYMOUR showed a thin section of the phonolite from Blackball Head, discovered by Mr. W. W. Watts, and mentioned in his Guide to the Geological Survey's Collection of Rocks (p. 91). This rock, which is very compact, and of a dark green colour, is the only recorded occurrence of a phonolite in Ireland.

### IRISH FIELD CLUB UNION.

A general account of the joint excursion made to Cavan and Lough Oughter on July 10th to 13th, appears on a previous page of the present number.

### BELFAST NATURALISTS' FIELD CLUB.

JUNE 20th.—GLENARM. On account of the inclement weather, only a very small number went to Glenarm, and little work was done. A couple of souterrains were visited at the Sallagh Braes and the old fort, and a few ordinary plants collected. The return was made by the coast road past Carncastle.

GEOLOGICAL SECTION, 24th JUNE.—F. W. LOCKWOOD in the chair. Miss S. M. THOMPSON exhibited specimens and sections of the riebeckite-bearing rocks of Skye and Ailsa Craig, obtained from the collection in Jermyn St., through the kind assistance of W. W. Watts, F.G.S., etc. Other rock specimens were shown, and twenty-four microscopic sections presented by the Rev. J. ANDREW; pamphlets by Prof. COLE; erratics by R. BELL, and a collection of Red Crag fossils by the Chairman.

An Excursion to Glenavy on the 18th July proved fruitless, owing to the flooded condition of Lough Neagh, which prevented access to the leaf-beds which formed the object of the expedition.

#### DUBLIN NATURALISTS' FIELD CLUB.

JUNE 27.—BECTIVE AND THE BOYNE.—A party of about twenty-five members proceeded to Kilmessan by the 9.30 train, and walked thence to Bective, to explore the portion of the valley of the Boyne. The well-known and picturesque ruin of Bective Abbey was first visited, and then the members scattered, a botanical party making for the marshy margins of the rivers, while others proceeded to Trim, to examine the antiquities of that historic town. The botanists found the reedy margins of the Boyne highly interesting, and many rare plants were gathered, including the Meadow Rue (*Thalictrum flavum*), Spearwort (*Ranunculus Lingua*), Marsh Stitchwort (*Stellaria glauca*), Narrow-leaved Water Parsnip (*Sium angustifolium*), Great Water-Dock (*Rumex Hydrolapathum*), Frog-bit (*Hydrocharis Morsus-ranae*), Sweet Flag (*Acorus Calamus*), Lesser Bank Sedge (*Carex paludosa*), and Reed Meadow Grass (*Glyceria aquatica*), while the great groves of reeds and bull-rushes, 9 or 10 feet in height, added picturesqueness to the scene. On the dry banks overlooking the marshes were the Gromwell (*Lithospermum officinale*), Vervain (*Verbena officinalis*), Teazel (*Dipsacus sylvestris*), and Goat's-beard (*Tragopogon pratensis*). Entomology was not represented in the party, but the botanists discovered in the stems of the Reed-mace the larvæ of *Nonagrietypha*. Subsequently the party returned to Kilmessan, where tea was served by Miss Gardiner. Time was still left for a stroll, and in a grave pit in the village the botanists again scored, finding among other plants the Henbane (*Hyoscyamus niger*), three of the four British species of poppy (*P. Rhæas*, *dubium*, *Argemone*), the purple Hempnettle (*Galeopsis Ladanum*) the Swine's Cress (*Senecioia Coronopus*), and other uncommon plants. By roadsides and in fields during the walk there were noted the Field Chamomile (*Matricaria Chamomilla*), Wild Mignonette (*Reseda lutea*) Toothed Corn-Salad (*Valerianella dentata*), Good King Henry (*Chenopodium Bonus-Henricus*), and Rough Chervil (*Charophyllum temulum*). The party returned to town at 8.45.

#### CORK NATURALISTS' FIELD CLUB.

JUNE 10.—A small party visited the grounds of Ballincollig Powder Mills and the Lee Valley.

JULY 1.—Carrigaline and Revine's Point were visited. Thirteen members went and had a most enjoyable drive of about twenty miles each way. Several stoppages were made to enable botanists and others to collect, and a good number of specimens were obtained, though no records were made.

JULY 11.—The glen between Waterfall Station and Ballincollig was explored by a good number, and yielded a good supply of flowers and insects to collectors.

## NOTES ON THE FAUNA AND FLORA OF CLONBROCK, CO. GALWAY.

### PREFATORY NOTE.

BY E. J. McWEENEY, M.D., AND R. LLOYD PRAEGER, B.E.

AMONG the many results which have followed, directly or indirectly, the Galway Conference of the Irish Field Clubs in 1895, and the gathering and intercourse of naturalists on that occasion, few will be looked back to with greater pleasure and interest by those who were so fortunate as to participate in it, than the week spent in June last by a representative party of the Dublin Naturalists' Field Club at Clonbrock, Co. Galway, on the invitation of our fellow-member, the Hon. R. E. Dillon. A very deep debt of gratitude is due to our host and hostess, the Right Hon. Lord Clonbrock and Lady Clonbrock, whose unflinching kindness was only exceeded by the interest they displayed in our researches, and the assistance they rendered us in numberless ways. When to this is added the fact that every corner of the large estate was thrown open to us, and all the resources of the estate placed at our disposal, it will be seen that we pursued our field work under circumstances of unusual advantage and pleasure.

It may be well to preface the scientific notes of the different members of the party with a general narrative of our doings.

On Tuesday, June 16th, the party, consisting of R. F. Scharff, F.D., E. J. McWeeney, M.D., David M'Ardle, and J. N. Halbert, left Dublin by the 9.15 train for Ballinasloe, which was reached at 12.30. The party was met at the station by one of Lord Clonbrock's carriages, into which M'Ardle and Halbert lost no time in transferring themselves, whilst Scharff and McWeeney mounted their machines, and the 8½ miles to Clonbrock were quickly negotiated. The party was received by Lord and Lady Clonbrock and the Hon. R. E. Dillon, and after lunch were accompanied round the ground and gardens, and through the more nearly adjoining woods. They visited the "Old Orchard," a veritable jungle of densely packed plant-life, and passing into the open wood were shown the bank on which grows that most remarkable fungus *Morchella elata*. This bank in Clonbrock Wood and its immediate neighbourhood are the only British localities for the "Tall-growing Morel."



Ocular demonstration of its existence here was afforded by the numerous shrivelled and dried-up specimens with which the slope was studded.

After dinner Mr. Dillon conducted a party to examine the contents of an apparatus devised by himself for trapping moths, whilst the non-entomologists sat in the large drawing-room—converted, by the way, into an admirably commodious laboratory—and discussed plans for the morrow.

Wednesday opened windy and wet. The enthusiasm of the party scorned such slight drawbacks, and it was not long after ten when they started, under the leadership of Mr. Dillon, for the western pine-wood and neighbouring boggy land. The chief botanical feature which was observed in the pine-wood was the enormous abundance of the Tway-blade (*Listera ovata*), which was here quite the commonest herb. McWeeney observed a cluster-cup fungus growing abundantly on the back of its leaves, and betraying its presence by yellow spots on the upper surface. It proved to be a stage in the life history of a "rust," *Puccinia moliniæ*. A rare ladybird beetle *Chilocoris bipustulatus*, was taken by Halbert, who also secured on Sheep-pool Bog a crab-spider, *Xysticus sabulosus*, new to Ireland, and a rare and interesting wolf-spider, *Pardos herbigrada*, also new to Ireland, figured in the current number (Plate 3).

At two o'clock all were back at the house for lunch, and afterwards most of the party started off to explore the south side of the river as far as the avenue; others, having a considerable number of specimens to work through, remained home. Mr. Dillon had occasion to go across the lawn to the pheasantry, which he uses as a breeding-place for moths and butterflies, and returned in a few minutes with two fungi that he had found in the pheasantry. One of them, a club-shaped specimen, about two inches long, was grown out of a huge chrysalis, and was none other than the famous *Cordyceps militaris*, which mysteriously originates from Lepidopterous larvæ. This carnivorous fungus, though absolutely uncommon in England, has been detected hitherto in Ireland only at Powerscourt (*Irish Naturalist*, Oct., 1881). The other specimen was a beautiful little agaric, *Lepidoglyphis felina*, Fr., which has not previously been recorded from Ireland.

The day concluded with a demonstration of specimens after dinner—and the usual moth-hunt, from which the enthusiastic lepidopterists were in nowise deterred by the heavy rain.

On Thursday the whole party went to the woods and separated, each collector going whithersoever his instinct led him to hope for booty. *Lachnea hemisphaerica*—a fungus new to Ireland—was found on the damp soil in the pine-wood; while Halbert secured the rare ground-beetle, *Calathus piceus*, in the oak-wood, and *Orectochilus villosus* in Clonbrock River. After lunch most of the party returned to the wood. The evening was spent arranging specimens and looking at microscopic preparations, M'Ardle's demonstration of the rotatory movements of the protoplasm in an internodal cell of *Chara* being much appreciated.

On Friday morning the party separated, Mr. Dillon proceeding on foot with M'Ardle and Halbert to Doon Wood, whilst Scharff and McWeeney cycled to near Mount Bellew, and did some collecting along the road. Doon Wood proved a good entomological locality, yielding a beetle, *Phalacrus substriatus*, and two spiders, *Cornicularia vigilax* and *Tetragnatha obtusa*, all new to Ireland. Returning to Clonbrock at 1.0, they picked up a well-stocked luncheon basket at the house, and rejoined their colleagues at Doon Wood. Some good work was done by M'Ardle in the domain of flowering plants. He had taken the Bee Orchis (*Ophrys apifera*), and Marsh Helleborine (*Epipactis palustris*) to preserve. A striking feature of Doon Wood is the enormous abundance of *Listera ovalis*, and the luxuriant development of the plant. One specimen, which measured 27 inches in height, was brought home, but Praeger, on being shown the specimen later on in the evening, recollected having found this plant four feet high, which caused the Doon specimen to hide its diminished head. Starting on the homeward journey, the party passed through the deer-park. Here Mr. Dillon pointed out *Iris foetidissima*. In turning over a large trunk, McWeeney came across a fluffy fungal mass which proved to be *Botryosporium diffusum*, Ca., one of the most exquisite of British moulds. At dinner the party was joined by Praeger, who had come through from Londonderry, *via* Belfast and Dublin, since the previous evening.

On Saturday afternoon Scharff and McWeeney had to leave for Dublin, much to their regret, so they did not join the party which started at 10.0 in a wagonette for some extensive bogs to the northward. We first examined a wood near Tycooly House, and then spread out over the adjoining bog. Here Praeger made an interesting find, the Brown Beak-rush (*Rhynchospora fusca*), a very rare plant in the British Isles, and in Ireland known previously only from stations much nearer the western ocean. It was subsequently found again growing in profusion on bogs at Killasolan, with its congener *R. alba*. Tramping over an extensive bog, we visited the banks of the Shiven River, which were ornamented with tufts of Royal Fern, and came back by the Killasolan bogs. A rapid drive brought us back in time for dinner, and a long evening among our specimens.

Sunday dawned fine. At breakfast specimens of the Bird's-nest Orchis (*Neottia Nidus-avis*) were produced by Praeger, gathered under beech-trees not far from the house. His morning ramble had a more important result, for a pondweed collected in the Clonbrock River, and at the time unknown, is believed by Mr. Arthur Bennett to be a new form of the rare *Potamogeton lanceolatus*; study of the growing plant will, it is hoped, settle its identity. M'Ardle, Halbert, and Praeger were early afoot, and investigated the bog beyond the "Lurgan Plantation" and the Clonbrock River adjoining. In the afternoon, accompanied by Lord and Lady Clonbrock, we explored the Deer-park, and pushed on to Doon, where the abundant Orchid-flora of that place—including the Bee Orchis, Marsh Helleborine, Sweet-scented Orchis, Butterfly Orchis, Frog Orchis, Tway-blade, and others—was again studied with admiration and interest. Specimen of *Cholva fumata*, a beetle new to Ireland, occurred in dead birds in the woods.

On Monday morning we drove eastward to the River Suck, which here bounds the counties of Galway and Roscommon, and spent some highly profitable hours collecting along its banks in the neighbourhood of Bellagill bridge. This place yielded a rich haul of flowering plants to the botanists, though poor in cryptogams; while the entomologists secured in *Trechus discus* a ground-beetle new to Ireland, and in *Eriirrhinus aethiops* a very rare weevil. But our work was doomed to interruption in the afternoon. The rain, which had threatened

all morning, at last came down in earnest, and it was a drenched and bedraggled party that reached Clonbrock at about four o'clock. The rain continued, so we spent a very busy afternoon putting away specimens, and sorting and arranging the spoil of the last few days.

The pleasantest time must have an end, and on Tuesday morning we bade a grateful adieu to our host and hostess, and drove to Ballinasloe, stopping for an hour at some gravel-pits by the roadside, which yielded a number of plants which we had not seen at any other place in the district—plants, such as the poppies, which love light soils. Ballinasloe was reached in good time, and in due course we once again glided under the familiar roof of Broadstone terminus.

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#### LAND PLANARIANS AND LEECHES.

BY R. F. SCHARFF, PH.D.

Several specimens of the only British land planarian, *Rhynchodemus terrestris* (almost all planarians being either marine or freshwater species), was secured under dead tree-trunks in Clonbrock forest. This little worm, as I pointed out in *Nature* (vol. 50, p. 617), is exceedingly rare, and is only known from about a dozen European localities. This is the second Irish record, having been first discovered in Ireland at Blackrock, near Dublin, by Miss Kelsall. It is a very inconspicuous black slug-like worm, about half an inch in length, and it seems to love damp shady places.

Halbert and I took several hauls in the Clonbrock river on the second day, and among other interesting objects, secured two species of freshwater leeches, viz., *Glossiphonia complanata*, L., and *G. heteroclita*, L. They are both about half an inch long when at rest, and are parasitic on water-snails. The former, which is the commoner of the two, is of a reddish-grey colour and semitransparent, so that its internal organs are plainly visible. Another curious feature about this leech is that it carries its young about with it, and one of the specimens taken had about a dozen very minute leeches fixed to the underside of the mother by their posterior sucker. The other leech is yellowish, and its six eyes are arranged in a triangle, so that with an ordinary lens only three are visible, though each of these is really composed of two.

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## EARTHWORMS.

BY REV. HILDERIC FRIEND, F.L.S.

Through the kindness of Dr. Scharff I have been able to examine a typical set of Earthworms from Clonbrock, Co. Galway, which contained several species already recorded for other parts of the country. I submit a full list of species received.

**Lumbricus herculeus**, Savigny (Common Earthworm). Usually known as *Lumbricus terrestris*. A fine typical specimen, well developed, with girdle extending over segments 32-37. On one side of segments 25, 26, there were ventral papillæ such as often occur in adult forms. The specimen was placed in spirits and returned to Dublin.

**Lumbricus rubellus**, Hoffmeister (Red Worm). This worm has the good fortune to be without synonyms. It is known by the girdle extending across segments 27-32. Sometimes it begins abnormally on segment 26. The colour is purple and iridescent. It is much smaller than the last, and often twice as large as the next, which in other respects it very closely resembles. It has no papillæ on segment 15 in connection with the male apertures.

**Lumbricus castaneus**, Savigny (Purple Worm). Long known as *L. purpureus*. A small, clean, lively worm, with girdle on segments 28-33. There is here also an absence of glandular swellings on the fifteenth segment.

**Lumbricus rubescens**, Friend (Ruddy Worm). Beddard regards this as synonymous with the *Enterion festivum* of Savigny, and the *Lumbricus festivus* of Dugès. Though the accounts of the worm given by these two authors are brief and imperfect, I am prepared to accept the identification, in which case the worm will be known as *Lumbricus festivus* (Savigny). I first described it in *Nature*, 1891, p. 273.

**Allolobophora foetida**, Savigny (Brandling). A well-marked species, abundant in old manure, and much sought after by the angler. It exudes a yellow fluid when irritated, and is known by its alternate yellow and ruddy-brown coloured bands.

**Allolobophora subrubicunda**, Eisen (Gilt-tail). A worm with a large list of names, first differentiated by Dr. Gustav Eisen, in 1873. It is often no more than an inch in length, though it sometimes reaches three inches. The girdle covers segments 26-31, and it is a great favourite with certain kinds of fish.

**Allolobophora chlorotica**, Savigny (Green Worm). There is usually little difficulty in identifying this species, first on account of its well-marked colour and habits, and next because of the three pairs of pores (*tubercula*) on alternate segments 31, 33, 35. It usually coils itself up when disturbed, and is very sluggish.

## LAND AND FRESHWATER MOLLUSCA.

BY R. F. SCHARFF, PH.D.

As one would expect from the abundance of wood, most of the species of *Hyalinia* are abundant in the Clonbrock demesne, especially the otherwise rare Garlic Snail (*Hyalinia alliaria*). When writing my paper on the Irish Land and Freshwater Mollusca (*Irish Naturalist*, vol. i., 1892), I was under the impression that the European range of this species was much more restricted than it really is, having since taken it on the Brünig Pass in Switzerland (see *Nachrichtsblatt d. d. Malakol. Gesellsch.* 1895). Another uncommon species which is known only from three or four Irish localities is *Hyalinia Draparnaudi*. The commonest species were *H. nitidula*, *H. cellaria*, and *H. crystallina*. Both *H. pura* and *H. radiatula* were noticed under decaying leaves and twigs, and also *H. fulva*.

As regards slugs, they were not so abundant, not even the ubiquitous *Agriolimax agrestis*, whilst *A. levis* was not to be seen anywhere. The only really common slug was *Limax marginatus (arborum)* which gracefully glided up and down the dripping tree-trunks after the heavy showers we had. Under leaves and dead wood were secured *Arion ater*. (the brown and black forms), *A. subfuscus*, *A. hortensis* (the bluish variety), *A. circumscriptus (Bourguignati)*, and *A. intermedius (minimus)*, also *Limax maximus*, but I was much surprised not to meet with a single specimen of the keeled slugs—belonging to the genus *Amalia*.

I was delighted to meet with such a number of the rarer *Helices* at Clonbrock. The stems of the stately Beech-trees are tenanted by numerous *H. fusca*, one of the rarest species of British *Helices*, and which in other localities I had only observed among the leaves of *Luzula sylvatica*. Other rare species found among leaves on the ground were *Helix lamellata*, *H. aculeata*, and *H. pygmaea*, whilst *H. rupestris* occurred among the crevices of old limestone walls. McWeeney was fortunate in discovering a scalariform monstrosity of *Helix rotundata* among the small fungi he was examining. I had never seen such a form before, and quickly transferred it to my collection. *H. rufescens*, our commonest

Dublin garden snail, is exceedingly rare at Clonbrock. Other species of *Helix* observed were *H. hispida*, *H. ericetorum*, and *H. nemoralis*. Not a trace anywhere of the common *Helix aspersa*. *Cochlicopa lubrica* and *Clausilia bidentata* abounded; indeed, as Mr. Dillon observed, the denomination *bidentata* seems somehow or other to have always been applied to very common species.

The rare *Pupa anglica*—a species confined to southern Europe and a few British localities—was abundant; at any rate it was more common than *P. cylindræa (umbilicata)*. *Vertigo* was represented by the sylvan *V. edentula*, whilst *V. pygmæa* was noticed under stones at the roadside on the way to Mount Bellew.

Near the river I found among the thickly-growing reeds *Succinea Pfeifferi*, which I think should be looked upon as a distinct species, and not as a variety of the South European *S. elegans*, as I formerly thought.

In the Clonbrock river itself were taken *Limnæa stagnalis*, *Physa fontinalis*, *Bythinia tentaculata*, *Valvata piscinalis*, and *Neritina fluviatilis*. In a cold spring near the house, I found numerous very fine examples of a form somewhat intermediate between the typical *Limnæa peregra* and *L. ovata*, and on Doon Bog I secured specimens of *L. truncatula*.

The more remarkable absentees, besides those already referred to, include the following: *Helix acuta*, *H. virgata*, and *H. intersecta*, *Balea perversa*, *Clausilia laminata*, and the genera *Planorbis*, *Ancylus*, and *Sphærium*.

Altogether the demesne and the surrounding country of Clonbrock are thoroughly good hunting-grounds for the conchologist, and I am convinced that further search, especially along the river Suck, whence Halbert brought me *Limnæa palustris*, would yield an additional number of species.

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## ISOPODS.

BY R. F. SCHARFF, PH.D.

THE large grey *Oniscus asellus* is exceedingly abundant under logs of wood, under stones, and under all kinds of refuse. The very minute red woodlouse (*Trichoniscus pusillus*) is common in Clonbrock wood under moss, and indeed everywhere where there is sufficient dampness to suit its comfort. *Philoscia muscorum*, which swiftly darts about among the twigs and moss, and *Porcellio scaber* frequent much drier localities. All these are species which occur in almost all parts of Ireland, and, except *Metoponorthus pruinosus*, no rare woodlice were observed. The latter occurs at Clonbrock only among garden refuse, and even there it is very scarce.

The most striking feature is the absence of the 'Pill Woodlouse' (*Armadillidium vulgare*), a species which is so abundantly met with around Dublin.

## SPIDERS.

BY GEORGE H. CARPENTER, B.SC.

UNABLE to join the Clonbrock collecting-party myself, I looked forward eagerly to the examination of the spiders and harvestmen which Scharff and Halbert were so good as to secure for me from that now famous locality. The result proves most gratifying, as the thirty-three species of spiders collected comprise five which I had not before identified from any part of Ireland. Several of the other species are now recorded as Irish for the first time. This collection must represent but a small fraction of the spider-fauna of the district, and many other novelties and rarities doubtless await discovery there.

I had some hopes that traces of *Atypus*—our only British genus of the *Aviculariidae*, whose nest has recently been discovered in King's Co.<sup>1</sup>—might have been found at Clonbrock. These expectations, however, were disappointed; nor was a species of the *Dysderidae* to be found in the collection, though several probably occur in the district. The large family of the *Drassidae* was represented only by the ubiquitous *Clubiona reclusa*, Cb., and the more interesting *Anyphaena accentuata*, Wlck., a species not included in Workman's list<sup>2</sup>, but collected

<sup>1</sup> See p. 167 of this volume.<sup>2</sup> *Entomologist*, vol. xiii., 1880, p. 125.



and received by me from many Irish localities, and apparently generally distributed. There were two species of *Dictynida*—*Dictyna uncinata*, Thor., and *D. latens*, Bl.; I do not think that the latter has ever been recorded from Ireland, though Mr. Freeman first took it near Dublin several years ago. No representative of the *Agelenidæ* was secured.

The small *Theridiidæ*, which comprise the majority of our spiders, are not numerous in June. *Theridion sisyphium*, Cl., was common, as might have been expected. *Linyphia montana*, Cl.,—a species that with us seems to be found in parks and gardens—was taken in the demesne, together with *L. pusilla*, Sund., *L. hortensis*, Sund., *Labulla thoracica*, Wid., *Leptyphantes tenuis*, Bl., and *L. Blackwallii*, Kulcz. The common species *Erigone atra*, Bl., and *Gonatium bituberculatum*, Wid., were also secured, as well as the tiny *Maso Sundevallii*, Westr. The only other theridiid taken was one of the prizes of the expedition—*Cornicularia vigilax*, Bl., a very rare species in the British Isles, found only in Dorsetshire and North Wales<sup>1</sup>, with a wide but discontinuous continental range from France to Galicia<sup>2</sup>, and occurring also in the United States. Both sexes of this species were secured by Halbert, a male at Doon and a female in the demesne.

Six species of the *Epeiridæ* or orb-weavers were collected. Besides the common *Tetragnatha extensa*, L., Halbert secured, by sweeping heather on Sheep-pool Bog, a female of *T. obtusa*, C. Koch, a species with less elongate abdomen, hitherto unknown as Irish. Since determining this spider, I have found another female in a collection sent me last year from Skibbereen, Co. Cork, by Mr. J. J. Wolfe. As might be expected, *Meta segmentata*, Cl., *Epeira diademata*, Cl., and *E. cornuta*, Cl., were common. The other epeirid taken, *Singa sanguinea*, C. Koch, is a valuable addition to the Irish list, being rare in Great Britain, and apparently confined to the southern counties<sup>3</sup>.

There were three *Thomisidæ* or crab-spiders:—*Philodromus aureolus*, Cl., and *Xysticus cristatus*, Cl.—both common species everywhere—together with another addition to the Irish fauna, also found by Halbert on Sheep-pool Bog—*X. sabulosus*,

<sup>1</sup> O. P. Cambridge, "Spiders of Dorset," Sherborne, 1879 (p. 113).

<sup>2</sup> E. Simon, "Arachnides de France." Tome v., Paris, 1881 (p. 848).

<sup>3</sup> O. P. Cambridge, *op. cit.*, p. 248.



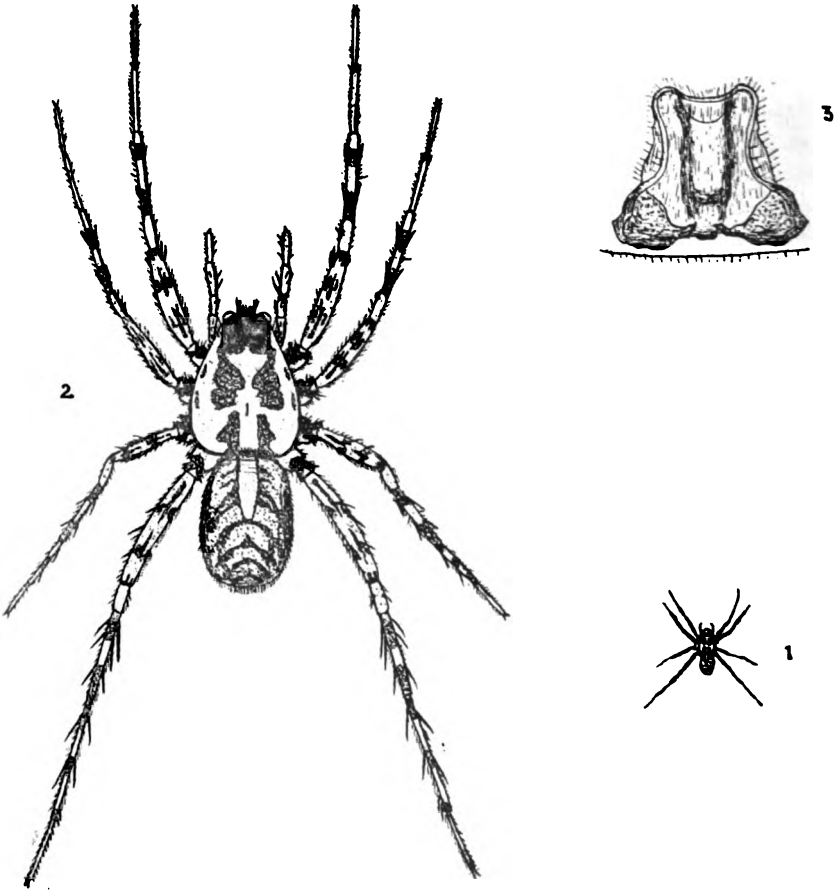


Fig. 1. *Pardosa herbigrada*, Bl., female, natural size.  
Fig. 2. " " " " magnified.  
Fig. 3. Epigyne, highly magnified.

Hahn. This handsome species was known as a British spider only from the south of England<sup>1</sup> until its recent discovery in Inverness-shire<sup>2</sup>. It is of interest to be able now to record it for one of the western counties of Ireland, its known range in the British Isles being thus strangely discontinuous, though it doubtless awaits discovery in intermediate localities.

Coming lastly to the *Lycosida* or wolf-spiders, it was interesting to find several immature specimens of the great *Dolomedes fimbriatus*, Wlck., which attracted so much attention on the Galway expedition of last year<sup>3</sup>. The genus *Lycosa* was represented only by two common species—*L. pulverulenta*, Cl., and *L. ruricola*, DG.; while there were five species of *Pardosa*. *P. amentata*, Cl., *P. pullata*, Cl., and *P. palustris*, L., are probably common species everywhere, while *P. nigriceps*, Thor., is generally distributed and not scarce. The remaining species represented by a single female taken by Halbert on Sheep-pool Bog running close to a drain, proves to be *P. herbigrada*, Bl., a very handsome addition to the Irish fauna. Since determining this specimen I have found another female in a collection made by Prof. D'Arcy Thompson at Roundstone, in August, 1894. This spider has a peculiar discontinuous range. In Great Britain it has been found in Dorset<sup>4</sup>, Northumberland<sup>5</sup>, and the Scottish Highlands<sup>6</sup>. On the continent it occurs in Norway, Sweden, and Galicia<sup>7</sup>. According to Simon<sup>8</sup>, it has not been found in France; but it probably inhabits at least the north-west of that country, as it has lately been discovered in Guernsey<sup>9</sup>.

This beautiful spider (see Plate 3) is remarkable among the species of *Pardosa* on account of the extensive area of the yellow markings on the cephalothorax, the dark lateral bands being generally, as in the present specimen (fig. 2), interrupted. Most species of the genus are predominantly

<sup>1</sup> Carpenter and Evans, *Ann. Scott. Nat. Hist.*, 1894, p. 233.

<sup>2</sup> O. P. Cambridge, *op. cit.*, p. 301.

<sup>3</sup> *Irish Nat.* vol. iv., 1895, p. 255.

<sup>4</sup> O. P. Cambridge, *op. cit.* (p. 385.)

<sup>5</sup> O. P. Cambridge. *Proc. Berw. Nat. Club*, 1875.

<sup>6</sup> Carpenter and Evans, *l. c.* (p. 235).

<sup>7</sup> T. Thorell, "Remarks on Synonyms of European Spiders," Upsala, 1870-3, (p. 282).

<sup>8</sup> "Arachnides de France," Tome iii. (p. 323).

<sup>9</sup> F. O. P. Cambridge "Trans. Guerns. Soc. Nat. Sci.", 1894.

dark in colour, the yellow bands tending to become narrow and broken up. The nearest ally of *P. herbigrada* is *P. palustris*, L., an abundant spider in which the cephalothorax is mostly of a black-brown colour, showing three narrow yellow bands, the central drawn out to a fine point in front. But in the specimen of *P. palustris* taken at Clonbrock the central band is somewhat widened behind the eyes. This form I have received from several Irish localities and the series goes far to bridge the gap between typical *P. palustris* and *P. herbigrada*. In the females of both these species the epigyne is very large and of a truncated triangular form. This structure in these and allied species has recently been carefully described and figured by Rev. F. Pickard-Cambridge<sup>1</sup>. In *P. herbigrada* it is relatively larger and more prominent than in *P. palustris*, but it varies somewhat in different individuals of the same species, and in the present specimen the hind corners are extremely prominent and rugose (fig. 3).

It is of interest to note that in some of the dusky species such as *P. amentata*, Cl., and *P. agricola*, Thor., the yellow colour is predominant in the cephalothorax of very young specimens; as the spider grows older, the amount of dark colour in the pattern increases. This suggests that *P. herbigrada*, with its broad expanse of yellow when adult, represents an old stage in the evolution of the genus, a suggestion supported by the rarity and discontinuous range of the species. While its dark-hued relation *P. palustris* is spread abundantly over our islands, and is found on the Continent from Lapland to Italy, *P. herbigrada* is apparently absent from the greater part of Central Europe, and almost restricted to northern and western regions in Scandinavia, Britain and Ireland. It would seem, therefore, that *P. palustris* is the younger and more vigorous species, and has largely superseded *P. herbigrada* in the struggle for existence. The problem remains whether the darkening of the cephalothoracic pattern has been itself an advantageous factor in the conflict, or whether it is but the necessary accompaniment of other and deeper causes.

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<sup>1</sup> *Ann. Mag. Nat. Hist.* (6), vol. xv., 1895 (p. 34, pl. iv.)

## HEMIPTERA

BY J. N. HALBERT.

THE Hemiptera or Plant-bugs are summer insects, though a comparatively few hibernate through the winter. A great number were in the immature state when we were at Clonbrock, yet the early season had caused some species to appear in the adult condition before the usual time. There is little doubt that specimens of a large shield-bug, in the larval state, occurring on the heaths about Clonbrock, are referable to *Podisus luridus*, Fab., but as the species has not been recorded from the country it must be given with reserve until fully developed specimens are found. I swept several examples of *Cymus grandicolor*, Hahn. off Flags in marshy places. *Microphysa elegantula*, Baer., was a rather satisfactory capture. It occurred freely by beating old lichen-covered Sloes near the Deer-park. I had not met with this species previously, the only Irish specimens that I know of being in Mr. Haliday's collection. *Myrmedobia tenella*, Zett., also occurred by general sweeping; it is said to be rare, though from its small size it is probably overlooked by collectors. I found *Tetratocoris Saundersi*, D. and S., in a marshy field beside Doon wood, very similar to localities in which it had occurred on the east coast. *Allodapus rufescens*, H. S., has not been previously recorded from any Irish locality. A single macropterous specimen occurred by sweeping heather, at dusk, and it is apparently a rare species in England. Several species of *Psallus* were more or less common in the woods, the rarest being *P. diminutus*, Kb. now recorded as Irish for the first time.

Amongst other captures were the following:—

*Nabis flavomarginatus*, Scholtz., common; *N. ericetorum*, Scholtz., on heath; *Salda scotica*, Curt., river banks; *Acompocoris pygmaeus*, Fall., *Dicyphus stachydis*, Reut., and *Plesiocoris rugicollis*, Fall., the last in some numbers off Willows at Sheep-pool Bog. I managed to secure a good many Homoptera, including several species I had not previously met with, but it is necessary to reserve these as they include many critical forms still in the hands of Mr. J. Edwards, F.E.S., awaiting further investigation.

## COLEOPTERA.

BY J. N. HALBERT.

THE great success attending Mr. R. E. Dillon's researches amongst the lepidoptera of East Galway are now well known to all students of the order. This success is mainly due to the varied nature of the district, comprising some fine remnants of natural forest and extensive moorlands, and to no small extent also, to steady collecting in the same localities for the greater part of the year. In an order so numerous in species as the Coleoptera, we could only hope during our visit to obtain a general idea of the species occurring in the district, and as three-fourths of the collecting was done on boggy heaths, a general sameness in results to those obtained in many places in west and central Ireland, was to be expected. We managed, however, to secure a fair number of local forms. Mr. Dillon had preserved a small collection of beetles from the immediate neighbourhood; amongst these were two or three rarities taken during the previous month, that all our efforts failed to refind, showing that on account of the abnormal earliness of the spring, many species were practically over at the time of our visit. The following notes refer only to the less common species.

The *Carabidæ* or ground-beetles are rather poorly represented at Clonbrock, as in such inland localities they are chiefly to be found on the stony margins of lakes and rivers; and it is to the scarcity of these conditions that the absence of such species as *Carabus clathratus* and *Pelophila borealis* may perhaps be attributed.

The first species to be noticed in our list is *Carabus arvensis*, F., here of the usual shining bronze colour. Mr. Dillon found two specimens running on a pathway earlier in the year; it is widely distributed, though local, occurring chiefly on heaths. *Calathus piceus*, Marsh., was fairly common in damp mossy places in the Oak-wood, where also *Dromius quadrimaculatus*, L., abounded under bark. Perhaps the best place for ground-beetles was along the banks of the Suck; here I was fortunate enough to meet with *Trechus discus*, F., a very local species, not previously recorded from Ireland. Other notable captures in this locality were *Chlænium nigricornis*, F., *Bembidium guttula*, F., *B. assimile*, Gyll, and *B. bipunctatum*,

L., the last occurring abundantly amongst shingle at the edge of the river.

We were much too late to do any good with the water-beetles, the rivers seemed to produce very few species; the best results were obtained in the pools and drains half choked by vegetation. There were amongst others *Haliphus fulvus*, F., *Hydroporus erythrocephalus*, L., and *Agabus Sturmii*, Gyll. I took a single *Hydroporus memnonius*, L., by sweeping at dusk, at some distance from water. *Orectochilus villosus*, Mull., a nocturnal beetle, occurred freely in the Clonbrock river, lurking amongst a thick growth of weed.

The *Staphylinidæ* or rove-beetles were not numerous in species. *Alcochara brevipennis*, Grav., is noteworthy, as it is one of those species, restricted, so far as we can at present judge, to a southern and western range in Ireland, though of wide distribution in Britain. I found *Gyrophæna affinis*, Mann., in *Boleti*, an addition to the Irish list, and *Philonthus quisquiliarius*, Gyll, a local southern species, occurred under stones on the banks of the Suck.

We kept a careful look out for all dead animals for the *Necrophaga* or carrion-feeders. One of the less common black and orange burying-beetles, *Necrophorus mortuorum*, F., swarmed in a dead squirrel, while Dr. Scharff got *Necordes littoralis*, L., in a rat. This species is of local occurrence inland, but it is much commoner in maritime localities.

Numbers of a species of *Choleva* occurred in dead birds in the woods, proving to be *C. fumata*, Spence, as far as I can ascertain not previously recorded from Ireland. Mr. A. H. Haliday possessed Irish examples, bearing, however, no definite locality. I was very pleased to meet with *Silpha dispar*, Herbst., when collecting on the banks of the Suck. This is one of the rarities so far monopolized by the Rev. W. F. Johnson, in the north of Ireland, where he has taken it on the south shore of Lough Neagh, and also near Armagh; this extension of range is therefore of interest. Several common species of *Coccinellidæ* abounded in the woods, the only one of interest being *Chilocoris bipustulatus*, Ill., found on willows in boggy places. This also seems to be a south-western species, at least it does not seem to have been recorded from any eastern locality. Near Doon Wood I found by sweeping in a marshy meadow two uncommon beetles, *i.e.*, *Phalacrus substriatus*, Gyll., and *Antherophagus pallens*, Gyll., the former



indeed being unrecorded from Ireland; a single example only, which is considerably larger than certain types in the museum collection, but agrees with them in every other respect; and I may add that Mr. G. C. Champion, F.L.S., has kindly verified this identification. *Epuræa deleta*, Er., was not uncommon in fungi on trees, and *Elmis Volkmani*, Panz., under stones on river-banks.

Passing over many common insects, the next species of note is *Elater pomorum*, Herbst., a handsome shining black click-beetle with deep red wing-cases; Mr. Dillon found it commonly enough on birch in the beginning of May. Although said to be very local in England, it would seem to be not uncommon with us, as it has now been recorded from Co. Armagh<sup>1</sup>, the Bog of Allen near Tullamore<sup>2</sup>, and I have just seen a specimen taken by Mr. F. Neale in south Clare, close to a lake-shore, where he discovered the beautiful ground-beetle, *Panagæus crux-major*, L., that formed such an unexpected addition to our Irish list. *Corymbites tessellatus*, F., another large species, occurred occasionally on the heaths. The Longicorns were singularly scarce at the time of our visit; we really expected to meet with some novelties, seeing that the district is so suited to their habits, but unfortunately no new species rewarded our search. Mr. Dillon found *Leiopis nebulosus*, L., earlier in the year. The large and handsome *Rhagium bifasciatum*, F., is evidently not uncommon in the fir-woods, and a small black *Grammoptera ruficornis*, F., found on flowers, were all that were observed.

In water-plants in the Clonbrock river several species of *Donacia* occurred, but all were common with the exception perhaps of *D. impressa*, Payk., a species that has now been recorded from at least three localities in the south and west. Other captures were *D. discolor*, Panz., frequent on the heaths, *Chrysomela hyperici*, Forst., and *Haltica oleracea*, L.

The *Heteromera*, a section of the Coleoptera containing such well known insects as the "cellar-beetles" and "meal-worms," are very poorly represented in Ireland. One small species, *Salpingus castaneus*, Panz., occurred by sweeping at edge of a fir-wood; all the previous records for this species are from the east. The Oil-beetles (*Meloe*) also belong to this section, but search should be made for these very early in spring.

<sup>1</sup> W. W. Fowler. "Coleoptera of British Islands," vol. iv. (p. 91).

<sup>2</sup> *I. Nat.*, vol. iv., 1895, p. 173.

The *Rhynchophora* or weevils usually come last in beetle lists; they are without exception vegetable-feeders, the greater number being extremely conservative in keeping to their respective food-plants. The first weevil deserving of notice in the Clonbrock list is *Rhynchites minutus*, Herbst., found on two occasions by sweeping near willows. This species was added to the Irish list last year by Mr. J. J. Walker, who found it at Queenstown.<sup>1</sup> *Apion Gyllenhali*, Kirby, and *A. marchicum*, Herbst., were the best species of that extensive genus; although I had previously collected the latter, generally in marshy places, I have never succeeded in taking more than one or two specimens on any occasion. Sweeping large patches of *Equisetum* in drains produced *Grypidius equiseti*, F., a queer beetle looking not unlike a seed-head of that plant, to which it is exclusively attached. One of the most satisfactory discoveries made on this excursion was the occurrence of *Erirrhinus athiops*, F. I found a single specimen of this rare weevil under a stone, on the banks of the Suck. Up to the present it had been found only by the Rev. W. F. Johnson in Co. Armagh<sup>2</sup>. According to Canon Fowler, the species is of extreme rarity in England, but it occurs in several Scotch localities; it will probably be found commonly enough when the midlands are better worked.<sup>3</sup> Amongst other captures I may mention the following:—*Polydrusus cervinus*, L., *Orchestes rusci*, Herbst., and *O. ilicis*, F., *Dorytomus maculatus*, Marsh., abundant; *D. pectoralis*, Gyll., *Caliodes rubicundus*, Herbst., and *Poophagus sisymbrii*, F.

The beetles occurring on the banks of the Suck afforded a rather typical example of the gathering of northern and southern forms, that adds such interest to collecting in Ireland. In company with *Erirrhinus athiops*, which has a decidedly northern range, I found a ground-beetle (*Trechus discus*) having for its habitat the river-valleys of the midland English counties, while with both might be found a rove-beetle (*Philonthus quisquiliarius*), a species that has apparently Cambridgeshire for its northern limit in Britain. Examples of this mingling may be found in almost any part of Ireland, but they are undoubtedly most characteristic of the west.

<sup>1</sup> *I. Nat.*, vol. iv., 1895, p. 209.    <sup>2</sup> W. W. Fowler, *op. cit.*, vol. v. (p. 270.)

<sup>3</sup> I have just seen a fine series of this beetle in a collection made at Tempo, Enniskillen, by Mr. C. Langham.

## FUNGI.

BY E. J. MCWEENEY, M.A., M.D.

## HYMENOMYCETES.

- Lepiota felina*, Pers. Pheasantry.  
New to Ireland.  
*Mycena juncicola*, Fr. Fir-wood.  
*M. tenerrima*, Bk.  
*Omphalia fibula*, Bull.  
*Pleurotus acerossus*, Fr. New to Ireland.  
*Claudopus depluens*, Batsch.  
*Hypholoma* sp.  
*Irpex* sp. immature.  
*Ezidia glandulosa*, Fr.  
*Tremella indecorata*, Somm.  
*Dacryomyces stillatus*, Nees.

## MUCEDINES and DEMATIEI.

- Monilia aurea*, Genel. New to Ireland.  
*Botryosporium diffusum*, Ca.  
*Rhinotrichum repens*, Preuss.  
*Peronospora parasitica*, Pers.  
*Stachylidium cyclosporum*, Grove.  
New to Ireland.

## UREDINEI.

- Puccinia primulæ*, D.C. Teleuto-spores much commoner than oecidia.  
*P. lychnidearum*, Link.  
*P. molinia*, Tub. Oecidia abundant on *Listera ovata*.  
*P. sanicula*, Grev.  
*P. violæ*, Schum.  
*P. caricis*, Schum. Oecidia on *Urtica dioica*.

## UREDINEI.—continued.

- Uromyces valerianæ*, Schum. Spermogonia only, in fir-wood. New to Ireland.  
*?* *Oecidium sonchi*, Johnst. New to Ireland.  
*O.* sp. On *Carduus palustris*.

DISCOMYCETES and PYRENO-  
MYCETES.

- Morchella elata*, Fr. On a mossy bank in Clonbrock wood—the only British locality for this species.  
*Peziza atrobrunnea*, Phil. New to Ireland.  
*Lachnea hemispherica*, Wigg. New to Ireland.  
*Dasyscypha virginea*, Fckl.  
*Lachnella corticalis*, Pers. Not hitherto recorded from Ireland.  
*Propolis faginea*, Karst. Not hitherto recorded from Ireland.  
*Phyllachora oegopodii*, Fckl.  
*Cordyceps militaris*, Fr. On buried lepidopterous larvæ and pupæ in pheasantry.  
*Hypoxyylon multiforme*, Fr.  
*Rosellinia mastoidea*, Fr.  
*Sphaeria*. Two sp. undetermined.

## MYXOMYCETES.

- Oethalium septicum*, Fr.  
*Lycogala epidendrum*, Fr.  
*Trichia* sp.

## MOSSES AND HEPATICS.

BY DAVID M'ARDLE.

THE number of species of Mosses found at Clonbrock is low, and there was a striking similarity of collections made on different parts of the estate. A peculiar feature on the Sheep-pool bog was the patches of *Funaria hygrometrica*, yards in extent; the brilliant red colour of the countless numbers of setæ and sporangia of the matured plants at once attracted attention, and was visible for a considerable distance. Most of the trees had their stems clothed with many forms of *Hypnum cupressiforme*, notably the var. *filiforme*, which hangs in long festoons. *Orthotrichum crispum* selected the tips of branches and luxuriated in neat compact tufts. *O. affine* was common on the trunks near the base. The ground in the woods was carpeted with *Hypnum triquetrum* and *H. proliferum*, with large patches of *Dicranum palustre*. On the bogs *Leucobryum glaucum* grew in large hassocks; *Campylopus fragilis* and *C. setifolius* were very common; and in wetter places *Aulacomnion palustre*. On the drain-banks *Dicranella varia* and *Fissidens adiantoides* were plentiful, in the streams the water-moss *Fontinalis antipyretica* was abundant. The Sphagnums were plentiful, and large patches of *S. cymbifolium*, *S. papillosum*, and *S. rubellum*, with many forms of *S. acutifolium* were collected, in the bog-pools *S. cuspidatum* var. *plumosum* was plentiful; it is by no means a common plant. On Doon bog I found *S. papillosum* var. *confertum*, a rare plant, only found by Professor Lindberg and myself on Connor Hill, Co. Kerry; it is very close to the rarer *S. Austini*, which I took it for at Clonbrock as I did in Kerry, but the microscopical difference is very marked. In the cell-walls the papillæ are regular and conical. On Tycooley bog, near the banks of the Shiven River, I was fortunate in finding the rare *S. Austini*, which differs in its peculiar branching, and in having the cell-walls of the leaves furnished with pectinate ridges. It was first found in Ireland by the Rev. H. W. Lett, in a bog at Glenariff, Co. Antrim, in 1889, and he afterwards collected it in a bog near Geashill, King's Co. (*I.N.*, vol. ii., p. 22), as did Rev. Canon. Russell and myself. These are the only known localities for this rare *Sphagnum*. There is an excellent figure and description of the plant in the *Monthly Microscopical Journal*, June

17th, 1871, p. 215, by Dr. Braithwaite, and the following account of its distribution "Hab. swamps Farrago, Ocean county, New Jersey, United States (*Austin*). In Europe only found in Sweden, Hunneberg Mountain, Westrogothia, 1859. (*Lindberg*). Viby, Nerike, 1860 (*Zetterstedt*), both sterile." He writes me that the Clonbrock specimen is referable to the var. *imbricatum*, and identical with specimens taken in Lewis by Dr. Moore.

The investigation of the Hepaticæ was the principal object of my visit. I endeavoured by every means to make as complete a collection as possible. In the Oak-wood alone I made thirty-three gatherings, and on Doon bog and adjacent woods thirty distinct gatherings. These and many others collected on other parts of the Clonbrock estate were subjected to a careful microscopical examination, with, I regret to say, very poor results, on account of the similarity between the specimens collected on different bogs and in different woods and plantations, although remote enough from each other. Out of all the material collected I enumerate only thirty species of Hepaticæ. Of these the following eleven species only are local on the estate; the remainder are widely distributed there, and I may truly say through Ireland.

*Lejeunea hamatifolia*, Hook.—On trees, Tycooley wood.

*Lejeunea serpyllifolia*, Libert.—In the oak-wood.

*Lepidozia reptans*, Linn.—Bog at Killasolan.

*Jungermania exsecta*, Schmidel —Sheep-pool bog, oak-wood, Doon bog. A rare species.

*Jungermania affinis*, Wilson.—Damp bank in oak-wood, Doon bog.

*Cephalozia divaricata*, Smith.—Doon bog.

*Cephalozia catenulata*, Huben.—Doon bog.

*Cephalozia Lammersiana*, Huben.—Doon bog.

*Astellia hemisphærica*, Beauv.—Doon bog.

*Riccardia latifrons*, Lindberg.—Doon bog, rare.

*Scapania undulata*, Linn. —Doon bog.

The small number of species of *Lejeunea* which were met with is remarkable. Out of the three which were collected *L. hamatifolia* only is rare in Co. Galway; it was collected in the woods at Kylemore Castle demesne, by the late Dr. D. Moore, in 1874, and, in July, 1895, I found it sparingly on Carn Seefin in the same county. The commonest liverwort in the district is *Lejeunea minutissima*. I collected it on all

parts of the estate ; it luxuriates on the trunks of the huge Beech-trees which dot the verdant lawn, and in the woods adjacent to the bogs, on almost every tree.

Out of fourteen species of *Lejeunea* known to grow in Ireland the number of species collected at Clonbrock is very small. They are curious little plants in their structure and habits, and love the moist warm glens, and tell of climatal conditions in as marked a manner as the rare flowering plants do. Amongst some of the liverworts that were remarkable by their absence I may mention *Lophocolea heterophylla*. *L. bidentata* was very common, but the former is a distinct plant, and I searched for it in vain on the decayed logs. It differs from the latter in having some of the leaves bidentate, others with the apex plane or slightly obtuse, and above all in having parœcious inflorescence, *i.e.*, the antheridia are in the axils of the leaves just beneath the perianth. By this character it is well separated from *L. bidentata*, which has the antheridia in spikes or amentæ.

*Cephalozia sphagni* was abundant on all the bogs, but no specimen of the rare *C. denudata* was found, which grows so abundantly on the Hill of Howth, and Corslieve Mountain, Co. Mayo, also sparingly on Bear Island ; these are the only localities known in Ireland. The range of *C. sphagni* is probably wider than that of any other species belonging to this singular family of plants. It abounds in the north temperate zone, and luxuriates in the hot forest plains of the equator ; it is always found on living plants of *Sphagnum*, *Leucobryum*, &c. *C. denudata*, on the contrary, is found mostly on decaying vegetable matter, such as rotting logs, peat, &c. ; and is a plant of the hills. *C. sphagni* is found on the plains, and rarely at high elevations. *Cephalozia curvifolia*, one of the prettiest of the genus, reported from Kylemore, was not to be found. I searched the drains and moist banks for any species of the curious genus *Riccia*, but without success. One of the commonest plants amongst the frondose section was *Metzgeria conjugata*, which was first collected at O'Sullivan's Cascade, Killarney, in 1873, by Professor Lindberg, who pointed out its remarkable autœcious character, *i.e.*, its having the antheridia on one branch of the thallus, and the calyptra which contains the capsule and spores on a separate branch of the thallus, of the same plant ; by this character it is separated from all the

other species of *Metzgeria*, which are dioecious, having the antheridia or male inflorescence on one plant, and the calyptra which contains the female inflorescence on another plant. Recent researches of myself and others, show that the plant is to be found in almost every county; it is as widely distributed in Ireland as *M. furcata*. In specimens of both species collected at Clonbrock, I have been struck by the remarkable examples they exhibit of adventitious budding or branching, and it is obvious that they reproduce themselves more by this method than they do by spores. I shall quote one instance where this means must be adopted to reproduce the species. *Metzgeria pubescens* is a rare plant, confined to a few stations in Co. Antrim. We have only the male plant in Ireland; the female has not been found, so far as I am aware. In the *Irish Naturalist* for April last year, from copious specimens I have been enabled to demonstrate the subject of adventitious branching or budding with a figure of *Metzgeria conjugata* bearing young plantlets, which I trust will serve to explain this singular mode of reproduction.

Amongst the rarer species which I collected *Jungermania exsecta*, Schmidl, must not be forgotten. I found it once before, in Co. Wicklow. It is a curious plant, not like any other liverwort that I know. The leaves are in two rows, ovate in outline, the apex bluntly bi- or tridentate, and having about the middle on the upper margin a strong tooth, pointing obliquely upwards across each leaf. The specimens from Sheep-pool bog are luxuriant; they were growing amongst *Jungermania incisa* and bore gemmæ, but no fertile specimen was found. The plant is beautifully figured by Sir J. W. Hooker, in his grand work on the British Hepaticæ, at tab. 19, and supplement, p. 1. In his description of the plant, he writes—“This singular species of *Jungermania* seems to be confined to the two most eastern counties in the Kingdom (Norfolk and Suffolk), at least I never heard of its being found in any other places, excepting indeed, very lately, near Bantry, by Miss Hutchins, of whom it may almost with truth be said, that she finds everything.” It has since that time been found by Dr. Carrington at Killarney; and at Gleniff, Co. Leitrim, and at Sallagh Braes, Co. Antrim, by the late Dr. D. Moore. We have no previous record for Co. Galway.

## FLOWERING PLANTS AND VASCULAR CRYPTOGAMS.

BY R. LLOYD PRAEGER, B.E.

WHEN the time arrived for our visit to Clonbrock, I was far out at sea, exploring that inhospitable islet of Rockall, in the N.E. Atlantic; and a heavy gale off the Hebrides further delayed junction with my colleagues, so that I did not reach Clonbrock till the pleasant week was half spent. My notes on the phanerogamic flora are, therefore, not so complete as might be desired; but they will convey, nevertheless, a fair general idea of the botanical character of the district.

The area in which Clonbrock is situated is composed entirely of the Carboniferous limestone formation, and is, in every particular, a characteristic piece of the great Central Plain. The streams flow sluggishly in broad shallow basins, through pasture and marshy meadows. The only hills are gently-swelling and inconspicuous ridges. The rock is seldom seen. Eskers are wanting, though one or two mounds of gravel occur. The pasture and tillage is broken by great bogs, which stretch for miles; their edges are often wooded, chiefly with Scotch Fir. Large areas are under timber, chiefly Oak, Beech, and conifers. Lakes there are none. From this description, it will be seen that the flora to be expected was that which characterizes the Central Plain, and that neither the lake or mountain rarities of Connemara, nor the limestone pavement flora of Burren, was likely to be represented, although both of these interesting districts lie within fifty miles. As a matter of fact, just one characteristic West Coast species turned up—*Rhynchospora fusca*, furnishing an important extension of range of this rare plant, fifty miles east of its most easterly recorded station. In mentioning briefly the more interesting plants found, they will be dealt with in the natural order, for convenience of reference.

Of *Ranunculaceæ*, the most conspicuous species was the Great Spearwort (*Ranunculus Lingua*), which grew abundantly on the marshy edges of the Shiven River, and on both the Galway and Roscommon banks of the Suck. The Marsh Meadow-Rue (*Thalictrum flavum*) was seen on the Roscommon bank of the River Suck.



*Fumaria Boræi* grew on both sides of the River Suck in cultivated land; with it was *F. officinalis*. *F. muralis* was gathered on the Roscommon bank. *Viola canina* was noted on old worked-out bog at Killasolan.

The Poppies were well represented for a district so far to the westward. The Long Prickly-headed (*P. Argemone*) grew on roadsides and in gravel-pits a couple of miles on the Ballinasloe side of Ahascragh—the only gravel-pits in the neighbourhood; with it were the two smooth-headed species (*P. Rhæas* and *P. dubium*) in abundance, and these two occurred in many places south and east of that spot.

Among crucifers, the Marsh Cress (*Nasturtium palustre*) and Water Radish (*N. amphibium*) grew by the River Suck, and in fields it was noticed that the White Mustard (*Sinapis alba*) in this district quite took the place of the usually all too common Charlock (*S. arvensis*), which was hardly seen at all, while its ally was most abundant.

*Caryophyllaceæ* had no representatives of much rarity, but the Three-nerved Sandwort (*Arenaria trinervia*) grew in many places, and was much more abundant than the commoner Thyme-leaved Sandwort (*A. serpyllifolia*).

Five species of St. John's-wort were noted—*Hypericum Androsæmum*, *perforatum*, *dubium*, *quadrangulum*, *pulchrum*. The third is the only one which is not generally distributed in Ireland.

The only Rosaceous plant of interest was the Bird-cherry (*Prunus Padus*), which grows in great profusion in one old wood at Clonbrock. A few brambles were collected, but have not yet been submitted to a specialist.

The beautiful Grass of Parnassus (*Parnassia palustris*) was everywhere abundant in marshy land. On the bogs all three species of Sundew (*Drosera anglica*, *intermedia*, *rotundifolia*) grew in charming profusion, often brightening the wetter portions by the large patches of red-haired leaves, glistening as the sunlight caught the heads of viscous fluid with which all the hairs are copiously tipped. Two species of Millfoil were found—*Myriophyllum verticillatum* on the Galway side of the Suck, and the commoner *M. alterniflorum* in various places.

Umbelliferous plants were not largely represented, the only uncommon species being the Broad-leaved Water-Parsnep

(*Sium latifolium*) which grew on the Galway bank of the Suck. Of the Valerian tribe, the Toothed Corn-salad (*Valerianella dentata*) was one of several plants found only in the neighbourhood of the gravel-pits already mentioned.

To come now to the large order of Composite plants, the Mountain Cudweed (*Antennaria dioica*) was quite conspicuous by its abundance everywhere. The Bur-Marygold (*Bidens cernua*) grew by the Shiven River. A much rarer plant, the Field Chamomile (*Matricaria Chamomilla*) occurred in many places on roadsides; though possibly originally introduced with seed, as it certainly is sometimes, it appears in this district to have settled down as a resident. Among the Thistles, *Carlina vulgaris* occurred but sparingly. The Slender-flowered Thistle (*Carduus tenuiflorus*), a species usually found near the coast, grew in the gravel-pits; the Bog Thistle (*C. pratensis*) was one of the most abundant plants in the district. Among the *Ligulifloræ*, or Dandelion-like plants, the Yellow Goats-beard (*Tragopogon pratensis*) was found in one field half way between Ballinasloe and Ahascragh. The Hairy Hawkbit (*Leontodon hirtus*) was common; its ally, the Rough Hawkbit (*L. hispidus*) was not seen; it appears to be a much rarer plant in Ireland, and I doubt if it has a wider range, as stated in *Cybele Hibernica*.

Of that beautiful order of which the Heaths are the type, two interesting plants abounded on the bogs—the Cranberry (*Vaccinium Oxycoccus*) whose delicate pink flowers had in many places already given way to the large berries; and the Marsh Andromeda (*A. polifolia*), its lovely pink bells still lingering on a few belated shoots. One gentian, *G. Amarella*, was found, though not yet in flower, still sufficiently advanced for determination. Its ally, the Yellow-wort (*Blackstonia perfoliata*) occurred sparingly. The Primrose order was represented by eight species—the Yellow Loosestrife (*Lysimachia vulgaris*), which grew by the Suck, and with it the Brook-weed (*Samolus Valerandi*), and the tiny Bog Pimpernel (*Anagallis tenella*); in the woods the Moneywort (*L. nemorum*) was remarkably abundant; while the Scarlet Pimpernel, Cowslip, and Primrose made up the balance.

Of *Boraginaceæ*, the only uncommon species was the Field Gromwell (*Lithospermum arvense*) gathered in a potato-patch

on the Roscommon side of the Suck. Of *Scrophulariaceæ*, the Mullein (*Verbascum Thapsus*) flourished at the gravel-pits, and the Cow-wheat (*Melampyrum pratense*) on Tycooly bog; of ten species of *Veronica* noted, the only one worth mentioning is *V. polita*, gathered on the Galway side of the Suck.

Two of these interesting carnivorous plants, the Bladderworts, grew in the bog-holes, both in blossom—the Common (*Utricularia vulgaris*) and Lesser (*U. minor*); that characteristic west coast species, *U. intermedia*, was not found. Of their equally interesting allies, the Butterworts, two species were noted—*Pinguicula vulgaris*, the common species, and the rarer Pale Butterwort (*P. lusitanica*) usually a mountain plant, but here growing on an old worked-out bog at an elevation of only about 150 feet. The great Water Dock (*Rumex Hydrolapathum*) grew with other marsh-loving species on the Galway bank of the Suck.

The native trees included both species (or varieties) of the Birch (*Betula pubescens* and *B. verrucosa*) which everywhere fringed the bogs, along with Willows, of which seven species were noted, all common except *Salix pentandra* and *S. purpurea*. The remaining indigenous *Amentiferae* were the Oak, Alder, and Hazel.

Orchids were well represented, and one of the prettiest and most interesting sights we saw was at Doon, where, on a rough piece of boggy land, sparsely dotted over with low stunted fir-trees, a remarkable variety of Orchids grew together. The large white or pinkish flowers of the Marsh Helleborine (*Epipactis palustris*) were perhaps the most conspicuous. M'Ardle found some plants in which the whole flower was suffused with a rich rose-red. With it grew the beautiful Bee Orchis (*Ophrys apifera*), and great abundance of the Sweet-scented (*Gymnadenia conopsea*), and Tway-blade (*Listera ovata*), and in less quantity the Smaller Butterfly Orchis (*Habenaria bifolia*), Frog Orchis (*H. viridis*), Broad-leaved (*Orchis incarnata*), and Pyramidal (*O. pyramidalis*). The only species found in the district which were not at Doon were the Early Purple (*O. mascula*), gathered in fruit; the Greater Butterfly (*H. chlorantha*) which was very rare, while *H. bifolia* was common; and lastly, the rare Bird's-nest (*Neottia Nidus-avis*), which grew under trees at Clonbrock.

Of Pondweeds, three species grew abundantly in the River Suck—*Potamogeton lucens*, *P. Zizii*, and *P. heterophyllus* var. *graminifolius*. In the Clonbrock River, not far from the house, were gathered *P. plantagineus*, and another form of much interest, on which Mr. A. Bennett supplies the following note :—

“ This plant is doubtless, in a wide sense, to be placed under *P. lanceolatus*, Smith, but differs from the Anglesea, Cambridge, or French specimens, as such supposed hybrids would do. It seems that these specimens may have been produced by *P. heterophyllus*, Schreb., v. *graminifolius*, as the one parent, and *P. pusillus*, L., as the other. The difficulty of reference to any known form, causes one to wish that it could be cultivated; the hybrid theory is an easy way out of a difficult problem, and yet it is not easy to suggest in this case any other. ‘ Make a new species of it,’ would be another way, and easy enough from some views, but if eventually *proved* an error, is only adding to synonymy unnecessarily. As a supposed hybrid, it is an uncertain quantity, and leaves it open for experiment. I consider all supposed hybrids that have not been actually produced by cultivation, as doubtful plants, although naturally the amount of faith or credence that may be placed in them is very variable.

The present specimens, by their longer and broader (relatively) upper leaves, with a much smaller part of the leaf occupied by the chain-like areolation, so conspicuous in the Anglesea and Cambridgeshire specimens<sup>1</sup>, bear the same proportion, as to shape and size, that the others do to *their* supposed parents. On these specimens the glands of the *graminifolius* section are very conspicuous.

If a name is required for it, it might be called var. *hibernicus* (or f. *hibernicus*), characterized by its longer, and broader upper leaves, longer lower leaves, slightly longer flower-spikes, and the structure of the leaves.”

Among the Sedges and their allies, the most interesting find was the Brown Beak-rush (*Rhynchospora fusca*), which has been already referred to in the general account of our trip (p. 220). Of sixteen sedges collected, the best was *Carex teretiuscula*, which was found in marshes by bog-holes in many places. Mr. A. Bennett remarks of specimens submitted to him, “ very near, if not identical with  $\beta$ . *Ehrhartiana*.” The twenty-five grasses found offer nothing of special interest; *Bromus racemosus*, *B. commutatus*, and *Festuca loliacea*, Huds., were gathered within the Galway area.

<sup>1</sup> In *P. pusillus*, L., when having spatulate upper leaves (as in *P. panormitanus*, Bivona), the tendency is to produce this chain-like areolation—A.B.

Ferns were tolerably well represented. The abundance of *Lastrea spinulosa* was remarked. The Scale Fern (*Ceterach officinarum*) grew at Clonbrock, and the great rarity of the Black Spleenwort (*Asplenium Adiantum-nigrum*) was noticed it is equally rare in King's and Queen's Counties, and perhaps it shuns the Limestone Plain. The Royal Fern (*Osmunda regalis*) grew in several places; the Moonwort (*Botrychium Lunaria*) was gathered sparingly at Killasolan; and the Adder's Tongue (*Ophioglossum vulgatum*) grew in pastures at Clonbrock. The only Club-moss found was the little *Selaginella spinosa*, which grew on worked-out bog at Killasolan, and abundantly on the gravel-ridge near Ahascragh.

The total number of plants noted in the three days I had at Clonbrock was 360, but a number of critical plants were also collected, which have not yet been determined; these will bring up the list to close on 400 species.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Peregrine Falcon from L. Powell, Esq.; a Moose Deer from the Earl of Aberdeen; a Sparrow Hawk from Master Stubbs; a pair of Cockatoos from V. W. Brown, Esq.; a pair of Doves from Miss Perry; freshwater fish from F. Godden, Esq.; a pair of Horsfield's Tortoise from A. Jamrach, Esq.; and some Rabbits from Mrs. Lennan. A pair of Siberian Cranes, a Brazilian Cariama, twenty Budgerigars, a pair of Ibex, a pair of Toggenburg Goats, and a Tibet Goat have been purchased; while four Puma cubs have been born in the Gardens.

13,360 persons visited the Gardens during July.

### DUBLIN MICROSCOPICAL CLUB.

AUGUST 6th.—The Club met at the house of PROF. T. JOHNSON, who exhibited a section of *Asperococcus compressus*, a brown alga, recently obtained by Miss Hensman and himself by dredging off Go Island (Co. Donegal). *A. compressus* was dredged by the exhibitor three years ago in Bantry Bay. It is now recorded for the first time as a member of the Irish marine flora; a southern type of weed, its occurrence so far north is of interest.

Mr. GREENWOOD PIM showed sections of the petioles of *Nymphaea alba* and *N. marliacea*, and drew attention to the curious internal hairs which occur in the air-canals in these and in other aquatic plants. They seemed especially numerous in *N. marliacea*, a hybrid raised by M. Marliac, and now common in gardens where water-plants are grown.

PROF. COLE showed a section of andesitic volcanic tuff, as an example of the series known as "pyroxenic rocks" near the summit of Slieve Gallion, west of Lough Neagh. These rocks had hitherto been regarded as metamorphic, but Prof. Cole hoped to show that a considerable volcanic series occurred as a capping above the granite of that area, which had intruded into it at a later date.

Mr. M'ARDLE exhibited specimens of *Jungermania exsecta*, Schmidel, a rare liverwort which he collected last June on Sheep-pool Bog, Clonrock. The leaves are arranged in two rows, ovate in outline, with their apex bluntly bi- or tridentate, and having about the middle of the upper margins a strong tooth which points obliquely upwards. The plant is very local. Dr. Carrington found it at Killarney, and Dr. D. Moore recorded it from Gleniff, Co. Leitrim, and Sallagh Braes, Co. Antrim. It has not been previously found in the Co. Galway.

Mr. W. HAUGHTON showed specimens of *Tribolium ferrugineum*, Fab., which had been found on empty flour-sacks. These small beetles often occur in large numbers in mills and warehouses among flour, and multiplying at a high rate, are very injurious and hard to exterminate.

#### BELFAST NATURALISTS' FIELD CLUB.

##### DREDGING CRUISE.

ON Saturday, 4th July, the Belfast Club held a somewhat unusual excursion: a dredging cruise having been arranged to Belfast Lough and adjacent bays. There has not been a dredging trip in this neighbourhood for some time, so that it was of some interest. Unfortunately for the enjoyment of the party, the morning proved very wet and drizzling, but no way deterred a party of nearly fifty from assembling on board the Steam Tug "Storm Light" before ten o'clock; at which time the whistle blew for the last time, and the vessel started for the day's work. The guiding genii of the day held a conference almost immediately, to settle the plans of action, following which the boat was headed for Carrickfergus: on arrival at the desired locality, all the appliances having been previously made ready, the vessel was slowed down, and the first dredge lowered over the side. Ten minutes or so was allowed for the filling of the net, and on the signal being given, a number of willing helpers lent a hand, and soon had the first haul on board: a cast of the lead showing  $3\frac{1}{2}$  fathoms. The take proved to contain a large quantity of corallines of various species, with much other material, all of which was emptied out into large flat trays and distributed about the after end of the vessel, for purposes of examination. Hitherto the weather had been getting steadily worse, until at this point the collecting of specimens was eagerly being carried on amid a downpour of rain. Meanwhile the "Storm Light" proceeded at full speed to the second station, three quarters of a mile from Whitehead, where a scrape in  $9\frac{1}{2}$  fathoms brought up a most miscellaneous haul, which kept the collectors of ascidians, crustaceans, seaweeds, worms, &c., occupied until the vessel was well under the great cliffs of the Gobbins. Here, sailing close under the precipitous face, the steam whistle's blast raised from their ledges a cloud of sea-gulls, whose screaming cries and wheeling flight distracted the scientists'

attention from the spoils of the deep, in order to gaze at the beautiful picture, with the blue sky, now fast clearing of clouds, as a background.

No time was lost, however, but another haul was made in fourteen fathoms, at about a quarter of a mile from the cliffs, bringing up a great mass of small pebbles, among which, however, two *Terebratulæ* were found, to the delight of many (or indeed most) of the party, who had never previously seen a living one. The hopes of getting more rarities in the deeper waters of this locality induced the party to try fisherman's mussel-dredge of large mesh, in twenty-five fathoms, close by the last station. This appliance brought up very little in bulk, but among its contents was a very large and perfect sponge, measuring nearly four inches across; there were also two sea-urchins in splendid condition, whose movements in one of the large belljars on deck provided much interest to many of the members. Several crabs of different quaint looking species (*Hyas*, *Portunus*) also disported themselves in an adjoining jar to the detriment of a fine worm, which rapidly disappeared, and to the amusement of the watchers. Meanwhile, the gallant little tug was making all possible speed outwards towards the "Maidens," but owing to the roughness of the water where unprotected by the land, the project of taking a netful from the deep water of mid-channel had to be abandoned for fear of losing the tackle; fate however was adverse, and on trying to make a haul off Larne, one of the dredges was carried away altogether, and the other, a brand new one of novel make, came up with its frame bent, and quite empty. This so disgusted members, that full speed was at once made for Whitehead, under whose sheltering cliffs tea was quickly prepared and most thoroughly enjoyed.

Clearance of tea-things having been made, it was suggested that the next trial should be made off the centre of the mouth of the lough, which proposal being acted on, resulted in another empty net. The increasingly rough water, on the southern side of the lough, made it advisable not to risk the remaining dredges, so orders were given to return in Kilroot direction, where a haul resulted in an enormous number of dead *Venus* shells being brought up.

Time now began to run short, and no time was lost in making for Belfast again. On nearing the jetty at Queen's Bridge, Mr. Alec G. Wilson (Hon. Sec.) proposed briefly that a hearty vote of thanks be given to Mr. Waterson, the owner of the "Storm Light," for his invaluable assistance in making the trip the success it proved to be. This was passed without further ceremony by a hearty round of applause. Three new members were then elected. During the trip, the Club was pleased to entertain four members of the Dublin Club, who availed themselves of the invitation to the other Club, and whose services during the day proved of great value, Prof. Johnson and Dr. C. H. Hurst being specialists in their respective lines of marine botany and zoology. Prof. Johnson's notes on the Algæ collected and Dr. Hurst's list of the animals observed will be published next month.

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## NOTES.

### BOTANY.

#### PHANEROGAMS.

**Veronica peregrina L. in Ireland.**—This plant was recorded from Belfast in 1857 by Rev. W. M. Hind, who found it “fully established as a weed of the soil at The Lodge” (*Phytologist*, n.s. ii. p. 47). It does not appear to have made headway in this district, as it has not been found near Belfast by any subsequent botanist, and Mr. Stewart remarks (*Flor. N.E.I.*) “perhaps extinct about Belfast.” In Co. Tyrone it was observed so far back as 1836, according to *Cybele Hibernica*, “growing abundantly within the demesne of Barnescourt” [Baron’s Court], and subsequently “in several localities between that place and Londonderry,” and in More’s “Recent Additions,” (*Journ. Bot.*, 1872), three Donegal localities are added, two on the authority of Mr. Hart, the other on that of Mr. Hind; also the more distant stations of Rockingham in Roscommon, and Hazelwood in Sligo, on the authority of Dr. Moore. In Donegal it would appear to have become quite naturalized, for Mr. Hart says of it in 1883 “in many places from east to west of Donegal this has become the commonest garden weed. Except in gardens I have not met with it” (*Journ. Bot.*, xxi., p. 208.) In its head-quarters in the valley of the Foyle, it appears to have thoroughly established itself, as Mrs. Leebody has this season sent me fine specimens which she collected in abundance in gardens at Duncreggan near Londonderry, while she has also found it abundant in a nursery garden near the same town, and at Culmore (all these stations are on the Donegal side of the Foyle); also at Favor Royal and Donaghmore, both in Co. Tyrone. This plant, therefore, would appear to be thoroughly established in cultivated ground in the north-west of Ireland, and the fact is of interest, as, so far as I can find, it is unknown in England, and in Scotland is recorded from Perth alone. In the “London Catalogue” it does not find a place, being apparently treated as merely a casual, and unworthy of insertion, but the above records show that it merits recognition as a British plant quite as much as, say, *Cameisina sativa* or *Cotula coronopifolia*. *Veronica peregrina* is an American species, now found, according to Nyman’s *Conspectus*, in Spain, France, Belgium, Holland, Germany, Italy, &c., and it appears to be one of the several American immigrants that has settled down as a colonist on European soil.

R. LLOYD PRAEGER.

**Scirpus parvulus, R. & S. (= S. nanus, Spreng.)**—Mr. R. M. Barrington sends fresh specimens of this very rare little plant, collected on July 14th at Arklow. It is interesting to know that, despite recent changes, the plant still survives in its only Irish station.

R. LLOYD PRAEGER.



## ZOOLOGY.

## MOLLUSCS.

**Littorina obtusata at Bunowen, Connamara.**—On the occasion of the Easter trip to Roundstone and district by a number of members of the Belfast and Dublin Field Clubs, many of those who were at Bunowen Bay, near Slyne Head, noticed the great numbers of this common little shell, at one end of the strand. There is a small cove at the westward end, cut off from the main beach; in this cove the surface of the sand above highwater mark was covered with shells.

From the surface I collected at random as many shells as covered about two to three square yards, taking care not to select special patches. The following is the list of species thus gathered:—*Littorina obtusata*, 509 individuals; *Trochus cinerarius*, 57; *T. umbilicatus*, 55; *Littorina littorea* 16; *Helix ericetorum*, 15; *Purpura lapillus*, 10; *Trochus sizyphinus*, 2; *Patella vulgata*, 1; *Helix acuta*, 1. In addition to these, which were all practically unbroken shells, were the following:—Small pebbles, 5; fragments of *Cardium edule*, 1; fragment of *Ostrea*, 1. This list seems so remarkable that I am sending it up for publication, in order to find out any parallel instances of great preponderance of one species.

A. G. WILSON, Belfast.

**Spiralis retroversus in Killala Bay.**—During the recent neap tides and in fine calm weather I visited the Island of Bartra, lying across Killala Bay, and having a long range of sandy beach exposed to the Atlantic. I thought it would be a favourable day for shell drift, but the most interesting occurrence was the immense deposit of *Spiralis retroversus*. It lay along the water-mark in a broad band varying in width from three feet to a few inches, and heaped up in some places to a depth of two inches. This deposit extended along the beach for about a mile, where it lay like froth. Though in colour a pale milky chocolate, the mass had evidently been wafted in alive, as the odour was most unpleasant, and remained on those I brought away for some days. Besides this froth-like deposit, which extended for quite a mile, there was a smaller quantity mixed with the usual drift all along the beach.

Once before I met with this shell in the froth-like masses, though not to such an extent. The shells were, for the most part, very small.

AMY WARREN, Ballina.

## FISHES.

**The Allis Shad in Irish Waters.**—The July number of the *Irish Naturalist* mentions that a specimen of the Allis Shad had been lately taken near Donaghadee, and quotes Thompson as an authority for saying that Londonderry is the only Irish locality where it has been found.

Dr. Day on the other hand quotes this same Thompson as reporting that it is often abundant in some parts of Ireland, and specially mentions two or three instances from Donegal, and I have myself seen two specimens taken in Inver Bay on the west coast of that county.

W. SINCLAIR, Strabane.

[Thompson (*Nat. Hist. of Ireland*, vol. iv., p. 178) gives Londonderry as the only Irish locality on the authority of the Ordnance Survey.—EDS.]

## MEDICAGO SYLVESTRIS IN IRELAND.

BY R. LLOYD PRAEGER, B.E.

On June, 1894, on a dry sandy bank at the southern extremity of the Portmarnock dunes, opposite the village of Baldoyle, I noticed among the close-cropped herbage the leaves of a plant, apparently a *Medicago* or *Trifolium*, with which I was not familiar. A search revealed the fact that it grew on several other dry banks in the vicinity, but no trace of flower or fruit could be found. On looking up "Cybele Hibernica" and the British Association Guide," I could find no plant recorded from Portmarnock with which the short leafy shoots of my plant appeared to correspond, so I went back at the end of July, in hopes that it would then be in flower, but no appearance of blossom could be detected. Walking into Malahide, I found a large patch of the same plant on the sand-dunes near the Baths. Roots from Portmarnock were brought away and cultivated; they grew vigorously, and in August of the next year (1895) they came into blossom; and at first sight, judging by its large size and clusters of purple flowers, I took the plant to be a form of *Medicago sativa*. But before the plant had ripened its fruit, which in the Medicks furnishes the most satisfactory specific criterion, it was accidentally cut down to the ground, and the opportunity of critically examining it was lost. I visited Portmarnock and Malahide again, but although there was an abundance of leafy shoots, no flower or fruit had been produced, or if it had, had been eaten down by the rabbits. This year, however, the cultivated specimens shot up, and flowered sparingly at the end of July, and when the fruit ripened in August I found it to consist of a pod twisted in the shape of a single flat or slightly spiral ring, thus corresponding exactly with *Medicago sylvestris*, Fries, a very rare plant, known in Great Britain to grow only in sandy or gravelly places on one limited area, which extends into the counties of Suffolk, Norfolk, and Cambridge. A fortnight later, Prof. G. F. Fitzgerald, F.R.S., sent me specimens of the plant in flower and fruit from Malahide for determination, suggesting the name *Medicago sylvestris*. I again visited

A

Portmarnock and Malahide, and found the plant flowering and fruiting at both places. At Portmarnock it could be traced along the dry banks over a considerable area, but flowering very sparingly. At Malahide it appeared to be confined to the limited area in which I had first noticed it: here most of the flowers assumed the peculiar greenish-yellow colour that is characteristic of the plant, others being purple, while at Portmarnock almost all the flowers were bright purple, a few only being greenish-purple. Though there could be no doubt as to the identity of the plant, specimens were sent to Mr. Arthur Bennett, who promptly confirmed my determination, adding the remark, "closely approaching in habit the wild Suffolk plant as I have gathered it."

Two points in connection with this plant and its occurrence in Co. Dublin invite comment—its standing (1) as a good species, and (2) as a native. As regards its specific distinctness, and its relationships, botanists appear to be much at variance. Fries<sup>1</sup> first described it as a species. Hooker and Arnott<sup>2</sup> treated it as a variety of *M. falcata*; Reichenbach<sup>3</sup>, and Grenier and Godron<sup>4</sup>, considered it a hybrid between *M. falcata* and *M. sativa*; Wallroth<sup>5</sup> and Koch<sup>6</sup> called it *M. falcata*  $\beta$ . *versicolor*. Syme<sup>7</sup> states that he never saw the plant alive, and therefore "adopts the middle course" of giving it sub-specific rank under *M. falcata*. Babington treated it as a good species in the last edition of his "Manual," and the same course is followed in the latest edition of "London Catalogue."

Discussing the question of its hybridity, and Fries' emphatic denial of the possibility of this, Syme states that in England it frequently occurs where *M. sativa* is absent. A similar argument against its hybrid origin might now be advanced as regards its Irish stations, for *M. falcata* is unknown in Ireland except as a rare casual, and the other supposed parent, *M. sativa*, only occurs occasionally where sown. Indeed, the occurrence in some quantity of a hybrid where one parent is absent, and the other is a fleeting plant of cultivation, strikes one as very improbable.

<sup>1</sup> *Mant.* III.    <sup>2</sup> *Brit. Flora*, ed. 8.    <sup>3</sup> *Fl. Germ. Excurs.*    <sup>4</sup> *Flore de France*, L.

<sup>5</sup> *Schal. Crét.*    <sup>6</sup> *Synopsis Fl. Germ. et Helv.*, ed. 2.    <sup>7</sup> *Engl. Bot.*, ed. 3.

Again, there does not appear to be any reason for supposing the plant to have been introduced in its Irish stations. True, there are scattered cottages near its Portmarnock home; but there is very little cultivation around or near these cottages. The close-cropped mossy grass extends on every hand, and no other introduced plants accompany the Medick. The Malahide station is nearer the influences of agriculture and civilization, but the occurrence of the plant here, in a habitat exactly similar to the Portmarnock one, and at a distance of three and a half miles, is itself an argument against the theory of introduction. Portmarnock has long been known as productive of alien plants, it is true, but these appear to have their home among the cultivated fields around the head of the Portmarnock inlet, and not among the natural sward at the extremity of the promontory, where several rare native plants, such as *Viola hirta*, *Vicia lathyroides*, and *Epipactis palustris*, have long been known to flourish. Another plea might be put forward in favour of its introduction—that so large a plant is not likely to have so long escaped notice in localities which have been thoroughly known to botanists for a century past. But as a matter of fact, *M. sylvestris*, growing stunted among short herbage along with *Ononis*, *Trifolium*, and other similar-leaved plants, is in reality quite inconspicuous, the more so on account of its sparse and late blossoming; when it took me three seasons to discover its identity, it appears possible that botanists have overlooked it, or, even if gathered, that it was passed by as an indeterminable fragment of probably a common species.

When once studied, *M. sylvestris* may be easily recognised, even in the absence of flower or fruit. The leaflets are smaller and narrower, and the stems thinner, more branched, and much more spreading than in *M. sativa*, and the whole plant, even when fully developed (as it appears to never be in its Irish stations, thanks to rabbits and sheep) is smaller than that species. In blossom, the smaller flowers, in shorter racemes, furnish an additional feature, not to mention their peculiar colour when typical. In fruit, the pod, coiled in a single plane or slightly spiral circle, supplies a character that cannot be mistaken. I have not had an opportunity of comparing it with *M. falcata* in a living state.

## ALGÆ FROM THE NORTH SIDE OF BELFAST LOUGH<sup>1</sup>.

(Dredged by the B. N. F. C. Expedition, 4th July, 1896.)

BY PROF. T. JOHNSON, D.SC., AND MISS R. HENSMAN.

To the request of the B.N.F.C. Secretaries, that we of the Dublin Field Club who happened to possess any special knowledge of marine fauna and flora investigation, should go over and help them, there could be, having regard to the kindly welcome for which Belfast is noted, but one answer. Accordingly Dr. C. H. Hurst, H. Lyster Jameson, Miss Hensman, and I, joined the dredging excursion, of which some of the results are here recorded.

Remembering that the weather was so rough the day the excursion took place that the Belfast Regatta was postponed, the results of the excursion, as recorded below, must be considered satisfactory. A little organization of the enthusiasts who faced the lough on the 4th of July should produce some good algologists.

The Belfast Field Club would do a splendid piece of natural history work, if it would make such arrangements as would enable some of its members to examine thoroughly, by shore-hunting and dredging, the coast of Co. Antrim, in the neighbourhood of Cushendall and Cushendun. Practically nothing has been added to the knowledge of the marine flora of the N. E. of Ireland since the time of Harvey, when, mainly through the work of W. Thompson and Dr. D. Moore, the district was as well known as any other.

During the past few years a committee has been investigating the marine flora of the Clyde sea area, and, thanks more especially to E. A. L. Batters (whose lists have been published), a better knowledge of this district is now possessed. Several competent members of the Club (whose names need not be mentioned) should be encouraged to do a similar piece of work for the N. E. of Ireland.

So far as time has allowed the examination of the material collected to proceed, some sixty species have been identified, of which the more interesting are here given.

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<sup>1</sup> For a general account of the Dredging Excursion on which these algæ were obtained, see pp. 245-6.

Names preceded by † are now recorded for the North-east of Ireland for the first time. Names preceded by \* are first records<sup>1</sup> for Ireland. Perhaps the most interesting of all is *Halicystis ovalis*, a green stalked alga, the size of a small pin-head. This alga, though known to occur on the French and Scandinavian coasts, has been only once before recorded for Britain—from the Clyde district by the late Prof. Schmitz and G. R. Murray, F.L.S.

## CYANOPHYCÆ.

- † *Hyella caspitosa.*
- † *Plectonema terebrans.*
- † *Mastigocoleus testarum.*

## CHLOROPHYCÆ.

- \* *Halicystis ovalis.*
- \* *Pringsheimia scutata.*
- † *Epicladia Flustræ.*
- † *Gomontia polyrhiza.*

## PHÆOPHYCÆ.

- Arthrocladia villosa.*
- Stilophora rhizodes.*
- Sporochnus pedunculatus.*
- † *Aglaosonia reptans.*

## RHODOPHYCÆ.

- † *Conchocelis rosea.*
- † *Erythrotrichia carnea.*
- † *Scinaia furcellata.*
- Phyllophora Brodiazi.*
- \* *Actinococcus subcutaneus.*
- Rhodophyllis bifida.*
- † *Gonimophyllum Buffhami.*
- Odonthalia dentata.*
- † *Rhodochorton membranaceum.*
- \* *R. mesocarpum.*
- Ceramium diaphanum.*
- † *Melobesia Lejolisii.*
- † *M. Corallina.*
- \* *Lithophyllum Lenormandi.*
- † *Lithothamnion calcareum.*<sup>2</sup>
- † *L. corallioides.*

<sup>1</sup> It should be stated that though the records are new, many of the species have been already found by the writers at other points on the Irish coast.

<sup>2</sup> It was interesting to find a coralline off Carrickfergus, identical with the much discussed *Melobesia compressa*, which M'Calla found in Dalkey Sound.

## OLDHAMIA IN AMERICA.

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

*Oldhamia*, the obscure ridge-like and radiating marking that occurs in the shales of the Bray series, has made the county of Wicklow famous among geologists throughout the world. Continental text-books have figured these problematic objects, adding, perhaps, even greater firmness to their outlines, and greater symmetry to the disposition of their rays. The handsome specimens in the Survey collection in the Dublin Museum are, indeed, enough to stimulate curiosity, even if they are disappointing to those who look for distinct organic structure. The supporters of the organic view of *Oldhamia* will, however, receive much encouragement from the discovery of similar objects in America in strata of Cambrian or Lower Ordovician age. Mr. C. D. Walcott, Director of the U. S. Geological Survey, has published (*Proc. U. S. National Museum*, vol. xvii., p. 313) a valuable description of *Oldhamia occidens* Walcott, from shales near Troy, New York State. I am indebted to the author for kindly sending me a copy of a paper not easily accessible.

Mr. Walcott throws doubt on Hall's *Oldhamia fruticosa*, from the Trenton Limestone (Upper Ordovician) of Wisconsin, but accepts Lapworth's determination of an *Oldhamia*, species uncertain, from the Cambrian slates of Farnham, in the province of Quebec.

The specimens on which the new record are based were sent, with various indeterminable tracks and impressions, by Mr. T. N. Dale to his chief in 1893. *Oldhamia occidens* is placed under the sub-genus *Murchisonites*, proposed by Brady for *O. antiqua* in 1865; but it differs from that species by the fact that each fan-like tuft springs serially from the summit of that preceding it—or, as appears from the figure, from some point slightly behind the summit, so that the "fans" are grouped along a straight line, the broad edge of one just overlapping on the point of origin of that following it.

The description of the beds, which are "post Lower Cambrian and pre-Trenton," reminds one very strikingly of those of Bray.

The literature relating to the Irish examples was quoted in the first number of the *Irish Naturalist* (vol. i., p. 13). Although the American specimens do nothing, as Mr. Walcott points out, to advance "the position of *Oldhamia* in the classification of organic forms," yet the whole question is evidently still an open one; while the absence of the structure from post-Ordovician shales has still to be explained by those who regard it as inorganic.

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## CONTRIBUTIONS TO GLACIAL GEOLOGY.

**A Map to show the distribution of Eskers in Ireland.** By Prof. W. J. Sollas, LL.D., F.R.S. (*Sci. Trans. Royal Dublin Society*, vol. v., part xiii. Price 2s.)

In this paper we have another example of that excellent system of publication, by which single memoirs, read before a learned society, are made accessible to the outer world. As a review of the literature of eskers alone, this part of the Transactions of the Royal Dublin Society should be in the hands of most geologists and of all "glacialists." Its title is misleading, for it is far more than a map; and the map given, by-the-by, illustrates only a certain part of Ireland. In the north especially, numerous fine eskers exist, which are not set down upon the maps of the Geological Survey, these sheets having been already hachured; but in the region between Galway and Dublin, Longford and Roscrea, Prof. Sollas has been able to extract the eskers from the unshaded 1-inch maps, and from the documents of the Geological Survey, and has brought together a striking picture of their distribution and of their confluence. He sums up his own observations as telling strongly in favour of the subglacial origin of eskers; the materials of the esker have been accumulated in the lower part of the ice-sheet, and have been left behind when the mass melted away. Hummel, in 1874, suggested that streams running beneath an ice-sheet, or beneath a local glacier, hollow out tunnels, which become choked with sand and gravel; the eskers are to be regarded as casts of these tunnels. Holst, two or three years later, held that eskers originated in the gravel washed into the ravines and beds of rivers which were cut in the surface of the ice; the glacier, on melting, yielded up the drift which it contained at various levels within it, as well as that which lay upon its surface, and this material became arranged along the beds of the streams; finally, the complete melting of the ice left these river-accumulations in the form of ridges, their sides having been, until then, banked up by the ice. Dr James Geikie adopted the englacial or subglacial view of eskers in 1877, and it is to him that geologists in the British Isles are indebted for an introduction to Hummel's and Holst's most suggestive papers. Prof. Sollas does justice to other independent workers, such as Winchell and



Upham in America; but should not Mr. J. G. Goodchild also appear prominently in this connexion? Mr. Goodchild (1) put forward in 1874 the somewhat curious view that drumlins and eskers accumulate on rock-bosses and rock-ridges *between* the channels of subglacial stream *i.e.*, between the channels of greatest flow; but, if he did not independently proceed precisely on Hummel's lines of argument, his papers contain much that is strikingly original, and much that appears to anticipate the work of Holst. Had he been more familiar with Irish eskers, his theory would doubtless have widened, and he would have no longer demanded a rocky boss as a base for every accumulation. His papers contain consistent and valuable explanations of the form and inner structures of drift-mounds, as well as the suggestion that the occasional contortions are due to the settling down of ice-blocks in the glacier-mass (2). Prof. Sollas, after his review of the literature, gives a topographical account of the principal esker-systems in the area selected by him, showing how each "presents a remarkable resemblance to a map of a river-system. The narrow linear outlines, the meandering course, the branches converging like tributaries, or diverging like the channels of a delta, the loops and knots are singularly alike in each" (p. 817). He ranges himself as an adherent of Hummel's view rather than that of Holst, the materials of the esker having "been deposited on the place where they are now found by the action of running water," and not "precipitated in mass from the bottom of sinking ice-cansons" (p. 819). The striking observations of Russell on the Malaspina glacier certainly afford the strongest support to the subglacial rather than the englacial theory. Where eskers run across the general direction of glacial striæ in the district, their origin is somewhat boldly attributed to crevasses, at the base of which the gravel is held to accumulate.

Certainly, when we see an esker, like those in the romantic district west of Cookstown, running up and down across a valley, with the aid of the Great Wall of China, and breached at right angles by the stream, we feel that we have still a good deal to learn. But Prof. Sollas has done for Ireland what has been done for parts of eastern America and Scandinavia, and has given us a comprehensive view which raises probability a long way towards proof. The map is beautifully printed, in four colours and a groundwork, and two portions are given in the text on a larger scale. There is also a "fig. 3," apparently showing the relation of eskers to lines of bog; but to this we have been unable to find a reference. As we have already hinted, the treatment of the subject in the text is even more important than the map; and the paper becomes a permanent work of reference upon eskers.

G. A. J. C.

(1) "On Drift." *Geol. Mag.*, 1874, pp. 509 and 510. Also "The glacial phenomena of the Eden Valley, &c." [Read June 24, 1874]. *Quart. Journ. Geol. Soc. London*, vol. xxxi. (1875), p. 95.

(2) *Geol. Mag.* 1874, p. 508, and *Q. J. Geol. Soc.*, vol. xxxi., p. 96.

**A Bibliography of Irish Glacial and Post-Glacial Geology.**

By R. Lloyd Praeger, B.E. (*Proc. Belfast Nat. Field Club*, vol. ii., Appendix 6; 1896).

This work appears as one of the now well known series of appendices published by the northern Field Club; but it is also issued in a separate form, so as to be accessible to all geologists. And, indeed, it is difficult to name the geologist to whom it might not prove useful; even the continental student of post-Pliocene faunas will find such a bibliography of constant service.

Mr. Praeger brings to his task, involving the selection and cataloguing of 767 works and pamphlets, the knowledge and method of a librarian. But, unlike some bookmen who have essayed such duties, he has also the judgment of a naturalist, and is able to give us a note on every paper, briefly indicating its scope. The arrangement is alphabetical, according to authors, and two indexes follow, one grouping the papers under their geological aspects, while the other classes them under counties.

No such list can ever be complete, for there must be passing references to Irish soils, or to discoveries of shells or bones, in works dealing with subjects far other than glacial geology. But Mr. Praeger has gone as far as he could, short of reading every work in which Ireland is accorded prominence, and he has thus given us Young's reference to Mitchelstown Cave in "A Tour in Ireland," and Parkinson's account of the great Irish deer in "Organic Remains of a former World." Even human bodies found in bogs, if sufficiently far down, come within his scope; and he has found it very hard to draw the line between flint gravels and chipped flints, between post-glacial geology and human archaeology. Mr. Praeger's tendency to give even trifling references is surely very much on the safe side, and he seems to have kept well clear of vain repetitions and purely second-hand sources of information. The handsome printing of the list will enable us to insert any later references as foot-notes, or in the margin; but we shall hope for an appendix from Mr. Praeger himself every ten years or so, and a complete new edition about A.D. 1926. Were the present bibliography never touched or reproduced, its value to geologists would remain; it is a pleasant gift from a busy worker to his fellows, and will vastly lighten the labours of all who deal with recent deposits in the British Isles. As to those who call themselves "glacialists," they will do well to keep the list constantly at their elbow; and its comprehensive character may make us indeed hesitate, before we add one sheet of foolscap to the controversial side of glacial geology. May we look in time for a digest of the whole matter from Mr. Praeger, a history of Ireland in post-Pliocene times, which shall bring together the scientific results of his own observations, together with those of the authors whose works he has so carefully kept before us?

G. A. J. C.

## THE SKUAS OF KILLALA BAY.

BY ROBERT WARREN.

ONLY three species of the skua family have as yet been known as visitors to this bay and estuary—the Pomatorhine, Richardson's, and the Longtailed or Buffon's Skua.

The POMATORHINE SKUA (*Lestris pomatorhinus*) up to the date of Wm. Thompson's "Birds of Ireland," was very little known as an Irish visitor, only nine specimens being recorded by him, of which two were obtained in Belfast Bay; one in the autumn of 1834, and the second on the 16th of October, 1848, both immature birds.

My first acquaintance with this skua began in 1862, when large numbers visited the bay on their way to the south. For several days previous to the 22nd of October the weather had been very stormy, the wind blowing in wild squalls from the south-west, accompanied by heavy showers of rain. On that morning I was standing at the parlour window of Moyview, looking down the estuary towards Bartragh, when suddenly a flock of ten or twelve dark-coloured birds appeared in view, flying slowly up the river from the sea. I immediately took my gun and ran down to the shore, but only reached it in time to see the skuas pass out of shot. My disappointment, however, did not last long, for a few moments after a flock of five birds passed, out of which I was so fortunate as to secure a fine specimen of the Pomatorhine Skua in almost perfect adult plumage. Several other flocks passed on afterwards, and I was able to obtain a second bird in a similar stage of plumage. But soon after I had shot the last bird I was called away to attend to some business matters, which delayed me for some time, and when I returned to the shore found that the flight of skuas had ceased for that day.

On the morning of the 23rd the gale still continued, but had changed round to the west-north-west, and consequently the skuas in their flight up the river kept close to the eastern (or Mayo) side, and none came within shot of the Sligo side, upon which Moyview is situated. On both days the skuas after keeping along the tidal course of the river for about two miles directed their flight across the country to the south-west.

I had an excellent opportunity for observing those that passed on the 22nd, and have little or no hesitation in considering the greater part, if not all, to have been Pomatorhines; the first flock that passed were undoubtedly of that species, their great size and clumsy-looking tails clearly pointing them out as such, and all exhibiting white underneath, and long tails which proved them to have been adults.

When seen during flight the Pomatorhine Skua's tail presents a very clumsy, awkward appearance, in contrast to the elegantly pointed tails of the smaller skuas; this is caused by the two elongated tail-feathers being bluntly rounded at the ends and twisted for nearly half their length at almost right angles to the plane of the short tail-feathers, so that when a side view of the bird is taken the full breadth of the long tail-feathers is shown, giving the tail that thick, clumsy appearance which so easily identifies this species of skua on the wing.

Very few dark-coloured birds were seen on either day—probably not one to ten of the white-breasted ones.

I could not be quite certain as to which species the birds seen on the second day belonged, for they passed at too great a distance for me to judge of their size and appearance; but as the first day's flight was undoubtedly made up of Pomatorhines, it may be safely inferred that the second day's was a continuance of the first, and therefore was of the same species.

A very interesting letter from J. C. Neligan, of Tralee, was read at a meeting of the late Dublin Natural History Society, in March, 1863, describing his meeting with a large flight of skuas (many of them Pomatorhines) in Tralee Harbour on the 25th of October, 1862, just two days after the last of the skuas left this on the 23rd, and, I think, almost satisfactorily proving that the skuas after leaving this bay, and crossing the island, continued their flight along the coast to Tralee Harbour, where they took shelter and remained while the stormy weather lasted.

Since the above date, this skua, so far as I am aware of, has only occasionally occurred in this and the adjoining County of Mayo; four specimens only having come under my notice. An adult bird of the black variety was shot on Lough Conn by my friend, Mr. John Garvey, of Ballina, on the 24th of

October, 1890; and on the 8th of November same year, the late Dr. Burkitt sent my friend, Mr. R. J. Ussher, of Cappagh House, Co. Waterford, an adult bird that he had found dead in a field close to his house, near Belmullet, County Mayo. Then, during the last week of November, 1890, Dr. Scott of Enniscrone gave me an immature specimen of the black variety, that was shot by his nephew, as, in company of two or three others, it was flying over a bog near Kilasser, twelve or fourteen miles from the sea. And a fourth specimen, a very fine adult, with long tail and white under-parts, was found lying dead (but quite fresh) on the Enniscrone sands by Miss Amy Warren on the 2nd October, 1892.

RICHARDSON'S SKUA (*Lestris crepidatus*) visits the bay and estuary much oftener than either of the other two species, some being observed nearly every autumn, during the migratory months of September and October.

This skua first came under my notice in October, 1851, when residing with my brother, Mr. E. H. Warren, on the island of Bartragh. We observed the first of the skuas on the 8th, when, as we were returning from Killala to Bartragh, two flocks of six and eight birds were seen at a great height coming from the open bay, and passing across the country to the south-west; but these were only the precursors of the large numbers that followed on the 15th and 16th. The wind had been blowing in wild squalls, with heavy showers of rain on the morning of the 15th, when my brother observed four skuas flying from the bay; about half-past nine o'clock, nineteen birds passed, one of which I shot (an immature Richardson's). At eleven, I saw twenty-two pass; about twelve, I saw ten, and at one o'clock, seventeen birds passed over; all flying in the same direction, up the river to the south-west. These flocks, together with the stragglers that passed singly while we were watching, altogether made up the number to seventy-two birds, counted without mistake. On the morning of the 16th the flight still continued, the birds passing in small flocks, and up to eleven o'clock (we were unable to remain longer) upwards of one hundred birds were seen.

They appeared to be all Richardson's (I did not notice the large Pomatorhine amongst them), and the greater part were dark-coloured birds, and mostly immature, for very few long-

tailed, or white-breasted ones were seen; some of the skuas appeared tired with their long flight against the wind, and would occasionally light on the water, resting for a few minutes, and then rise and follow their companions. Strange to say, though there were plenty of gulls about the sands on both days while the skuas were passing, yet we never saw any attempt to chase the gulls, though quite close to them.

The next occasion on which I had the pleasure of seeing skuas on migration was on the 18th September, 1869—a fine bright calm day, as I was in one of my fields looking on at some reapers at work, and chancing to look upwards, my attention was drawn to a flock of fifteen birds passing at an immense height on their usual course to the south-west, and if the day had not been so clear I could not have recognised them as skuas, for I was only just able to make out their dark long tails against the clear blue sky. Again on the 3rd of October, 1874, I was fortunate in witnessing a small flight of skuas migrating in the usual direction. The weather had been very stormy, with heavy showers for some days before: wind north-west on this day, when about ten o'clock I observed a flock of twenty birds flying up the river from the sea; a short time afterwards four more passed; then a little flock of three, which were followed by four, and in about a quarter of an hour, a solitary bird (which I think was a Pomatorhine) brought up the rear, and as far as I saw ended the flight for the day.

I have frequently observed, and shot solitary birds of this species during the migratory months of September and October, but their spring visits are very rare.

In May, 1877, a party of six birds accompanied a large flight of Common and Arctic Terns visiting the bay and estuary: three of the skuas were in light-coloured plumage, and three in the very dark, or black stage, and I imagined at the time, from seeing a light and a dark-coloured bird keeping company, that these colours marked the male and female, and in order to ascertain if my surmise was correct, I shot three birds, a light-coloured one, a bird in an intermediate stage of plumage, and a dark, or nearly black one, all three having long tails, showing that they were adults. However, much to my surprise, on skinning and dissecting them, they all three turned

out to be females, the ovaries of each containing eggs varying in size from No. 8 to B shot.

The LONGTAILED or BUFFON'S SKUA (*Lestris parasiticus*) is of very rare occurrence on this part of the coast, and has only on two occasions come under my notice—first, on the 24th of October, 1862, I was on the shore near Scurmore, looking out for any rare birds that might have been driven in by the gale of the two previous days, when a small skua flew past, which I fired at and wounded, but it escaped over the sandhills. On the following day when walking along the Enniscrone sands, on the bay side of the sandhills, and nearly in the same place where on the previous day I had found two fine specimens of the Fulmar Petrel, I picked up a dead skua, and fancied it was the bird I had fired at the day before. After I got home I skinned the bird and found that it was wounded by No. 6 shot, the same that I had used, so felt pretty certain that it was the bird I had wounded. It proved to be an immature specimen of Buffon's Skua.

The second specimen was given to me by the late Mr. N. Handy of Ballintubber, near Killala, on the 18th of October, 1867, who told me he met it when out grouse-shooting, and shot it as it rose from the carcase of a hare, upon which it had been feeding. This was also an immature bird, but as it had been kept too long, I was unable to preserve it.

The only instance that I am aware of this skua being seen on its spring migration in Ireland, is that mentioned by Lieutenant Crane, of the 67th Regiment, in a letter read at a meeting of the late Dublin Natural History Society on the 7th February, 1862, in which he says:—

“The specimens of Buffon's Skua were shot by me on the 16th of May, 1860, on the Shannon, about five miles south of Athlone.

“I was out with two brother officers shooting Land-rails, which are very plentiful on that part of the river. The day was very stormy, and cold for the season, the wind from north-west. I was sitting in a boat at a place called Longisland, when a flock of about twenty skuas passed over. I saw at once that they were not common birds: the long tail feathers marked them at once; but as I was sitting in the bow, the flock had nearly passed over before I saw them, but I succeeded in killing one. Sometime after another flock of about the same number passed, but I could not get a shot; but a third flock came over, out of which I killed one with each barrel, making three in all. I gave two

of them to the late Mr. Glennon, and he then showed me another, which he told me had been killed from a flock in the Co. Donegal on the 17th, the day after I got mine. The birds were following the course of the Shannon, flying north. I gave the third specimen to Major Newton, R.A., who sent it to his brother, Alfred Newton, Esq., so well known for his work on eggs. I saw between sixty and seventy in all."

From the foregoing notes on skuas seen on their southern migration, and from the fact that my brother, when residing on Bartragh island from February, 1851, to December, 1855, observed skuas every October passing over Bartragh, and crossing the country to the south-west, I think it may be safely inferred that the line of flight of a part of the southern migration is along our north-west coast until Killala Bay is reached, and then, to avoid the longer course round the rugged coast-line of Mayo and Galway, they enter Killala Bay, and taking the shorter and more direct course over Bartragh, continue their south-west route across the country, and striking on the coast again, probably at Galway Bay, continue their flight to the south.

It may also be noted that the skuas were never seen in any large numbers, unless during very stormy weather occurring in October: and that if the weather was calm and fine during that month, only a few straggling birds were seen, probably birds not strong enough to keep up with the main flight.

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a magnificent pair of Crown Cranes from L. O. Hutton, Esq.; a pair of Bibron's Frogs from A. E. Jamrach, Esq.; a pair of Wild Cats from Miss Cunningham; a Merlin from Sir Douglas Brooke; a snake from the Editor of the *Irish Field*; two parrots from J. H. Davidson-Houston, Esq.; an eagle from F. H. Young, Esq.; a Merlin from C. J. Wisdom, Esq.; a Cape Canary from Mrs. Cannon; and some Loach from Miss Phillipson. Two Lion cubs and two Capybaras have been born in the Gardens, and a Somali Lioness has been purchased.

19,928 persons visited the Gardens in August.



## BELFAST NATURALISTS' FIELD CLUB.

AUGUST 15.—The Club held an excursion to Slieve Gallion, in County Derry. The party, numbering over twenty, left the Northern Counties Station at eight o'clock, arriving at Moneymore at ten. Cars were at once taken, and the long drive will be a pleasant recollection to all the party, the hedgerows being bright with blackberries and the brilliant scarlet of the honeysuckle-berries. Arriving at Lough Fea, a boat was kindly provided on the lake by Mr. Russell to explore the crannog showing so conspicuously in the centre. A short notice of the geology of the district was read, written by Professor Cole, who had been working out the local rocks, the main features being the intrusion of granite in pre-Carboniferous times into the much older pyroxenic and hornblendic rocks, formerly supposed to have been altered shales and sandstones, but now recognised as being volcanic in origin, ashes and tuffs having been found in considerable quantity, and vesicular structure being often seen. The melting up of the older rock by the intrusive granite seems to have produced a curiously mixed rock on a regional scale. This is described by the Geological Survey and elsewhere as diorite, and was supposed to have been of separate origin. It is also of considerable interest to see the small capping of our familiar basalt and Chalk, showing what a gigantic amount of denudation has gone on in geologically recent times in order to clear all the basalt and most of the Chalk from the great valleys on either side of the mountain. The members were then free to ascend the mountain or explore the lake; but the party decided to climb, so a start was at once made over the fields and by cart lanes until the open heath was reached. Investigating each crag and exposure of the rock, the party gradually reached the summit (1,623 feet), from which the view proved somewhat disappointing owing to the heavy clouds covering the sky. After a short rest the descent was undertaken, passing exposures of the mingled rock above referred to. Another long and lovely drive brought the members to the top of Carndaisy Glen. The little stream has cut down through gravels and sands until it now has got some way into the rock, the sides of the gorge rise steeply, beautifully timbered on either hand, while the carriage road runs down close by the stream. Leaving the vehicles, the members scattered in pursuit of their various avocations, the fungi being (though still early) especially noticeable. The Hedgehog Mushroom (*Hydnum repandum*) was in considerable quantity, as were several species of *Russula*, *Boletus* (including the locally rare *B. satanas*), *Amanita* and *Peziza*. Halfway down the glen the surprising sight was seen of the stream apparently rushing against the steep bank, and having cut through it, flowing at right angles to its old course, now quite dry. This has been caused by a second stream cutting its way from outside, till its bed was lower than the main one, thus, when cut far enough back, tapping the larger stream and producing the above effect. On arriving at the end of the glen cars were again mounted, and the few miles separating Carndaisy from Moneymore were soon covered, bringing the party quickly to the

Drapers' Arms, where tea was in readiness. It should be mentioned that some members of the Gaelic League accompanied the Field Club, and succeeded in finding quite a number of Irish-speaking people, though even the magic key of silver failed to extract Gaelic from the younger members of the community.

SEPTEMBER 5.—The last long excursion of the season was held to Ballynahinch and Slieve Croob, where a pleasant and enjoyable day was spent amongst the rocks and mountains of what is, with the exception of the Mourne, the wildest portion of County Down. The party drove through Ballynahinch, past the historic height of Ednavaddy, to where the Belfast Water Commissioners are having a section made of their new Mourne scheme. Here a short halt was called to allow the members to inspect a deep cutting through which a concrete tunnel has been made. Shortly after this, the little village of Dromara was reached, and then the mountain road was taken skirting the Lagan. A good climb up the beds of different streams, each party intent on discovering the real source of the Lagan, soon brought all the members to different little wells of limpid water, where lunch was taken. The sloping sides of Monahoor were then passed, and the heights of Cratlieve left behind, making it but an easy pull up to the topmost cairn, 1,755 feet high, of Slieve Croob itself. Here a halt was called, and some photos taken around the great cairn, which has been pulled down and erected into small modern piles. A little work would restore this cairn to its original conical condition—the covering and monument of some long-forgotten hero. From the cairn the descent was easy and rapid to the vehicles, which were soon mounted, and the road taken to the little chapel of Dunmore, high perched upon a rocky knoll. Here Father Quail, who had been the Club's local guide throughout the day, showed the members some geological specimens and other things of interest. Time did not permit of a long delay, so the road was once more taken to the Spa, where an excellent tea was provided by Miss Brelsford, after which the following new members were elected:—The Rev. G. Foster, Mrs. Stevens, and the Rev. Richard Cole. The President, Mr. Lavens M. Ewart, M.R.I.A., in a few well-chosen words, then thanked Father Quail, on behalf of the members, for his great kindness and hospitality throughout the day.

GEOLOGICAL SECTION.—This section met in the Museum on the 29th July, when Mr. A. G. Wilson, Honorary Secretary, described a recent visit with Professor Cole to the Slieve Gellion district, illustrating his remarks by a collection of rock specimens, which he subsequently presented to the Club. Mr. R. Bell mentioned that the well-known Rhætic beds in Colin Glen, which had been inaccessible for many years, are exposed by recent floods, exhibiting specimens of the bone bed. He also presented a series of rhyolites from Cloughwater, Kirk-inniola, Ballyloughan, and Eslerstown. After some discussion, the Pomeroy excursion was relinquished, as the section to be visited occurs in the bed of a stream. The recent excursion to Glenavy was also spoiled by the severe rain, which had made Lough Neagh unusually high.

## DUBLIN NATURALISTS' FIELD CLUB.

AUGUST 15.—KELLY'S GLEN. A party numbering close on thirty proceeded by car and cycle to Whitechurch, and thence on foot up Kelly's Glen. Some elected to search along the stream, where rough banks strewn with rocks invited the naturalist; others struck up the heather-clad side of Tibbradden Mountain, and along its high ridge to the summit, where, from the ruined sepulchral cairn, a fine view of the Dublin and Wicklow hills was to be had. The party re-assembled at a whitewashed cottage at the head of the glen, where tea was spread on the grass. Close at hand rose the green slopes that covered a deposit of much geological interest—the highest of the celebrated series of Dublin high-level glacial gravels. The descent was made across the ridge to Ticnock, and thence to Dundrum. The season was rather advanced for flowering plants, but *Trifolium medium* was observed in one of its few Co. Dublin stations; with it grew the Golden Rod (*Solidago virgaurea*). The Sweet-Scented Orchis (*Gymnadenia conopsea*) and Grass of Parnassus (*Parnassia palustris*) were still in flower in damp spots, and the mountain variety of the Cow-wheat (*Melampyrum pratense* var. *montanum*) was gathered both on Tibbradden and Kilmashoge. Among the Liverworts collected by Mr. M'Ardle were *Scapania nemorosa*, *S. umbrosa*, *Nardia gracillima*, and *Riccardia multifida* var. *pinnatifida*.

SEPTEMBER 5.—BRITTAS BAY. A rainy morning kept a few members away, but a party of close on twenty disembarked at Wicklow from the train leaving Dublin at 10.0. The day brightened as the party drove southward, through pretty undulating country and hedges laden with sloes, hips, haws, and blackberries. The sands of Brittas Bay were reached shortly after mid-day, and as the sun burst forth the party scattered among the dunes. Here that fine and rare rush, *Juncus acutus*, grew plentifully. Specimens were measured seven feet in height. Other plants of the sand-hills were *Carlina*, *Cynoglossum*, *Euphorbia paralias*, and *E. portlandica*. On the sand-hills the entomologists noted a fair number of species. Amongst the beetles the following are noteworthy:—*Demetrius atricapillus*, *Dromius nigriventris*, *Otiorrhynchus ovatus*, and a very white form of the common *Philopeton geminatus*. In the marshy ground behind the sand-hills *Aphodius fatens* occurred, a very local species in Ireland. Two uncommon plant-bugs were found on the sand-hills, *Metacanthus punctipes* and *Nabis lativentris*. The former occurred in abundance under *Lotus corniculatus*; it had previously occurred only on Portmarnock sands. The Spiders collected included *Lycosa leopardus*, *L. picta*, *Pardosa monticola*, and an immature *Drassus* (probably *D. delinquens*) new to the Irish Fauna. Along the rocks of Mizen Head were found *Staticia occidentalis* and *Carex extensa*. *Feniculum* and *Artemisia Absinthium* grew on roadsides adjoining. A note on the fungi taken will be found on p. 268. At 3.30 a sumptuous tea was provided by Mrs. Johnson, and subsequently the party drove back to Wicklow, and caught the mail train to town. Hon. R. E. Dillon and Brigade-Surgeon Wellington Gray were elected members of the Club.

## CORK NATURALISTS' FIELD CLUB.

AUGUST 12.—ROSTELLAN AND CASTLE MARY. Fifteen members left by 12.10 train, and proceeded by steamer to Aghada from Passage. Driving to Rostellan the grounds were explored, and along the boggy margins of the lake were found the Common Skullcap (*Scutellaria galericulata*) in abundance, the Gipsywort (*Lycopus europæus*), the Marestail (*Hippuris vulgaris*), and the Marsh Willow-herb (*Epilobium palustre*). Crossing the fields to Castle Mary, the Dwarf Spurge (*Euphorbia exigua*) was noted, a species local in Ireland. Two fungi were collected, *Boletus edulis*, frequent in the moist woods at Rostellan, and *Coprinus comatus* under the beeches at Castle Mary. The margins of the lake at Rostellan were evidently rich in insect life, but time prevented many captures. Numerous fine specimens of *Argynnis aglaia* were seen. After tea at Cloyne the fine old cathedral was visited, and the round tower inspected. A drive of four miles back to Aghada, then steamer and train, and Cork was reached at 9.45, after a most delightful day's outing.

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## FIELD CLUB NEWS.

The Dublin Club has recently been elected a Corresponding Society of the British Association, and was for the first time represented at the Corresponding Societies' Conference at the recent meeting at Liverpool. Prof. Johnson, Treasurer of the Club, was the delegate on this occasion.

Several English conchologists—Dr. Chaster, Mr. R. Standen, and Mr. Hardy—have recently been collecting in North Antrim, under the able guidance of Mr. R. Welch. We trust some account of their results will shortly appear in these pages.

We note with pleasure that the Hon. R. E. Dillon, who initiated and organized the recent week's field-work at Clonbrock, the results of which filled our last issue, has been elected a member of the Dublin Club. Mr. Dillon's name is already well-known on account of his remarkable entomological discoveries in Co. Galway.

Mr. Charles Elcock, long a member of the Belfast Field Club, and a microscopical manipulator of great skill, has been appointed Curator of the Art Gallery and Museum at the Free Public Library in Belfast, in place of Mr. J. F. Johnson, whose recent mysterious disappearance caused some sensation locally.

The Cork Club are losing a valued member by the removal of Surgeon W. G. Axford, R.N., F.L.S., from H.M.S. Black Prince, Queenstown, to Devonport, where he has been appointed Surgeon to the Dockyard at Keyham. His presence on the various excursions this year have been most helpful to the members, and while congratulating him on promotion, they much regret his removal.

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## NOTES.

## BOTANY.

## FUNGI.

**New Irish Fungi.**—Mr. Praeger has lately sent me the following specimens:—*Glyceria aquatica* affected with the long linear sori of *Ustilago longissima*, Sow., which ultimately cause the leaves to split up and die, and the stem to wither away without flowering. The spores are very small; it would take sixty-four millions to cover a square inch! The affected grass was gathered at Bective, and near Enfield, Co. Meath. *Ustilago caricis*, Pers. (= *U. urceolorum*, Tul.), is a smut-fungus which converts the fruit of sedges into a little mass like a grain of charcoal. Its spores are four times as large as those of *U. longissima*. It was found on *Carex panicea* near Enfield by Mr. Praeger. From the same locality comes an inflorescence of *Holcus* sp., with a large-spored smut, *Tilletia Raruenhofii*, Fischer v. Waldheim, a species allied to the well-known "bunt" of wheat, and like it smelling of herring-brine when rubbed. All three fungi are new to Ireland, and the last-mentioned species has not to my knowledge been hitherto published as British, but Dr. Plowright, the British authority on the subject, informs me that he found it on *Holcus mollis* near Doncaster, in 1891.

ED. J. McWEENEY, Dublin.

**Fungi from Brittas Bay Excursion, D.N.F.C.**—The following were the rarest of the few agarics collected:—*Clitopilus carneoalbus*, Wither; *Entoloma jubatum*, Fr.; *Stropharia inunctus*, Fr.; *Inocybe rimosa*, Bull. (This common agaric is mentioned on account of the peculiar locality where it was found, viz., amongst the sand-hills on the seashore; the pileus was in many cases quite coated with sand). Of *Uredinei* and *Ustilaginei* one species was found (by Mr. Halbert) which I have not hitherto met with, though I have often sought for it, *Puccinia hydrocotyles*, Lk., forming pustules chiefly on the upper side of leaves of the Marsh Pennywort. Mr. M'Ardle found *Puccinia calthæ*, Lk., a decidedly rare species, within a few yards of Mr. Halbert's capture, on the marshy land west of the coast-road to Arklow and north of the cross-road at Brittas Bay. The other Fungi taken comprised *Erinella apala*, Mass., an exceedingly beautiful tiny *Peziza* growing on dead culms of rush. It is covered with long hairs, whitish round the margin, fawn-coloured elsewhere, and its spores, resembling compact bundles of slender rods ( $40\mu \times 2\mu$ ), form an interesting high-power object. *Cyphella villosa*, Karst., a minute woolly species, closely resembling a *Peziza*, was also found. It covered a considerable area of a dead herbaceous stem. This is the first occasion on which I have found this species. My measurements of the spores come out a little smaller ( $9 \times 7$ ) than those given in Masee, but the agreement is otherwise perfect.

E. J. McWEENEY, Dublin.

PHANEROGAMS.

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**Flora of Lough Derg.**—The following notes as to some of the rarer species which I observed in the neighbourhood of Lough Derg in June and July, 1895, may perhaps be of interest:—

*Thalictrum collinum*.—A few plants among rocks near mouth of Rossmore river (Co. Galway). *Thalictrum flavum*.—Abundant on banks of Borrisokane river (Co. Tipperary). *Aquilegia vulgaris*.—Frequent in stony places throughout the district. *Erysimum cheiranthoides*.—One plant at Brocka (Co. Tipperary). *Geranium sanguineum*.—Plentiful among rocks at Drominagh (Co. Tipperary.) *Galium boreale*.—Abundant at Brocka. *Insula salicina*.—A fine clump of this striking plant found on rocky shore of Lough Derg at Curraghmore, seen also on Brynas Island, both on Tipperary shore of Lough. *Carduus pratensis*.—Abundant in bogs. *Taenidium scordium*.—In profusion among rocks on shore of Rossmore river, and also at Drominagh. *Ophrys apifera*.—Frequent in limestone pastures at Borrisokane. *Epipactis palustris*.—Moderately abundant in a rocky meadow at Bellevue, on the Tipperary side of Lough. *Habenaria conopsea*.—Frequent at Brocka. *Sisyrinchium angustifolium*.—Growing freely on rocky shore at the mouth of Rossmore river. The district is a most interesting one to a botanist, as it yields some species not found elsewhere in the United Kingdom, and appears to be the only European habitat of the beautiful *Sisyrinchium angustifolium*.

C. J. LILLY, Larne.

***Sisyrinchium californicum*, Dryander, in Ireland.**—To the *Journal of Botany* for August, Rev. E. S. Marshall contributes a note on the occurrence of this plant in marshy meadow-land north of Rosslare station, Co. Wexford, where he states it grows in abundance, among plants all of which are undoubtedly indigenous. *S. californicum* is a native of California and Oregon, and Mr. Marshall says he is "quite convinced that this plant has not been accidentally introduced" in its Co. Wexford station.

***Dryas octopetala* in Co. Antrim.**—Among some plants which I gathered in 1884 at the Sallagh Braes, in Co. Antrim, and which had got astray among my papers, I have recently found a specimen of *Dryas octopetala*. This discovery is interesting, as the only record of this plant from Co. Antrim is in Mackay's *Flora Hibernica* (1836), without any locality being mentioned, viz. :—"County Antrim, Mr. Templeton"; on which the editors of the *Flora of the North-east of Ireland* (1888), p. 48, remark: "In *Flora Hibernica* Mr. Templeton is erroneously credited with finding this plant in Antrim." I have since heard from my friend Mr. Stewart, the surviving editor, that neither he nor his coadjutor, the late Mr. Corry, found in Templeton's MSS. any note of *D. octopetala* in Antrim, hence their reason for doubting the correctness of the statement in the *Flora Hibernica*. Mr. Stewart has seen my plant, which has come as a surprise to

him. He has often searched the Sallagh Braes, but as my plant is an old barren one, it was probably overlooked from its habit of creeping close to the ground, and resembling *Salix repens*. To me it is very satisfactory to be able to verify Mr Templeton's record.

H. W. LETT (in *Journ. Bot.* for August).

[We are not sanguine that the foregoing note will convince Irish botanists as to the occurrence of *Dryas octopetala* in County Antrim. The fact that a plant so striking and distinct was not recognised at the time, but should turn up long afterwards amongst papers admittedly mislaid, does not tend to inspire confidence or conviction. The remark that "as my plant was an old barren one, it was probably overlooked from its habit of creeping close to the ground, and resembling *Salix repens*" strikes one as strange. The resemblance to *Salix repens* is surely fanciful, and our experience is that old plants do not creep closer to the ground, or flower less than younger ones. It must be noted also that several records credited to Templeton by various writers, but not mentioned in his own notes, have already proved erroneous, *Euphorbia hiberna* and *Chrysosplenium alternifolium* for instance, and that the Sallagh Braes have been well searched by botanists ever since Templeton's time, notably so by the late Dr. Moore. From these considerations the desirability of Mr. Lett's verifying his specimen by the discovery of the plant *in situ* is manifest, and while we do not for a moment cast doubt on the *bona fide* nature of his communication, it appears to us that there are now two records which invite verification—Mr. Templeton's, and Mr. Lett's.—EDS.]

**Carex teretiuscula, Good., in County Down.**—This sedge has just now been re-found, July, 1896, in a wet sphagnous bog near the Giant's Ring at Ballylesson, Co. Down, which was in all likelihood Orr's original locality, and it is thus a restoration to the county of a plant which was excluded by the authors of *Flora N. E. Ireland* as not now being found. Indeed, until it was lately discovered at Killelagh Lough in County Derry, by Mrs. Leebody and Mr. Praeger, as recorded in the Supplement to the Flora, it was considered as probably extinct in the north of Ireland. The history of the occurrence of this species in the district, particularly as relating to County Antrim, is amusingly curious. It was believed that there was neither bog nor marsh at or near the Giant's Ring. The habitat in the case of Templeton's locality in County Antrim, given by him as "old moss holes" at Cranmore (which place was for a long time the residence of that careful and indefatigable naturalist) was, in transcription, changed to marl hole, and then from marl hole it was altered, in *Flora Hibernica*, to the marble hole, Cranmore, and again transformed in *Cybele Hibernica* to Marble Hall, Carnmoney; but nobody seems to be aware of the existence of any Marble Hall at that place or elsewhere in the county, nor is the plant to be found in the neighbourhood of Carnmoney. Possibly it may still exist at Cranmore, but since Templeton's time it does not seem to have been seen there. In conversation with my friend, Mr. Stewart, concerning this species, he told me that, as mentioned in the *Flora*, he did not know of

any bog near the Giant's Ring, but stated that he had sought for it between that singular relic of antiquity and the River Lagan, where, as a matter of fact, there is no bog. Recollecting that some years ago I had examined, bryologically, a bog at the foot of the eastern slope of the Giant's Ring, close by the roadside, the approach to which is by a lane directly opposite the Ballylesson National School, we concluded it to be highly probable that this might prove to be the spot, where, on the authority of David Orr, *C. teretiuscula* had been detected by him more than half a century ago; and I determined, though too late in the season to find the plant in perfection, to adventure in quest of it, if haply it might still be found there. The result showed our supposition to be correct. A very few specimens of a starved form of the plant were obtained in different parts of the bog, but for the most part it is confined to a cutting running at right angles with the road, where it occurs, growing in the water, in considerable profusion and luxuriance. At the time of my visit, the latter end of July, the fruit was thoroughly ripened, and indeed most of it had disappeared, but sufficient was secured to facilitate the accurate identification of the plant, in the examination of which I had the friendly assistance of Mr. Stewart. The height of this sedge is given in Babington as one to two feet, which may be generally correct, but the Ballylesson plant is fully three feet high, and many specimens were found measuring very little under four feet. The re-discovery of the species in the county may not be without some interest to North of Ireland botanists. When *Cybele Hibernica* was published the plant could be recorded for only two counties, Down and Antrim, but it is more widely distributed than it was then known to be, and there are specimens to vouch for its occurrence in Tyrone, Derry, and Donegal.

J. H. DAVIES, Lisburn.

### ZOOLOGY.

**Fauna of Belfast Lough.**—The following is a record of species taken on a dredging expedition, on July 4th, 1896, organised by the Belfast Naturalists' Field Club. Names in parentheses ( ) are given on the authority of Dr. Hurst alone; those in brackets [ ] on Mr. H. Hanna's authority alone. Those without brackets on the authority of both:—

PROTOZOA.—(*Ceratium*, sp.)

PORIFERA.—[*Leucoselinia botryoides*.] [*Sycon coronatum*.] [*Euspongia*, sp.]

HYDROZOA.—*Plumularia*, sp. *Tubularia indivisa*. [*Obelia geniculata*.] *Sertularia abietina*. [*Sertularia pumila*.] [*Filellum serpens*.] (*Chytia Johnstoni*.) (*Calycella syringa*.) (*Diphasia rosacea* ?.) (*Garveia nutans*.) (*Antennularia ramosa*.) (*Coryne*, sp.) (*Hydrallmania falcata*.)

POLYZOA.—*Pedicellina cernua*. *Fustra (fofiacea)*. *Fustra (securifrons)*. *Crisia (eburnea)*. (*Vesicularia spinosa*.) (*Amathia lendigera*.) (*Mucronella Peachii*.) (*Gemmellaria loricata*.) (*Cellaria sinuosa*.) (*Scrupocellarius scruposus*.) *Valteria uva*.) (*Eucratea chelata*.) (*Bugula plumosa*.) (*Bugula flabellata*.)



- BRACHIOPODA.—(*Terebratula*, sp.)  
 CHÆTOPODA.—[*Serpula pectinata*.] [*Sabella vesiculosa*.] *Hermione*, sp.  
*Ne reis*, sp.] [*Polynoe propinqua*.]  
 CRUSTACEA.—(*Hyas coarctatus*.) (*Portunus depurator*.) (*Ebalia Pennantii*.)  
 (*Pandalus annulicornis*.) (*Eurynome aspera*.) (*Balanus*, sp.)  
 PYCNOGONIDEA.—(*Ammothea lævis*.)  
 ECHINODERMATA.—(*Echinocyamus pusillus*—dead.) (*Ophiacantha*, sp.)  
 (*Ophioglypha albidula*.) (*Echinus sphaera*.) (*Spatangus purpureus*.)  
 MOLLUSCA.—(*Venus casina*.) (*Astarte sulcata*.) (*Aporrhais pes-pellicani*.)  
 (*Dentalium*, sp.—dead.)  
 TUNICATA.—[*Ascidia*, sp.] [*Ciona intestinalis*.] [*Aphidium elegans*.]  
 [*Lepidium*, sp.] [*Perophora Listeri*.] *Clavellina lepadiformis*.

This list is of course very far from being complete.

Some species I have been unable to identify with certainty, and in such cases I have given Mr. Hanna's names, or no specific name at all, or indicated my doubt by a note of interrogation.

No special comment is called for in the case of any of the above species: all are well known as occurring in British waters, and most, if not all, of them have been previously recorded from the same district.

C. HERBERT HURST, Dublin.

#### INSECTS.

**Wasps catching Flies on Cattle.**—On August 28th, about 1 P.M., I noticed a number of wasps buzzing about my cows, which were lying down quietly chewing the cud, and whisking their tails now and then in a lazy fashion to remove the flies. It was a field between two woods, and the cows were lying far away from any bank or hole likely to contain a wasp's nest. I could not therefore imagine what the wasps were doing—four to eight about each cow—and as the cows did not mind them in the least, it was evident that the wasps were not stinging them. Closer inspection revealed a most interesting sight. The wasps were all busy catching flies—darting quickly hither and thither along the cows' flanks—and pouncing with the rapidity of hawks after birds on the flies as they tried to settle or rest on some favorite part of the cow. One white cow drew more wasps than any of the others, because the moment a fly alighted it was seen at once against the skin. I do not think, however, that wasps can see very well—because one little black speck which looked like a fly (but was not) was pounced on by a disappointed wasp more than once. When a wasp catches a fly it immediately bites off both wings (this is the work of an instant)—sometimes a leg or two, and I believe occasionally the head. I saw some of the wasps when laden with one fly catch another—without letting go the first, and then fly away with both. They were coming and going as long as I watched—there was a constant stream of wasps carrying away flies—I suppose to feed the larvæ in their nests, and returning again to the cows to catch more. In about 20 minutes I estimate between 300 and 400 flies were caught, on two cows lying close to where I stood.

RICHD. M. BARRINGTON, Bray.

**Entomological Notes from N. E. Ireland.**—In a collection of insects made by the Rev. H. W. Lett, when a boy, in the neighbourhood of Clough, Co. Antrim, I found a specimen of *Carabus clathratus*. This appears to be the furthest N. E. record for this beetle. Mr. C. B. Moffat, who is preparing for publication the journals of the late Mr. A. G. More, found a note of the capture of *C. clathratus* by Rev. G. Robinson on Deer's Island, in Lough Neagh. Mr. Robinson frequently told me that he had taken *C. clathratus* at Tartaraghan, among turf. In fact the beetle seems particularly attached to turf, for all the captures that I am acquainted with have been made where there was turf, or bog suitable for turf.

The records given above are interesting, as showing the junction in the line of its distribution with its Scottish habitats. In Rev. H. W. Lett's collection were also *Blethisa multipunctata*, *Pelophila borealis*, *Chlænium nigricornis*, *Stomis puniceus*, *Amara spinipes*, *Silpha opaca*, a very narrow brown form of *Silpha subrotundata*, and *Barynotus obscurus*.

Both *Blethisa* and *Pelophila* thus like *C. clathratus* complete the line of connection with Scotland, though the former is by no means so northern a species as the latter. Mr. Lett had also some lepidoptera in his collection, of which I may mention the following:—*Chrysophanus phleas* var. *Schmidtii*, this is the only specimen of this form that I have seen in Ireland, and I do not know of any record of it from this country; *Cherocampa elpenor*, *Smerinthus populi*, *Saturnia pavonia*, *Apamea didyma* (a very black form), *A. basalis*, *Xylocampa lithorrhisa*, and *Hybernia progemmaria*.

I have two fresh localities for *Sirex gigas*—on July 22nd, a specimen was forwarded me from Caledon, Co. Tyrone, where it was found on a Larch, and two days later a specimen was found close to the glebe here, also on Larch. These captures would seem to indicate a spread of this Saw-fly in the country, a thing by no means to be desired, as it is very injurious to timber.

On June 6, I paid a short visit to Greencastle, on the Co. Down shore, opposite Greenore. I had only about half an hour to search for insects, and confined my attention to the beach, where I met with *Calathus fuscus*, *Amara fulva*, *Heterothops leinotata*, *Lathrobium tricolor*, and *Mecinus pyraeter*, also numbers of *Oliorrhynchus atroapterus*. *Lathrobium tricolor* also occurred at Omeath when I was there on June 25th. I have captured a few Hymenoptera here, among them being *Halictus rubicundus*, *Andrena cineraria*, *Bombus agrorum*, *B. lapidarius*, and *B. smithianus*; of this last I found a couple of very strong nests in my lawn when the hay was being cut. They were very fierce, and chased me a considerable distance when disturbed. This appears to be the first record of their occurrence in Ireland. *Megachile centuncularis* I captured in my garden on July 21st, in the act of cutting a piece out of a rose leaf. *Vespa norvegica* occurred on July 27th. *V. vulgaris* is not as plentiful as I had expected after the mild winter and spring, but there is quite a sufficient supply. Among the butterflies I have noticed a great abundance of *Pararge aegeria* here; it quite swarms in my garden, and abounds along the roads and lanes. I have seen a couple of *Vanessa atalanta*, but *V. urticae* has not been at all as plentiful as usual; possibly the torrential rains of last month had something to

do with its scarcity. I may mention that the larvæ of *Melitæa aurina*, which I mentioned in a former note (*I.N.*, vol. v., 190) duly pupated and emerged, giving me a very handsome series of this pretty butterfly, some being very dark.

W. F. JOHNSON, Acton Glebe, Poyntzpass.

#### MOLLUSCS.

**Marine Mollusca of Co. Galway.**—In April last, the following species were collected on the extensive strand between Bunowen and Slyne Head, Connemara, in addition to the many commoner ones that characterize the shell-sand of Roundstone (see *I.N.*, 1895, pp. 264-5). The shells have been kindly determined by Dr. Chaster.

*Actis minima*, Jeff.; *A. supranitida*; *A. unica*; *Scalaria communis*; *S. clathratuta*; *Homalogyra atomus*; *H. rota*; *Odostomia rissoides*; *O. nivosa*; *O. insculpta*; *O. diaphana*; *O. Warreni*; *O. nitidissima*; *Eulima incava*; *Cerithiopsis concatenata* (= *pulchella*, Jeff.); *Rissoa fulgida*; *R. obtusa* (= *soluta*, Jeff.); *Cyclostrema serpuloides*; *C. nitens*.

R. WELCH, Belfast.

**Mollusca of Cavan Excursion.**—Land and Freshwater Shells collected near Cavan, 10th to 13th July, 1896:—*Vitrina pellucida*, Kilmore graveyard; *Hyalinia cellaria*, Kilmore graveyard; *H. Draparnaudi*, Kilmore graveyard; *H. allaria*, Kilmore and Farnham woods; *H. fovea*, old quarry at Crossdoney; *H. crystallina*, Kilmore, on old mossy wall; *H. nitidula*, Kilmore graveyard; *Arion ater*, *Limax maximus*, *Agriolimax agrestis*, in woods and shore of lake near Killykeen; *Helix rotundata*, a few only under fallen trees in Farnham demesne, and at Crossdoney and Killykeen; *H. hispida*, *H. rufescens*, almost everywhere; *H. nemoralis*, Killykeen; *H. nemoralis* var. *interrupta*, Farnham demesne; *H. aspersa*, Trinity Abbey; *Cochlicopa lubrica*, everywhere in damp moss and under stones, Kilmore; *Pupa cylindræa*, everywhere on old mossy walls and on Beech trunks near Derrywinny bog, some very light-coloured specimens; *Vertigo pygmaea*, on fallen leaves in old quarry near Crossdoney, plentiful; *V. anti-vertigo*, on lake-shore, Killykeen; *Clausilia laminata*, common on Beech trunks in Farnham woods; *C. bidentata*, damp walls and old trees almost everywhere; *Succinea putris*, on shore of Trinity Island, and fine large specimens on small island near Killykeen; *Carychium minimum*, lake-shore near Killykeen, a few; *Limnaea stagnalis*, a few on causeway at Trinity Abbey; *L. peregra*, Trinity Abbey, and on lake-shore near Killykeen, and Lough Cuttragh; *L. palustris*, a few in rejaementa on Lough Oughter shore; *L. truncatula*, Lough Oughter, and in old quarry, Crossdoney; *Physa fontinalis*, locality not noted; *Planorbis vortex*, causeway at Trinity Abbey, very plentiful; *P. contortus*, *P. albus*, *P. fontanus*, Lough Cuttragh; *Bythinia tentaculata*, Trinity Island shore, and rejaementa at Killykeen; *Valvata piscinalis*, Trinity Island shore, and rejaementa at Killykeen; *Pisidium nitidum*, Trinity Island.

R. WELCH, Belfast.

## FISHES.

**The Shade Fish or Malgre (*Sciæna aquila*) on the Irish Coast.**—Mr. Thornhill, of Castle Bellingham, recently obtained a specimen of this rare fish in the salmon-nets, near Annagassan, in Dundalk Bay. He sent it in the first place to Messrs. Williams & Son, of Dame-street, to have it mounted for himself, but, at their suggestion, he has kindly presented it to the Dublin Museum, as there was no specimen of the species in the Natural History collection. It may be of interest to note that this is only the second record of this fish having been observed on the Irish coasts, a specimen having been once caught in the harbour of Cork. *Maigre*, the French name of the fish, is sometimes applied to it, and refers to the bloodless appearance of its flesh. It is a large fish, somewhat like a huge perch, and of great strength, the present specimen measuring over three feet in length, and weighing about 30 lbs. Its stomach, Mr. Williams tells me, was full of flat-fish.

The genus *Sciæna* has a very wide distribution, and though most of the species are marine, some of them inhabit the lakes and rivers of the United States. The fish known to Americans by the name of the Drum or Thunder-pumper on account of the peculiar noise it makes, is one of these. The Shade-fish has of all the species of *Sciæna* the widest range, since it has occurred at the Cape of Good Hope and on the south coast of Australia.

R. E. SCHARFF, Dublin.

## BIRDS.

**Quail In Co. Dublin.**—In the early part of June, this year, a Quail's nest was found in a meadow near Dundrum by some farm boys, who unfortunately managed to break all the eggs (ten in number) except one, which they gave to me. Messrs. Watkins and Doncaster identified the egg.

H. BULLOCK, Dundrum,

**The Wood-Sandpiper (*Totanus glareola*) In the Co. Wicklow.**—While out shooting on Calary bog (which is at least some half dozen miles from the sea) on the first of August, my dog sprang three birds of the sand-snipe appearance; not recognizing what they were, I emptied my choke barrel on one of them, and got him—the others were so wild that I could not mark them. On more careful examination I found the bird obtained to be the Wood-sandpiper, a bird as far as I can make out only once before recorded to have been shot in Ireland. Sunday being the following day I could not of course look out for the others, but was up on the spot at dawn on Monday morning, and had the luck to see and obtain another, which was by itself, its mate probably being shot in the interval, and doing service for a snipe to some fellow sportsman. The two birds are being preserved by Mr. Williams of Dame-street. If any reader could give me information of the distribution of this bird in Ireland I should feel much obliged.

ERNEST BLAKE KNOX, Bray.

**Occurrence of the Night Heron in County Cork.**—During a visit to my brother this summer, who was stationed near Kilworth for the manœuvres, I made the acquaintance of a gentleman who kindly presented me with the skin of an immature Night Heron (*Nycticorax griseus*). I regret to say he did not ascertain the sex after he had skinned it. It was obtained by him in March, 1894, not far from the town of Fermoy, as it was feeding in company with a Common Heron on the River Blackwater. My friend did not know what it was, and it was quite a chance that he had taken the trouble to preserve it.

C. B. HORSBRUGH.

#### GEOLOGY.

**Caves in Co. Leitrim.**—I have received from Mr. O. B. Maffett a description of a cave recently explored in Co. Leitrim. The cave is known as Phoula-Dingdong, and is situated on the slope of a hill "considerably above the level of Lough Gill, which is about half a mile away." The entrance, a passage thirty feet long, leads to a drop of forty feet, at the bottom of which is a talus of boulders and a small pool; from this chamber another passage runs for 300 feet. No invertebrates of any kind were observed by Mr. Maffett, but numerous bones of sheep and dogs, and the skeletons of a cow and a horse were found, and also part of a human skeleton which was supposed to be that of a woman who disappeared about 70 years ago.

Mr. Maffett informs me that there are unexplored caves at Glenaniff near Lough Melvin, and also at Ballinturbeck, near Bundoran.

H. LYSTER JAMESON, Killenchoole.

**The alleged Eurite of Lisnamandra, Co. Cavan.**—In the *Irish Naturalist* for August, 1896, pp. 195 and 197, I am responsible for the statement that a grey eurite occurs in juxtaposition to the Carboniferous series at Lisnamandra. My notes were sent to Mr. Praeger from the country, in the absence of the specimens which had been collected. On unpacking the latter, the "eurite" at once proves to be merely a compact grey limestone, perhaps baked by the igneous intrusion in the neighbourhood. So little of the rock, however, was exposed in the field, that it may be questioned if the mass is truly in place. Its relation to the sandstones certainly suggests a fault. I much regret the erroneous statement to which our hurried work in the field gave rise.

GRENVILLE A. J. COLE, Dublin. }

**The Longest Cave in the British Isles.**—John Naughton, of Harrogate, writes as follows:—"At a village within three and a-half miles of Westport, called Aglemore, there is a cave which is said to exceed two miles. This surpasses Mitchelstown cave. The Aglemore cave is well known in that part of Ireland. I cannot personally vouch for the accuracy of the length, but this I can at least say, that it is a most wonderful cave and well worth a visit."—*The Friend*, 24th July, 1896.

[Can any reader of the *I.N.* favour us with information?—EDS.]

## THE BOTANY OF A SCHOOL PLAYGROUND IN THE HEART OF DUBLIN.

BY REV. THOMAS B. GIBSON, A.M.

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PERHAPS no spot of earth could be considered less likely to interest the botanist than the playground of a boys' school in the heart of a city. And yet I have there found material for study in my leisure moments; so that, after eighteen years observations, I am disposed to show that even the most unlikely hunting-grounds may afford pleasure to the enthusiastic lover of nature's own process of carpeting. The school I speak of is that of the King's Hospital, more commonly known as the Bluecoat; and when I say that the playground lies midway between Guinness's brewery and Jameson's distillery, and is adjacent to the Royal Barracks, besides being bounded on all sides by high walls, I think I have said enough to show that, at any rate, this plot of ground has no unusual capabilities for the reception, or perfection, of floral treasures. It may be that some few of the plants I shall mention have been introduced through my own agency; for it has been my custom, whilst enjoying my summer holidays in the country, to gather the seeds of such wild flowers as pleased me, and to scatter these seeds in the playground, on my return. No attempt has ever been made, however, to *assist* any growth by cultivation or protection; and, therefore, though everything there may not be indigenous, everything is in a sense natural, or at any rate uncultivated. Of course, under the circumstances, there have been in these eighteen years changes of flora, and fluctuations of prosperity even in the plants that are permanent, but, all things considered, there is not much appreciable difference in the *general* character of the flora now to what it was in 1878. Therefore, I think I am justified in assuming that the careful observer will find it worth while to scrutinize even the waste spaces of the city, when he has no opportunity of going out into the country.

I might of course begin by an enumeration of the most plentiful species, and from that descend to notice the less numerous and robust inhabitants ; but, for purposes of classification, if not, indeed, as an aid to memory—writing as I do now, at a distance—it is, I think, well to follow the regular order of arrangement.

First then, of the Buttercup family there are to be found in more or less quantity *Ranunculus bulbosus*, *R. repens*, and *R. acris*, that is the Bulbous, Creeping, and Meadow Buttercups. I have also found *R. hirsutus*, but for the past two years it has not flowered, to my knowledge ; though, of course, it may have done so in my absence. The Green Hellebore (*H. viridis*) and *H. fetidus* are to be found there too ; but these I believe to have sprung from seed scattered there by myself. The Winter Aconite (*Eranthis hyemalis*) I planted ; but after two or three years it was crowded out, as I gave it no assistance. Columbine (*Aquilegia vulgaris*), of course, grows here and there ; but the garden being near, it may be recruited from that source ; and, indeed, it is, I think, doubtful if this be ever, in truth, a *wild* flower. The Common Poppy (*Papaver Rhæas*), is also to be found there ; and, for a couple of years, the Horned Poppy (*Glaucium flavum*), seeds of which I brought from Wicklow, maintained a precarious existence, without flowering. The Greater Celandine (*Chelidonium majus*) too, I introduced from the Zoological Gardens ; but its properties were too soon discovered by my pupils, who managed to get new boys to rub their eyes, after having besmeared their fingers with its juice, and thus brought about its banishment. The Fumitory, with its beautiful flowers, rose-coloured and tipped with purple, occasionally shows its head, especially if there be any waste top-dressing thrown out of the garden. Of *Cruciferae* it is always hard to say what is stray and what is indigenous ; but there is certainly no room for doubt that Shepherd's Purse (*Capsella Bursa-pastoris*) is of the latter character ; for it is here, there, and everywhere, encroaching even upon the cricket crease to the despair of those who nurse that spot carefully. The Ladies' Smock or Cuckoo Flower (*Cardamine pratensis*) is but an occasional visitor in plenty, and yet there have been few years that one flower stalk, at least, is not to be found ; but the

Hairy Bitter Cress (*C. hirsuta*) is more common, and less welcomed. The Common Hedge Mustard (*Sisymbrium officinale*) is there in force; and there, too, is the Garlic Mustard (*S. Alliaria*); though, on account of the dry nature of the soil, its leaves are seldom luxuriant. The White Mustard (*Sinapis alba*) and the Wild Mustard or Cherlock (*S. arvensis*) are always in evidence, as well as Rape (*Brassica Rapa*); but this may be from the refuse thrown out of my aviaries rather than that the plants are regular inhabitants. Of the Rocket family, *Reseda lutea* was introduced by me and still maintains an existence; though, unfortunately for its dispersal, it flowers *before* the summer holidays commence. The Dog-violet (*Viola sylvatica*) may now and then be seen to rear its head, though not for long; and three times have I found *V. arvensis* or Field Pansy; but alas, that I did show it. The Common Milkwort (*Polygala vulgaris*), too, is not unknown; and Soapwort (*Saponaria officinalis*), which I brought from the Dargle Road, has found a home in one of the corners, where it not only lives but also thrives. The Bladder Campion (*Silene inflata*) and the Sea Campion (*S. maritima*), though sometimes to be seen are, alas, only to be botanically denominated "common"; but the tiny Procumbent Pearl-wort (*Sagina procumbens*) is to be found on every wall, as well as infesting every path. Chickweed (*Stellaria media*) is to be found in every shady corner, I am thankful to say; for my birds never tire of it; and, though I have once, only, noticed a plant of Cathartic Flax (*Linum catharticum*), it then appeared at home and not a visitor. With regard to this I may say that I have never been in the place from the middle of June till the middle of August; and, so, many plants may have escaped my notice. I introduced the Common, Dwarf and Musk Mallows (*Malva sylvestris*, *M. rotundifolia*, *M. moschata*); and, with the exception of the last, they have indeed increased and multiplied exceedingly; so much so that were it not for the fact that the seeds are eaten by the pupils under the name of cheeses, nothing else would have room to grow at one side of the playground. Two species of St. John's-wort grow and flower; but the Tutsan (*Hypericum Androsæmum*) has not succeeded there, though I have sowed it more than once, and even intro-



duced a plant. *Geranium sanguineum* and the *Erodium*, or Stork's-bill, bloom profusely, having been introduced; but Herb Robert (*G. Robertianum*) and the Dove's Foot (*G. molle*) are older inhabitants than myself, while everywhere, even on the paths, the Common Balsam finds a home, till flowering time. The Wood-Sorrel (*Oxalis Acetosella*) grows, but only where I planted it. Trefoils and Medick (*Medicago lupulina*), however, abound on the sloping banks, with which the playground is surrounded; and Rest-Harrow (*Ononis arvensis*) has lately obtained a footing, through planting a root which had chanced to come up in gathering a spray on one of our Field Naturalists' excursions. I brought seeds of the Spotted Medick (*M. maculata*) from Bray, and of the White Melilot (*Melilotus alba*) from Wicklow; and these have at once located themselves and spread. The Purple and White Clovers (*Trifolium pratense* and *T. repens*), but especially the latter, grow luxuriantly; and the fact that we always have one or more nests of Wild Bees in the playground may have something to do with this luxuriance. *Lotus corniculatus*, too, spreads along the slopes, and one or two of the vetches, but, except during the holidays, no legumes ever show. The Silver-weed, or Goose-grass (*Potentilla Anserina*) is everywhere, though its fleshy roots are eaten with relish; and the Creeping Cinque-foil (*P. reptans*), as well as the Strawberry-leaved Cinque-foil (*P. fragariastrum*), can be discovered. Here also you can see the Common Tormentil (*P. Tormentilla*), and in a corner the Blackberry sometimes preserves its fruit till it is quite green. The Agrimony (*Agrimonia Eupatoria*) I have only once seen; though it grows quite freely on the esplanade ground of the Royal Barracks adjacent. Of Willow-herbs there are no less than three kinds; and the Evening Primrose (*Oenothera biennis*), though, of course, a garden escape, is quite a weed; while Enchanter's Nightshade (*Circæa lutetiana*) is a terrible nuisance, though not so much so as Knot-grass, which ousts even the grass from the middle of the playground, especially where an old fly-pole once stood. The *Cotyledon Umbilicus* has lately located itself in a corner, though how, or why, I know not, for I did not bring it there; but stone-crop has been near that same corner for many years. I planted some London Pride (*Saxifraga umbrosa*)

around the tennis pavilion some years ago, and, though the pavilion is gone, the *Saxifraga* remains, endeavouring to push its head between the Alexanders (*Smyrniium*), which love to congregate about a ruin. Here, too, a plant of Hemlock (*Conium maculatum*) grew this year, plainly distinguishable (though young) by its smooth and spotted stem; while Wild Parsley (*Anthriscus sylvestris*) and Gout-weed (*Agopodium Podagraria*), known as Bishop-weed, from the difficulty of uprooting it, are more plentiful than is desirable. Fool's Parsley (*Æthusa Cynapium*), too, with its peculiar bracts, abounds; and the Common Fennel (*Fœniculum officinale*), grown from seed, is now domesticated. A few plants of the Cow-Parsnip (*Heraclium Sphondylium*) and Wild Carrot (*Daucus Carota*)—remarkable for the sheathing-base of the leaves in the one, and for the central purple flower in the other—have been allowed, by me, to grow, though I have no desire that the stock should increase. The Golden Elder grows luxuriantly; but it, of course, I have planted, as an ornament to the playground, and I only refer to it as being a specimen of an order which could not otherwise have been represented. Ladies' Bed-straw (*Galium verum*) survives, because of its flowering-time, and *Galium Aparine* has an attachment to the place quite distinct from that with which it favours a pedestrian's trousers; but Sweet Woodruff (*Asperula odorata*) can scarcely be said to thrive, although there are, at least, two plants. Field Madder (*Sherardia arvensis*) I planted some years ago; and, though scarcely spreading, it is, at least, not declining. The Red Valerian (*Centranthus ruber*) grows upon a wall. Corn Salad (*Valerianella olitoria*) is certainly indigenous, for, in my garden, it is by no means encouraged, and yet it spreads amazingly. Both the Field and Small Scabious (*Scabiosa arvensis* and *S. succisa*) sometimes show; and a plant of *Jasione montana* has not only established itself but started a colony. Of the Chicory group I introduced the Yellow Goat's-beard (*Tragopogon pratensis*), Salsafy (*T. porrifolius*), and Wild Succory (*Cichorium Intybus*); and these have propagated themselves, unaided, for several years. But this *Compositæ* group is so involved, with Hawk-bits, Hawk's-beards and Hawk-weeds, that I shall not even attempt an enumeration, except to say that we have many

different species and all of them in a flourishing condition. The Dandelion (*Leontodon Taraxacum*) and Knapweed (*Centaurea nigra*) are, of course, ubiquitous; and the Burdock (*Arctium*), with the hooked scales of its involucre, affords infinite amusement when a boy with back-hair sufficiently long can be pounced upon unobserved. There are four species of Thistle, besides the Sow-thistle; but I have not studied the class very closely, and shall not specify. The Tansy (*Tanacetum officinale*), the Common Wormwood (*Artemisia Absinthium*) and Mugwort (*A. vulgaris*) are all to be found, especially the last, while even of the Common Cudweed (*Filago germanica*) I found a plant growing on the foot-paths. *Petasites fragrans* I introduced; and it has so grown that it is now nearly as plentiful as the *Tussilago*, which needed no introduction. The Groundsel (*Senecio vulgaris*) is naturally common; and we have four plants of Ragwort (*S. Jacobæ*), which seem to supply food for numerous broods of caterpillars of the Cinnabar Moth, as we are never without a swarm of these during the summer. Indeed with regard to Lepidoptera, I may mention in passing that the Ghost Moth, the Yellow Underwing, the Herald Moth, and the Grey Arches are very plentiful, while I have even caught the Humming-bird Hawk and Convolvulus Hawk Moths: and, on one occasion, viz., 11th February, 1885, I found such myriads of the Caterpillar of *Aplecta nebulosa*, that they had to be swept out of the yards and thrown on the ash-heap. Of Daisies we have, in plenty, not only the Common Daisy (*Bellis perennis*), but the White and Yellow Ox-eye (*Chrysanthemum Leucanthemum* and *C. segetum*), and a few plants of the Common Feverfew (*Matricaria inodora*), while Yarrow (*Achillea Millefolium*) is rampant throughout, and the Sneezewort (*Pulicaria dysenterica*) effecting an entrance. Both species of Periwinkle (*Vinca major* and *V. minor*) grow, having probably been planted or thrown out of the garden; and there are two species of Convolvulus, viz., *C. arvensis* and *C. sepium*, growing plentifully, besides another which has dark rose stripes down the petal. There is a plant of Comfrey (*Symphytum officinale*), a few of Borage (*Borago officinalis*), and two of Hound's-tongue (*Cynoglossum officinale*); but all these have grown from seed which I scattered, and may no more be

counted natives than the small Bugloss (*Lycopsis arvensis*), which sprung up on a heap of waste earth and died off in a year or so. A plant of the Common Bittersweet (*Solanum Dulcamara*) has found a home against one of the walls; and, for several years back, in one corner, the Black Nightshade (*S. nigrum*) has grown up, seeded, and died. Henbane (*Hyoscyamus niger*) I tried to introduce, but it never survived the winter, though why I know not, as I have found it growing in an old stable-yard near Kilkenny.

The Ivy-leaved Toad-flax (*Linaria Cymbalaria*) grows on every wall, and the Knotted Figwort (*Scrophularia nodosa*) perfumes every corner; but Yellow-rattle (*Rhinanthis Cristagalli*), Eye-bright (*Euphrasia officinalis*), and *Bartsia Odontites* barely survive, though long ago naturalized. The little Wall Speedwell (*Veronica arvensis*) and the Germander Speedwell (*V. Chamædrys*) are, however, plentiful, as is also the Great Mullein (*Verbascum Thapsus*), which springs up everywhere, though seldom allowed to flower, as boys love the flannel-like feel of the leaves. The Hemp Nettle (*Galeopsis Tetrahit*) and Self-Heal (*Prunella vulgaris*) are scattered all over the place, and Ground Ivy (*Glechoma hederacea*) grows in one corner. I brought a plant of Vervain (*Verbena officinalis*) from Bective Abbey some years ago; but it has never flowered and is growing smaller every day, though, as it grows plentifully at Old Connaught cross-roads, I don't see why it fails to grow. The Primrose (*Primula vulgaris*) is an introduction, but the tiny Scarlet Pimpernel (*Anagallis arvensis*) seems to flourish in being trampled on, for its petals expand, every fine day, along the very paths and walls. Of Plantains we have the Greater and Ribwort species (*Plantago major* and *P. lanceolata*), and each too abundantly; for, always and ever, they come up before the grass, after our winter games, and spoil the appearance of the cricket creases. The Goose-foot (*Chenopodium album*) and the *Atriplex* (Orache) have found a footing in the untrodden corners, while Docks, and Sorrel (*Rumex Acetosa*) and Knot-Grass (*Polygonum aviculare*) abound, as well as the Spotted Persicaria (*P. Persicaria*), and *P. Convolvulus* is only too plentiful. Of the genus *Euphorbia*, the Caper Spurge (*E. Lathyris*), having been sown in the garden, has spread to the

playground, but the Sun-Spurge (*E. Helioscopia*) is everywhere, despite of its being so often crushed to show the "milk." As for Dog's Mercury (*Mercurialis annua*) it springs up in every shady corner, and the Nettle is not unknown. The Wall Pellitory (*Parietaria officinalis*) too, with its curiously elastic filaments, causes great amusement; and one or two Orchids, now and then, appear spontaneously; though of those I have transplanted there scarcely one has ever flowered, whilst preserving life enough to throw up leaves. A few Wild Hyacinths (*Endymion nutans*) and Cuckoo Pints (*Arum maculatum*) have survived, out of many which I planted; but the flowers of the former grow less every year, and the latter have never flowered at all. Thus after many years observation I find that some specimens of nearly all the great Natural Orders spring up spontaneously, in most unlikely places, while others can be domiciled without any trouble; and even of those that require care to make them bloom profusely, it is possible to preserve the life, without unduly interfering to assist; for to do this would, I contend, remove them from the category of wild flowers altogether. If these remarks, from which all mention of grasses is excluded, induce anyone to take more interest in the plant-life—though it be but of the commonest—around him, I shall be satisfied.

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## NEW BOOKS ON BRITISH ZOOLOGY.

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**The Collector's Manual of British Land and Freshwater Shells.** By LIONEL E. ADAMS. 2nd Edition; pp. 214; pls. x.; 8vo. Leeds: Taylor Bros., 1891. Price, 8s. (with coloured plates, 10s.)

The aim of Mr. Adams' little book is to give a critical treatise on the British Land and Freshwater Mollusca, with concise descriptions and with an account of their habits. It contains also hints on the preservation and arrangement of shells, and, as stated on the title-page, it purports to furnish us with the names and descriptions of all the varieties and with synoptical tables showing the differences of species difficult of identification.

The only work with which this can at all be compared is that by Lovell Reeve published in 1863, and now out of print, and though it shows a very considerable advance on it in some respects, it falls short of it in others. For instance, there is hardly any synonymy given by Mr. Adams, nor is there any mention of the distribution of the British land and freshwater mollusca outside the British Islands. Then why should *Paludestrina ulva*, *Otina otis*, and the genera *Melampus* and *Alexia* be omitted, whilst *Paludestrina similis* and *P. ventrosa* are described in the work? They are all more or less brackish forms, and all their nearest relations are typical freshwater species.

It is to be regretted that Mr. Adams should have adopted the absurd custom of attaching Latin names to mere normal variations, whilst the system of bestowing varietal names should be carried out strictly in accordance to the law of priority. The variety *roscolabiata* of *Helix nemoralis* was described and named by Dr. Kobelt long before Mr. Taylor attached his name to it.

In many other cases foreign authorities have not been sufficiently consulted. Dr. Böttger, the highest authority on *Clausilia*, has pointed out that the so-called varieties *Everetti* (Miller) and *tumidula* (Jeffr.) of *Clausilia bidentata* are type forms of that species, whilst all British forms of the latter may be grouped under the three varieties, *gracilior*, *septemtrionalis*, and *exigua*, only one of which is referred to by our author. *Helix costata* and *Hyalinia contracta* are now almost universally looked upon as distinct species, and not as varieties of *H. pulchella* and *H. crystallina*. Of *Helix sericea*, which was identified as such from Yorkshire specimens sent by us to Drs. Böttger and Westerlund, there is no mention at all. The latter, moreover, thinks it very doubtful if the *Helix itala* of Linné (p. 83) can really be referred to *H. ericetorum*, and before making such a sweeping change in a well-known old name, the

opinion of the great modern Swedish conchological authority should be carefully considered. Even if we should not all agree with the propriety of Dr. Westerlund's applying the name of a distinct species (*H. lampra*) to the Aran Island form of *H. ericetorum*, some reference to it might have been made.

Although some of the figures, such as that of *Limnæa involuta*, are poor, they are on the whole satisfactory, and no one can help admiring the beautiful plate X. containing the *Pisidia*, a genus which is a sore trouble to the conchologist. It would have been well to place the figures of the shells of *Testacella haliotidea* and *T. Maugei* on plate II., instead of moving them to plate VII., where they are apt to be overlooked.

In speaking of the size of slugs (p. 2) it is misleading in the highest degree to say that they measure so many millimetres "from the nose to the extremity of the keel," since if slugs have an organ of smell at all, it certainly is not at the extreme anterior end of their body, whilst only few possess what may be called a keel.

Mr. Adams has in many ways made it easier for students to identify the British species of slugs, but it is doubtful whether any one could distinguish *Arion ater* from *A. minimus*, after reading the description on page 27. The latter cannot be at once identified, as Mr. Adams says it can, by its lateral bands, since it is more often without than with such; and *Arion ater* is certainly not without bands; during its youth, banded forms are the rule and bandless ones exceedingly rare.

Before we conclude our criticism of Mr. Adams' work, we should like to say a few words on the list of the "authenticated" records of the distribution of British land and freshwater mollusca given at the end. It appears that records are "authenticated" if the specimens have been seen by one out of the three following conchologists, viz., Mr. Taylor, Mr. Roebuck, and the late Mr. Ashford. Apparently such records as even those of the late Dr. Jeffreys would be rejected as *not authenticated*. The great merit of this system of authentication is supposed to lie in the uniformity of value which it gives to the records, but it is certain that there are many conchologists in the British Islands who are just as capable of identifying most of the British species as the gentlemen above mentioned. Would it not be a better plan in order to quickly arrive at the distribution of land and freshwater mollusca throughout the British Islands to enlarge the body of referees, and ask them to select a few of the critical species which should always be submitted to specialists before entering them as authenticated records?

A few defects and deficiencies in special parts of this work cannot, however, seriously detract from its value and importance. The print is excellent, and the book may be confidently recommended as the best existing collector's manual on the British land and freshwater mollusca.

R. F. S.

**British Butterflies, being a popular Handbook for young Students and Collectors.** By J. W. TUTT, F.R.S. London: George Gill and Sons, 1896. Pp. 469, plates 11, and 45 figures in text. Price 5s.

This work is an attempt to supply beginners in the study of our native butterflies with an introduction to the subject, which shall give due regard to recent work in morphology and classification. It cannot be denied that the books on British lepidoptera which issue in rapid succession from the press are, as a rule, too stereotyped in treatment, and too conservative in arrangement. Entomologists who wish to see the advance of their favourite science in these countries will be grateful to Mr. Tutt for having produced the present volume.

The author confesses in the preface that the book is "utterly inadequate as a finished manual." Nevertheless the beginner will find in it enough information to serve as a foundation for his studies. It is a pity that there is nothing of the nature of a bibliography to direct the student to original sources for more advanced study. There are chapters on egg-laying and eggs, caterpillars and how to obtain them, and chrysalids, which give a good general idea of lepidopterous development. We are glad to see that in writing of caterpillars, Mr. Tutt abandons the old, incorrect method of reckoning the head as a single segment and numbering the body-segments two, three, &c.; he adopts a nomenclature that shows the correspondence of the segments in the larval and perfect stages. It is a pity however that he should write "the horny biting jaws of the caterpillar give place to the spiral sucking tongue of the butterfly," in a connection which might lead the student to regard the two sets of organs as homologous; especially as he elsewhere states the correct homology of the sucking-tube of the imago with the rudimentary maxillæ of the larva. In describing the pupa, Mr. Tutt naturally draws largely on the recent important researches of Dr. Chapman, pointing out that, as development proceeds from lower lepidopterous families to higher, a greater number of pupal segments tend to become fused. We are surprised however that no acknowledgment to Dr. Chapman is to be found either in the text or in the preface. The paragraph on p. 47, in which the temperature-experiments, presumably of such investigators as Weismann, Merrifield and Standfuss, are referred to, seems to show that Mr. Tutt is apt to state too positively his opinions on points still under discussion.

There are short chapters on hybernation and æstivation, and on variation, but in the systematic part of the work much space is devoted to the description and naming of varieties and aberrations. There are the usual chapters on catching, setting, and preserving insects; we wish that Mr. Tutt had seen his way to recommend the abandonment of curved setting-boards. Very valuable is the chapter inculcating the careful labelling and recording of insects, and we hope Mr. Tutt's readers will take it to heart.



In the chapter on names and classification, Mr. Tutt makes the astonishing statement that "butterflies in common with all other insects have two names by which they are known all over the world." How devoutly soever we may wish this were true, it would perhaps be as correct to say that no two entomologists use the same two names for any species! Mr. Tutt, doubtless quite correctly, has followed Continental and American writers in breaking up several of our old genera, such as *Vanessa*, *Lycæna*, and *Thecla*; as he points out, it is wrong to continue to "lump" species—however few—under the same generic name when they really deserve separation. But alas for uniformity in nomenclature! Mr. W. F. Kirby<sup>1</sup> has recently published a popular book dealing with the same question, and here is a comparison of the nomenclatures of the British Lycænidæ as given by these two authorities:—

TUTT.	KIRBY.
<i>Chrysophanus.</i>	<i>Lycæna.</i>
<i>dispar.</i>	<i>dispar.</i>
<i>phleas.</i>	<i>phleas.</i>
<i>Lycæna.</i>	<i>Nomiades.</i>
<i>arion.</i>	<i>arion.</i>
<i>Nomiades.</i>	<i>semiargus.</i>
<i>semiargus</i>	<i>Zizera.</i>
<i>Cupido.</i>	<i>minima.</i>
<i>minima.</i>	<i>Polyommatus.</i>
<i>Polyommatus.</i>	<i>corydon.</i>
<i>corydon.</i>	<i>thetis.</i>
<i>bellargus.</i>	<i>icarus.</i>
<i>icarus.</i>	<i>alexis</i>
<i>astrarche.</i>	<i>Plebeius.</i>
<i>Plebeius.</i>	<i>argus.</i>
<i>ægon.</i>	<i>Cupido.</i>
<i>Everes.</i>	<i>argiades.</i>
<i>argiades.</i>	<i>Cyaniris.</i>
<i>Cyaniris.</i>	<i>argiolus.</i>
<i>argiolus.</i>	<i>Lampides.</i>
<i>Lampides.</i>	<i>beticus.</i>
<i>betica.</i>	<i>Callophrys.</i>
<i>Callophrys.</i>	<i>rubi.</i>
<i>rubi.</i>	<i>Zephyrus.</i>
<i>Zephyrus.</i>	<i>quercus.</i>
<i>quercus.</i>	<i>betulæ.</i>
<i>betulæ.</i>	<i>Thecla.</i>
<i>Thecla.</i>	<i>w-album.</i>
<i>w-album.</i>	<i>pruni.</i>
<i>pruni.</i>	

<sup>1</sup> A Handbook to the Order Lepidoptera (Allen's Naturalists' Library.)

It will be seen that out of the eighteen British species in this family Messrs. Kirby and Tutt are in agreement only as to the names of ten. Whether *Lycæna* belongs to the "Large Copper" or the "Large Blue" is a matter of perfect indifference; but this uncertainty in nomenclature will be used as an excuse by many conservatively-disposed naturalists for holding to the old familiar names. It is the more deplorable since, except in one instance, the two authorities are in entire agreement as to the generic divisions.

In the systematic part of the work, Mr. Tutt arranges the families in a somewhat new sequence. The *Hesperiidæ*—undoubtedly the lowest group—naturally come first, and the *Satyridæ* are placed at the top. The *Lycenidæ* which, in Bates' scheme, come between the *Pieridæ* and *Lemonidæ* on account of the normal development of all three pairs of legs, are inserted by Mr. Tutt immediately after the *Hesperiidæ*, so that the *Nymphalidæ* may follow the *Pieridæ*, these two last families showing much similarity in pupal structure. It is doubtful if Mr. Tutt's removal of *Aptura iris* from the *Nymphalidæ* to the *Satyridæ* will meet with general acceptance. He points out that the caterpillar shows satyrid affinities, but it must be remembered that the larval stage in all lepidoptera must have undergone much adaptive modification.

In spite of a tirade against the use of English names for species, Mr. Tutt heads his chapters with such titles as "Coppers, Blues, and Hair-streaks," "Swallow-tails, Whites, and Clouded Yellows." A decided flaw in these descriptive chapters is the want in several instances of definite diagnoses of the genera; the fact that many of the genera used are new to most British lepidopterists should have made their justification specially desirable. We could better have spared the long lists of named aberrations and varieties; and with respect to these, nothing but confusion to the student can result from Mr. Tutt's frequent plan of giving a list of several varietal forms, and then, after a paragraph of general remarks, another list with a new series of numbers. The treatment of *Colias edusa* on p. 259 is a case in point.

The egg, larva, and pupa of each species are described in detail. Irish naturalists will be glad to know that one of their most isolated brethren, Mr. J. J. Wolfe, of Skibbereen, has been able to supply Mr. Tutt with valuable information on the transformation of several species of butterfly. The time of appearance of each insect is, of course, given, and a set of valuable tables indicate the months occupied by the various stages of the life-cycle of each species, together with the food-plants and method of pupation. The distributional notes are in many cases imperfect. We miss such recent Irish records as Mr. Dillon's captures of *Argynnis adippe* and *Polyommatus astrarche* var. *artaxerxes* at Clonbrock. And the statement that *Vanessa polychloros* haunts the "outskirts of woods" will not help the student who wishes to trace its British range.

We can heartily endorse the author's praise of the plates drawn by Mr. W. A. Pearce, and excellently reproduced. The figures are far more life-like than many coloured representations of insects. It is irritating

to find eight pages of press-notices of Mr. Tutt's other works on natural history inserted between the explanation of the plates and the plates themselves. We hope that a new edition of the book will speedily be called for, when these advertisements may be relegated to their proper place at the extreme end of the volume.

G. H. C.

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**A Handbook of British Lepidoptera.** By EDWARD MEYRICK, B.A., F.Z.S., F.E.S. Pp. 843. London: Macmillan & Co., 1895. Price 10s. nett.

Pressure on our space has prevented earlier notice of this book, which, like Mr. Tutt's, presents the British lepidoptera to the student in a new light. But, instead of being confined to the butterflies only, it deals with all the British species of the order, and consequently comes before us as a claimant to the place on our bookshelves long occupied by Stainton's time-honoured "Manual."

That the arrangement adopted by Mr. Meyrick is revolutionary will be inferred when we state that he places the *Arctiidae*, or Tiger-moths, at the head of the series, and inserts the butterflies in the middle of his system, between the *Lasiocampidae*, or Eggar-moths, and the Pyralids. The families of the old "Bombyces"—such as the cossids, hepialids, sesiids, &c., which are now well known to be closely related to the so-called "Microlepidoptera"—are, as might be expected, to be found in the place required by their true affinities. It seems to us, however, that the removal of the butterflies from the headship of the lepidoptera is not warranted, when we consider the very great specialisation of their most elaborated members; while other eminent students of the order do not consider the *Arctiidae* an extremely highly developed family.

The families, genera, and species are differentiated by the help of tables, and there are phylogenies of the tribes, genera, and families. Though quite in sympathy with Mr. Meyrick's desire to present the subject in the light of the doctrine of descent, we question the wisdom of genealogies which seem to indicate that existing genera of insects are the direct descendants of other existing genera.

In his definition of genera Mr. Meyrick is inclined to rely too exclusively on isolated characters, especially those drawn from wing-neuration, and the result is often a cumbersome assembly of species. We believe, however, that wing-neuration, being probably little affected by adaptive modification, is a safe guide to family relationships. The separation of the Coppers and Blues by Mr. Meyrick into only two genera, on the character of the eyes being hairy or glabrous, results in a most curious division of the insects, and we should not envy the naturalist who endeavoured to apply this method to the classification of the *Lycanida* of the world. We much regret to see that in the nomenclature of his genera, Mr. Meyrick

has disinterred a number of Hübner's names published without descriptions, and substituted them for names familiar to entomologists for the last half century. And the superseded names are not even given as synonyms; the student, for instance, will not find *Cidaria* or *Eupithecia* in the index.

The descriptions of the species are naturally very condensed, but most of them give the salient points of the insect. The references to caterpillars and pupæ are, as a rule, meagre. The range of each insect is briefly indicated, but, so far as regards Irish localities, we can only marvel exceedingly whence Mr. Meyrick derived his information. In the preface he tells us that the records were tabulated for him by a lady from "various entomological periodicals" and "reliable private correspondents." A few instances will suffice. *Hylophila bicolorana* is said to be found "E. and W. Ireland—not uncommon"; according to the recent list of Mr. Kane, who certainly knows the Irish moths better than any other living naturalist, the species is unknown in Ireland. *Halias prasinana* is given as "N. and E. Ireland—common"; it ranges into the extreme south-western county of Kerry. *Gnophria rubricollis* appears as "N. and W. Ireland—common"; it has not been found north of counties Dublin and Galway, and, though widespread, is certainly not common. *Lithosia complana*—"N. and E. Ireland—local"; ranges round the coast from Derry to Cork. Mr. R. E. Dillon's Clonbrock records are omitted, but Mr. Meyrick tells us in the preface that all omissions are intentional, and imply disbelief. We cannot think that such misstatements as we have instanced are also intentional, but errors in matters of fact, so easily verifiable, tend to shake confidence in Mr. Meyrick's opinions on other matters in which the difficulty in arriving at correct conclusions is much greater.

The only illustrations are good figures of the wing-neuration, more rarely of other structural characters, in the various genera. It is satisfactory that the attention of the student should be so largely directed to the structure of moths, for collectors of the lepidoptera are too prone to think only of comparing wing-patterns when identifying their insects. In spite of its defects, Mr. Meyrick's work will be welcomed as a real attempt to describe, in brief compass, the whole of our native lepidoptera in the light of modern knowledge.

G. H. C.

## THE ISLAND-FLORA OF THE CONNEMARA LAKES.

BY R. LLOYD PRAEGER, B.E.

MANY of the Connemara lakes have in them rocky islets, and most of these are thickly covered with shrubs and stunted trees, in one or two spots undoubtedly planted, but usually indigenous—the only native arboreal vegetation, excepting an odd bush on the mountain-cliffs, that I have observed in Connemara. Lying between Roundstone and Clifden is an enormous stretch of bog and rock, so intersected with winding lakelets that without a map one might spend a day in trying to find one's way out of the labyrinth. Here, miles from any road, house, or field, the islands contain a strictly indigenous flora, not easy to investigate, as there are no boats. Wishing to see what plants grew on these islets, my friend Frank M'Cormick and I left Roundstone one grey, chilly August day, and drove to Craigga More Lough, long famous as the head-quarters of that very rare heath, *Erica Mackaiana*, Bab. Here it grows in great abundance. Last year it was in full flower when I visited the place on July 17; this year, a remarkably early season, it was still blossoming in great profusion on August 22, so that its flowering period does not appear to be very restricted. In Craigga More there are several islets, thickly covered with low, tangled scrub. The intervening water is not more than waist-deep, so in discarding our clothes we were able to retain our jackets, for the sake of warmth, while boots and stockings were also retained, to ward off brambles. These, with the addition of vasculum and stick, made a cool and business-like costume. We waded the lake, through reefs of rock, great boulders, and muddy patches, green with a luxuriant growth of *Eriocaulon* and *Lobelia*, and visited the islets. The vegetation was limited in variety, but interesting. The Yew was the prevailing species. With it grew the Mountain Ash, not more than three or four feet high, but spreading widely, and gloriously covered with scarlet berries. The Juniper was also present, and the Dwarf Gorse (*Ulex gallii*) in full bloom. Stunted Hollies grew here and there, and bushes of Bog Myrtle. The Bear-Berry (*Arctostaphylos Uva-ursi*)

spread luxuriantly among the Heather and Ling, as did also the Ivy. In a sheltered nook *Erica Mackaiana* was gathered with stems three feet in length and abundance of flower. The Cow-wheat (*Melampyrum pratense*) grew among the tangle, and one bramble, its fruit already ripe: The Royal Fern, Broad Buckler Fern, and Common Polypody represented the order *Filices*.

From Craigga More we pushed southward several miles across the bog to Lough Bollard, following a very devious course, on account of the network of lakelets that intervene. Lough Bollard is a comparatively large lake—perhaps a mile across—and is very deep, with a number of high, rocky islets. This was a plain case of swimming, so, with a costume consisting of one vasculum between us, we explored island after island, with plenty of swimming between-times. The wind had risen, covering the surface of the lake with a nasty jabble, and it was raining heavily, so that we found the deep water to the lee of the islands the warmest and most comfortable place. The rocky sides, thoroughly glaciated, rose out of deep water so steeply and smoothly that landing was often impracticable. We found that the flora of these islands was almost exactly similar to that of the ones previously explored, with the addition of a few very common plants, including the Nettle, which does not often grow in a spot so thoroughly wild. The trees along the eastern margin rise to a height of 20 feet or more, and slope down almost to water-level on the exposed western side. A visit to an adjoining habitat of the Maiden-hair, a tramp up a valley filled with the rare *Erica mediterranea*, now completely out of flower, and a climb over the mountain of Urrisbeg in thick, driving mist, brought us back to Roundstone, and concluded an interesting and particularly aqueous day.

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## ADDITIONS TO THE LIST OF IRISH ACULEATE HYMENOPTERA.

BY PERCY E. FREKE.

THE collecting season for Aculeate Hymenoptera being now practically over for this year, it may be well to sum up the results in a list supplementary to mine published last year. I regret that the records which have come to my knowledge are very few indeed.

- Halictus punctatissimus**, Schenck.—Borris, co. Carlow. Freke.  
**Andrena rosea**, Panz. (not var. *trimmerana*).—Borris, co. Carlow. Freke.  
**Megachile maritima**, Kirby—Lambay and Killiney, co. Dublin. Cuthbert.  
**Ceolioxys acuminata**, Nyl.—Armagh. Rev. W. F. Johnson.  
**Psithyrus quadricolor**, Lep.—Borris, co. Carlow. Freke.  
**Bombus smithianus**, White—Poyntzpass, co. Armagh. Rev. W. F. Johnson.  
**Bombus soroensis**, Fabr.—Mullinure, co. Armagh. Rev. W. F. Johnson.

I have also taken here at Borris a female of *Bombus hortorum* agreeing in coloration with var. *subterraneus*, Auct., the only variation from the *hortorum* type that I have yet met with in Ireland.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include three Bleeding-heart Pigeons from J. F. D'Arcy, Esq.; a Badger from J. F. Shackleton, Esq.; three Japanese longtailed fowl, a goat, and three Spinning Mice from J. B. O'Callaghan, Esq.; a Parrot from D. P. C. Smyly; two Otters and a Gannet from W. R. Joynt, Esq.; four Guinea-pigs from Col. Plunkett; ten Guinea-pigs from Messrs. J. and W. Robertson. Four Lemurs, two Squirrel-monkeys, and a Gapuchin have been purchased.

12,330 persons visited the Gardens in September.

## BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 12.—The GEOLOGICAL SECTION on their last formal excursion for this season went to Kilroot, studying the sections of Trias with abundant veins of gypsum, relics of the great lakes whose rock-salt is so invaluable in the present day. A walk along the coast gave plenty of time to ransack the Cretaceous rocks about Whitehead, where abundant sponges and other characteristic fossils were obtained. An informal meeting was held after tea, during which it was suggested that at the monthly meetings in the museum small field excursions should from time to time be organised.

SEPTEMBER 30.—The GEOLOGICAL SECTION met. Mr. F. W. Lockwood in the chair. A small collection of fossils, recently gathered in a chalk-pit in Kent, were shown by the secretary. Boulder clay deposits at Dromore and on Black Mountain, recently visited by members of the section, were described, in each of which two clays, differing in colour and texture, as well as in the nature of their stony contents, were observed. At Dromore the usual red boulder clay overlies a very tough blue clay, which rests upon beautifully smoothed Ordovician rocks. At Black Mountain the lower stratum is brown, similarly overlaid with red clay. In both places the lower deposit is tough, and well filled with beautifully glaciated stones. A letter from Mr. Kilroe, of the Geological Survey, having been read, arrangements for the expedition to Marino on the 10th inst. terminated the meeting.

OCTOBER 10.—In spite of somewhat inclement weather, a small geological party visited the Triassic and Carboniferous beds at Cultra. After inspecting the well-known fault on the shore which has brought up the Carboniferous rocks on a level with Triassic beds, the ardour of the geologists was rewarded by the acquisition of some good specimens of *Mediola Macadami* and scales of *Holoptychius Portlockii*.

## DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 26.—WOODLANDS.—The Club held the last excursion of the season. The 1.0 o'clock tram was taken to Lucan, and some hours were busily spent in collecting fungi. The larger sorts, such as agarics and *Boleti*, were almost over, but a good harvest was obtained among the smaller forms. Tea at Lucan was followed by an hour's exhibition of the specimens collected, and a demonstration by Mr. Greenwood Pim and Dr. E. J. M'Weeney, who will report in due course on the rarer species gathered.



## NOTES.

## BOTANY.

## MUSCINEÆ.

**Moss Exchange Club.**—A proposal was made in *Science Gossip* for December, 1895, and in the *Irish Naturalist* and *Journal of Botany* for February, 1896, by Rev. C. H. Waddell to organise a Club on the lines of the Botanical and Watson Exchange Clubs, for the exchange of Mosses and Hepaticæ. The response proved that the want of such a Society was widely felt, and it has now been got into working order. Twenty-two members have joined, and the parcels sent in for the first distribution will soon be distributed. It has not been possible this term to do more than exchange the plants sent in. In future it is hoped to obtain the assistance of referees to name doubtful and difficult plants, also to publish lists and an annual Report. Its object is to help beginners in the study of these lowly but interesting forms of vegetation, as well as to prove a means of communication and help to more advanced students. In this way it may prove instrumental in preparing the way for the publication of a new edition of the London Catalogue of British Mosses and Hepaticæ, the want of which is a serious hindrance to the advance of Bryology in this country.

## PHANEROGAMS.

***Alchemilla vulgaris* L. and its segregates.**—Very little progress has been made as yet in our knowledge of the distribution of the *Alchemilla vulgaris* group in Ireland. The restricted form which is regarded as the type of this aggregate species extends in Great Britain from the south coast to the Orkneys, occurring in numerous counties; in Ireland the counties from which I have seen specimens are three, Westmeath, Clare, and Antrim. It appears to be very scarce in the latter county, where Mr. S. A. Stewart informs me the other two forms are frequent. The subglabrous plant *A. alpestris*, Schmidt, occurs in Antrim, and near L. Salt, Donegal; I have several notes of its occurrence in the former county; and it must be found in many others, since it ranges in Great Britain from Cardigan and Derby (not to mention Sussex, for fear of some mistake in the label of the specimen which professedly comes from that county) northwards to Inverness and Mull. The other British form, *A. filiculis*, Buser, is known to me from Co. Waterford, Co. Cork (twice seen from Fermoy), Kerry, and Antrim. In Great Britain this has been noted for many counties from the south coast northwards to Perthshire. The distribution of *A. vulgaris* forms, it will be seen, is very imperfectly known as yet for Ireland; and I shall be pleased to have specimens sent me, on loan or otherwise, which may aid in extending the range of any of the segregates.

EDWARD F. LINTON, Crymlyn, Bournemouth.

**Crithmum maritimum in County Down.**—Until this year no station in the north-east of Ireland could be certainly assigned to the Samphire, though there have been several verbal reports of its occurrence. Most of these referred to *Salicornia*, which is often called Samphire, and none were based on actual specimens or other sufficient authority. Late, in preface to "*Flora Belfastiensis*," referred to such reports and rejected them as unreliable, and Dr. Dickie, in "*Flora of Ulster*," could only cite Donegal localities. The authors of "*Cybele Hibernica*," in 1866, included this species amongst the plants of district 12, but inasmuch as no specific locality in Down, Antrim, or Derry was given, their reference was too vague to be accepted. It is a plant to be expected on the rocky coasts of Down and Antrim, but though these shores have been closely scrutinised from the time of Templeton until now, a period of over a century, it seems to have escaped detection. I have, therefore, much pleasure in recording its occurrence in Co. Down, having seen a specimen freshly gathered by Mr. Samuel Moore, a member of the Belfast Naturalists' Field Club. The locality is Kearney Point, in the Ards, the most easterly point in Ireland. Mr. Moore informs me that he saw only one clump of the Samphire. It was situated so low that at high water it must be almost submerged. Since writing the foregoing, Mr. P. F. Gulbransen, another member of the Belfast Naturalists' Field Club, has informed me of a second station for the Samphire in County Down. This has come still more as a surprise, the locality being not far from Bangor, on a shore which for botanical purposes was thought to be exhausted long since. Mr. Gulbransen stated that a few plants occur clustered together in one spot, and availing myself of his directions I have seen them in the place indicated. There is one little clump of about five roots growing with other maritime species in a crevice of the uptilted Lower Silurian Slates, and just about the high water mark of spring tides. A careful and protracted, but fruitless search proved that the plant has not spread beyond this one spot.

S. A. STEWART, Belfast.

**Stachys Betonica in Co. Antrim.**—Rev. S. A. Brennan has sent me a specimen of this plant, gathered in July near Whitehall, Broughshane, Co. Antrim. He writes that the plant was growing on a roadside, no house near it, and had all the appearance of being native. The Betony is very rare in Ireland, and though previously recorded from Co. Antrim it has not been seen in the county for half a century, so that Mr. Brennan's find is important.

R. LLOYD PRÆGER.

**Limosella aquatica in Clare.**—A few weeks ago, while searching for *Adiantum Capillus-Veneris* on the limestone pavements about four miles from Lisdoonvarna, I found this interesting plant growing in hollows in the rock in which mud had deposited. The only other note of its occurrence in Ireland is that of Mr. Levinge, who records it as found by Mr. O'Kelly in Inchiquin Lough, Co. Clare, and near Gort, Co. Galway (*Journ. Bot.*, xxxi. (1893), p. 309). The specimens, which were in full fruit, were kindly identified for me by Mr. Præger.

GREENWOOD PIM, Monkstown, Dublin.

**Donegal Plants.**—In the *Journal of Botany* for September, Mr. H. C. Hart records *Cuscuta Epithymum*, *Galium Mollugo*, and *Reseda suffruticosa* from the vicinity of Rosapenna Hotel, and *Cochlearia granlandica* from several headlands of north-west Rossgull.

**Medicago sylvestris in Scotland.**—With reference to my paper in last number on the occurrence of this plant in Ireland, it is worth giving prominence to the fact that at a meeting of the Natural History Society of Glasgow, held on Sept. 30, specimens of *M. sylvestris* from Heads of Ayr, Maybole parish, were exhibited on behalf of Mr. Andrew Gilchrist and Rev. D. Landsborough, who found the plant growing there abundantly in August last. I have to thank Mr. A. Somerville, B.Sc., for a copy of a local paper containing a report of the meeting.

R. LLOYD PRAGER.

**Matricaria discoidea DC. at Howth.**—This curious rayless *Matricaria*, whose occurrence in several stations in Co. Dublin has lately been recorded by Mr. Colgan (*J. N.*, III., 215, 1894), has now made its appearance at Howth, where I observed it on Sept. 18 growing on waste ground by the new road between the police station and the chapel. *M. discoidea* has not yet been observed in any other Irish county: it is a native of North America, now naturalized in several countries of Northern Europe, though as yet very rare in Britain.

R. LLOYD PRAGER.

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## ZOOLOGY.

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### HYDROZOA.

**British Hydroids and Medusæ.**—Readers of Mr. E. T. Browne's list of the Medusæ of Valentia harbour in the July number of the *Irish Naturalist* will turn with interest to his paper "On British Hydroids and Medusæ" in *Proc. Zool. Soc. Lond.* (pp. 459-500, pls. xvi., xvii.), in which several of the Irish forms are described in detail and figured.

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### CRUSTACEA.

**Free-swimming Copepoda from the West Coast of Ireland.**—Under this title, Mr. J. C. Thompson contributes to the *Trans. Biol. Soc. Liverpool* (vol. x., pp. 92-102) an account of the copepods collected at Valentia Island by Mr. E. T. Browne by tow-netting. Twenty-two species are recorded, of which the most noteworthy are *Metridia armata*, *Candace pectinata*, *Pseudocalanus armatus*, *Monstrilla rigida*, *Corycaeus speciosus*, and *Oncaea mediterranea*. The two last are of special interest as distinctly southern forms. The *Oncaea* has occurred at Plymouth, but the *Corycaeus* appear new to British waters. Mr. Thompson also gives a list of the copepods taken on the west coast of Ireland by Prof. Herdman in the "Argo" in 1890.

## SPIDERS.

**Spider carrying Snail-shell.**—On the warren near the sea here, one day several years ago, an object attracted my attention: something white moving along rather quickly. Looking closely I found that the object was a small bleached snail-shell (*Helix virgata*) which a large spider was carrying along underneath its body; supporting it by means of some of its fore-legs at one side, and hind legs at the other as it went. For the purpose of closer examination I deprived it of its burden, and found that the shell was packed with what appeared to be spiders' eggs. On placing the shell on the ground again near the spider, it took it up and walked off as before; going at good speed considering the weight of its burden and the limited number of legs at its disposal for walking purposes. That some kinds of spiders carry their eggs about enclosed in soft silky cocoons is a well-known fact, but I have never heard of a shell being so used before.

FRANCES SARAH O'CONNOR, Ballycastle, Antrim.

## BIRDS.

**Birds of Connemara.**—As I do not see the *Irish Naturalist* regularly, Mr. Palmer's note in the March number referring to my article on the Birds of Connemara in the January number was not read by me until a little while ago, when my attention was drawn to it. I must therefore apologise to Mr. Palmer for not having answered his questions before. With regard to Mr. Palmer's first point, viz.:—whether it was the Dunlin or the Ringed Plover which I saw on the islands of Lough Corrib, I may say that I am perfectly satisfied that the birds were Dunlin (*Tringa alpina*). I quote my diary:—"May 20, 1895. Saw a number of Dunlin and noticed that they sang really nicely. Very short, but somewhat like a lark." I don't remember seeing the Ringed Plover, and have no note of it, but I certainly could not have confounded the two birds as I know both of them perfectly; moreover they are not easily confounded.

With regard to the Black Guillemots nesting amongst the boulders, I felt sure at the time that this was the case, and I now find that several authorities mention it as a fact.

Mr. Palmer's third point refers to the nesting habits of the Oyster-catcher. Of course it is well known that Oyster-catchers will nest on turf and rock where no shingle can be found, but I have never before seen the eggs in such a position when there was plenty of shingle available. Mr. Palmer's suggestion as to the cause of this peculiar habit is interesting, and is, perhaps, the correct solution. He says that "West of Ireland Oyster-catchers may have found that it is not always safe to nest on the shingle within possible reach of an unusually high Atlantic wave."

HARRY F. WITHERBY, Blackheath, Kent.

**Quail In Co. Down.**—A correspondent of the *Field* (Sept. 8th) records the nesting of the Quail at Seaford, co. Down.

**FIELD CLUB NEWS.**

We have to congratulate Rev. C. H. Waddell, Vice-President of the Belfast Club, on his successful establishment of an Exchange Club for British mosses and hepatics, some particulars respecting which will be found in our Botanical Notes.

The Belfast Club was recently honoured with a visit from its founder in 1863, Ralph Tate, then a science teacher under the South Kensington Department, now Professor of Natural History in the University of Adelaide, Director of the Museum there, and the foremost naturalist in Australasia. He received a cordial welcome from the veteran members of the Club—S. A. Stewart, William Gray, William Swanston, W. H. Phillips, and others—and delighted them with the freshness of his recollections of the old days when they laid the foundation of the first Irish Field Club.

It is pleasant to note the interchange of courtesies by which members of the Metropolitan Field Club were invited to take part in the Belfast Club Conversazione on 27th October, and members of the northern and southern Clubs to take part in the conversazione of the Dublin Club on 10th November. A goodly party of members from Dublin attended the Belfast meeting, and no doubt the compliment will be returned at the forthcoming meeting in Dublin. Both will be reported in our next issue.

It is a good sign to find our younger Field Club members appreciating the value of a scientific training in natural history work. H. Lyster Jameson, of the Dublin Club, having gained a studentship in the Royal College of Science, has gone to London for a six months course of biological study. Miss Knowles, of the Belfast Club, has come to Dublin for a special course on Algæ under Prof. Johnson. H. J. Seymour, of the Dublin Naturalists' Field Club, who goes to Belfast to study engineering at Queen's College under Prof. Fitzgerald, will be an acquisition to the Geological Section of the Belfast Field Club.

We much regret to learn that the expedition organized by the Royal Society, under the leadership of Prof. Sollas, to make a deep boring into a coral atoll, has failed to fulfil its main object. The island of Funafuti was selected as the scene of work, and it was found that at about 70 feet below the surface further boring became impossible, as a material like quicksand, which choked the borehole, containing great boulders of coral-rock, was reached. So far as the reef was pierced it appeared to be "a vast coarse sponge of coral, with wide interstices either empty or sand-filled." Prof. Sollas and his companions however made numerous highly interesting and valuable hydrographical, ethnological, and biological observations, and though the failure to solve one of the most burning scientific problems of the day will cause general disappointment, it is satisfactory to know that our knowledge of man and nature has been largely increased by the labours of our Dublin professor and his colleagues.

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## ON THE FLORA OF THE OX MOUNTAINS, CO. SLIGO.

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

TOWARDS the middle of July last, after a few days spent in botanizing along the cliffs of Ben Bulben, it occurred to my friend the Rev. C. F. d'Arcy and myself that the remainder of our holiday in Sligo might be most profitably given up to a survey of the Ox Mountains. Whether viewed across the bay from the plateau of Ben Bulben or studied in its representation on the one-inch Ordnance maps, this line of mountains appeared to us anything but promising. Its elevation was too small and its contours too gentle to warrant any strong hopes that it would prove rich in alpine species. But we knew that it was almost virgin soil to the botanist, and that however poor the flora might appear on close examination, it could hardly fail to afford materials for an interesting comparison with the exceptionally rich district we were about to leave behind us.

We broke up from our very pleasant quarters in a farmhouse by the waterfall in Glencar, on Monday, the 13th July, *en route* for the Ox Mountains. Sending on our baggage by road we took boat across Glencar lake, climbed the range forming the southern boundary of the glen, and descended to Sligo early the same evening. On our way we made a rather careful examination of this southern mountain flank of Glencar, as it appeared to us to lie outside the limits of the Ben Bulben district proper so thoroughly explored by Messrs. Barrington and Vowell in 1884 <sup>(1)</sup>. Nameless on the Ordnance map, three of the prominent points in this range, with heights varying from 1,450 to 1,500 feet, we found to be locally known as Lug-na-Gall, Meenaphuill and Faughrey, the last being the most eastern and highest of the three. Along this line there is a considerable extent of limestone cliff with a due north exposure and reaching in some places to over 1,400 feet. The result of our examination of these cliffs was not altogether disappointing. We could find, indeed, no trace of what we most of all hoped to find, *Arenaria ciliata*

<sup>(1)</sup> Report on the Flora of Ben Bulben, by R. M. Barrington and R. P. Vowell—*Proc. R.I.A.*, 1885.

in a new station ; but we found the following alpine in profusion :—*Draba incana*, *Silene acaulis*, *Saxifraga oppositifolia*, *S. aizoides*, *Sedum Rhodiola*, *Oxyria reniformis*, *Asplenium viride*, and *Selaginella selaginoides*. Specially interesting was *Silene acaulis*, which in the Ben Bulbin district north of Glencar is apparently restricted to the western extremity or Ben Bulbin proper. On the summit of Lug-na-Gall, where the limestone rises into peculiar rounded knobs, unusual in this formation, the *Silene* studded the rocks with countless bright green cushions. Further eastward towards Faughrey it ceased abruptly, and, indeed, a vigorous stone-thrower could span its whole area here with a single cast. On the way up from Glencar lake *Lotus pilosus* and *Carex pendula* were gathered, and near the head of the lake *Carex paludosa*, all three in Leitrim and additions to District IX. of *Cybele Hibernica*. And finally before taking leave of the Ben Bulbin district it may be mentioned that we discovered a single plant of the rare *Hypopithys Monotropa* in a new station on Lough Gill, a hazel copse at Dooney Rock at the opposite side of the lake to Hazelwood, where the plant was found by Miss Wynne some twenty-five years ago.

Four days in all were spent in our survey of the Ox Mountains. The first day, July 14th, was given up to the ascent of Knockacree, which is easily accessible from Sligo by the Ballina mail-car. On Wednesday, the 15th, we moved our quarters some twenty miles westward from Sligo to Dromore West on the Ballina mail-car route, where we found an excellent little hotel ; and here the day was spent examining the limestone tracts along the shore. On Thursday, the 16th, we drove from Dromore to Lough Easky, and tramped over the mountains north-eastward to the head-waters of the Owenduff, in the glen known as Lugdoon, examining several of the high-lying loughs on the way. On Friday, the 17th, we drove *via* Lough Easky and the Mass Valley to Lough Talt, explored the shores of the latter lake and part of the surrounding mountain-slopes, and driving on to Tubbercurry station returned by rail to Sligo the same evening. The southern or inland slopes of the range and its western extremity where it crosses the Mayo border we left almost altogether untouched ; and it need hardly be said that our four days of steady work were very far from exhausting the

flora of the district. It enabled us, however, to safely draw some conclusions as to its general character and to add something to the existing knowledge of the county Sligo flora.

Before proceeding to sum up the results of our hasty survey a few words may be said on the physical features of the district. The Ox Mountains stretch in a roughly north-east and south-west direction for twenty-five miles, from Ballysodare in the north-east to Aclare in the extreme south-west of Sligo, and have an average breadth of about eight miles. From their culminating point, Knockacree, which reaches to a height of 1,778 feet, six miles due south of the coast of Aughris Head, a wide and featureless table-land, covered with very wet bog, stretches N.E. and S.W. for a distance of some five miles, maintaining a general elevation of 1,600 feet. Towards the extremities the elevation becomes lower, averaging hardly 1,000 feet for the five miles west from Ballysodare, and about 1,200 feet for the eight miles N.W. from the neighbourhood of Aclare. At either end the range is more broken than near the middle, and on the northern slope of the central table land, as under Knockacree, where the drainage of the upper bogs rushing down to Lough Achree has ploughed a deep gully in the mountain flank, and, again, farther west, near Lugdoon, some bold rock faces appear which, however, nowhere deserve the name of cliffs. In the south-west, where the Owenaher, one of the chief affluents of the Moy, passes through the deep depression known as the Mass Valley, and at Lough Talt, where the hills rise rapidly from the water's edge, the scenery becomes picturesque. Elsewhere the range is monotonous.

The great mass of the Ox Mountains is of non-calcareous rock, mica-schist, quartzite, and granite, which latter, in some places, as round the Cloonacool lakes, S.E. of Lough Easky, and in the hills above Lough Talt, exhibits the characteristic wavy foliations of gneiss. The limestone is confined to the lower levels from about 400 feet downwards. Lakes are numerous, especially towards the south-west; but with two exceptions, Lough Talt and Lough Easky, which somewhat exceed a mile in length, they are of small size. The bog which caps the central plateau as with a vast saturated sponge sends down innumerable small streams to the north and south, those to the north reaching Sligo Bay after a short course, those to the



south uniting at one end to form the Moy river, which reaches the sea at Ballina, and at the other to form the Owenboy, which discharges at Ballysodare. Save for some thin native scrub of Oak and Hazel along the rocky flanks of the Mass Valley the range may be said to be bare of wood.

It is hard to define precisely the limits of the Ox Mountains, and we made no attempt to do so in our four days' survey. Our observations were carried on within the following boundaries: the sea-coast from Ballysodare to Dromore West, a line from that point south to Lough Talt, the high road thence to Tubbercurry, and the railway back to Ballysodare. Inside of these limits we gathered 366 species of flowering plants and higher cryptogams. Had our area been more strictly defined by taking for its northern boundary the high road from Ballysodare to Dromore West, and for the southern the high road from Lough Talt through Coolaney back to Ballysodare, the total of species would have sunk to about 350.

The flora of the district is undoubtedly a poor one. Out of the total of 366 species observed by us no less than 307, or fully 84½ per cent., belong to Watson's British type plants, common and wide-spread in Ireland no less than in Great Britain; 22, or say 6 per cent., to the English type; 15, or 4 per cent., to the Scottish and Highland types taken together; and 7, or less than 2 per cent., to the Atlantic type. The neighbourhood of the Ben Bulbin district lying not more than fifteen miles to the northward, and the fact that it has been so thoroughly explored by Messrs. Barrington and Vowell, at once invites comparison of its flora with that of the Ox Mountains.

This comparison brings out in the most glaring way the relative poverty of the latter district. But it must be borne in mind that as yet the Ox Mountains have been very imperfectly examined, and that the peculiar structure of Ben Bulbin, with its miles of lofty flanking cliffs, make it, perhaps, unique in Ireland as a congenial home for a whole group of alpine species. No less than twenty-two of Watson's Highland type plants were observed in the Ben Bulbin district by Messrs. Barrington and Vowell in 1884, and to this total my friend, Mr. D'Arcy, was fortunate enough to add *Vaccinium Vitis-Idæa*, which he discovered at about 1,950 feet on the north-west slope of Truskmore during our few days' ramble in the district.

Against this array of twenty-three alpine the Ox Mountains, so far as at present known, can only set the following five species of the same type: *Saxifraga aizoides*, *Hieracium iricum*, *Vaccinium Vitis-Idæa*, *Salix herbacea*, *Selaginella selaginoides*; and inadequate as our survey was, we have no reason to expect that further search would add anything to this meagre total.

In the Scottish type plants, which may be ranked next to the Highland type as imprinting a northern character on a flora, the contrast between the two districts is less glaring. Against a total of eighteen for Ben Bulbin our lists show ten for the Ox Mountains, and in the latter total are included two species absent from Ben Bulbin, *Prunus Padus* and *Lobelia Dortmanna*, to which may be added a third, *Equisetum variegatum*, if we hold this to be distinct from *E. Mackaii*. In types other than those indicating a northern or alpine character, the divergencies between the two floras are much less marked. The number of species observed by Messrs. Barrington and Vowell in the Ben Bulbin district in 1884, is set down in their Report at 430. Adding to this some fifteen species, since observed, we have a total of 445, or an excess of 80 over our list for the Ox Mountains. But with this decided preponderance in favour of the limestone district, a large proportion of the Ox Mountains species, no less than 41, or fully 9 per cent., are apparently absent from Ben Bulbin. These species are set forth at length in the following list:—

OX MOUNTAINS SPECIES NOT RECORDED FOR BEN BULBIN.

<i>Fumaria confusa.</i>	<i>Pulicaria dysenterica.</i>	<i>Epipactis palustris.</i>
<i>Viola arvensis.</i>	<i>Lobelia Dortmanna.</i>	<i>Juncus obtusiflorus.</i>
<i>V. tricolor.</i>	<i>Jasione montana.</i>	<i>J. lamprocarpus.</i>
<i>Leptogonum neglectum.</i>	<i>Gentiana campestris.</i>	<i>Sparganium affine.</i>
<i>Trifolium medium.</i>	<i>G. Amarella.</i>	<i>Typha latifolia.</i>
<i>T. procumbens.</i>	<i>Convolvulus arvensis.</i>	<i>Lemma minor.</i>
<i>Lathyrus macrorrhizus.</i>	<i>Veronica Buxbaumii.</i>	<i>Triglochin maritimum.</i>
<i>Alchemilla arvensis.</i>	<i>Anagallis arvensis.</i>	<i>Eleocharis multicaulis.</i>
<i>Potentilla reptans.</i>	<i>Utricularia minor.</i>	<i>Scirpus Savii.</i>
<i>Prunus Padus.</i>	<i>Nepeta Glechoma.</i>	<i>Carex arenaria.</i>
<i>Scandix Pecten-Veneris.</i>	<i>Teucrium Scorodonia.</i>	<i>Asplenium marinum.</i>
<i>Sambucus Ebulus.</i>	<i>Plantago Coronopus.</i>	<i>Lycopodium clavatum.</i>
<i>Sherardia arvensis.</i>	<i>Polygonum Convolvulus.</i>	<i>Equisetum variegatum.</i>
<i>Gnaphalium sylvaticum.</i>	<i>Populus tremula.</i>	

A scrutiny of this list might fairly be expected to show that the majority of the Ox Mountains plants absent from Ben Bulben are calcifuge species, that is to say, species which shun the limestone, while they appear in full development on non-calcareous soils. But we find that this is by no means the fact; for out of the forty-one species just mentioned only two—*Lathyrus macrorrhizus* and *Jasione montana*—can be classed as decidedly calcifuge. When on the other hand we examine the catalogue of Ben Bulben plants we find the following twenty-two calcifuge species recorded for this eminently calcareous district:—

CALCIFUGE SPECIES FOUND IN BEN BULBEN DISTRICT.

<i>Galium saxatile.</i>	<i>Rumex Acetosella.</i>	<i>Carex pilulifera.</i>
<i>Vaccinium Myrtillus.</i>	<i>Empetrum nigrum.</i>	<i>C. binervis.</i>
<i>Calluna vulgaris.</i>	<i>Myrica Gale.</i>	<i>Aira flexuosa.</i>
<i>Erica cinerea.</i>	<i>Narthecium ossifragum.</i>	<i>Nardus stricta.</i>
<i>E. Tetralix.</i>	<i>Juncus supinus.</i>	<i>Lomaria Spicant.</i>
<i>Digitaria purpurea.</i>	<i>J. squarrosus.</i>	<i>Lastræa dilatata.</i>
<i>Pedicularis sylvatica.</i>	<i>Scirpus cæspitosus.</i>	<i>Athyrium Filix-femina.</i>
<i>Polygonum Hydro Piper.</i>		

This full representation of the calcifuge group in a district where the formation is almost purely limestone, would appear at first sight to utterly discredit the classification of plants by their apparent affection for, or aversion to limestone soils. In reality, the constitution of the Ben Bulben flora furnishes no argument against the validity of this classification, which is the expression of a very well-grounded induction. The explanation of the apparent anomaly is not far to seek. Ben Bulben, in fact, even if we restrict the name to the great steep-scarped rock-mass lying between Glencar on the south, and Glenade and Gleniff on the north, so as to cut off all but the purely calcareous formations, is capped for some eight miles with a deep bed of peat; and in this peat-cap the calcifuge species find that neutral or non-calcareous soil which appears to be a necessary condition of their healthy development.

Having thus sketched the general features of the Ox Mountains flora a few details may be given as to the more interesting plants observed by us in our hasty survey.

**Trifolium medium**, Linn.—Frequent amongst Gorse, and in field borders and on banks near Skreen and Dromore West.

**Prunus Padus**, Linn.—A single tree, apparently native, on the rocky shores of Lough Achree.

- Rubus saxatilis**, Linn.—Sparingly on the northern slope of Knockacree and at the head of Lugdoon.
- Potentilla reptans**, Linn.—Roadside banks near the sea below Dromore West. A rare species in many parts of West Ireland.
- Saxifraga aizoides**, Linn.—Abundant on Knockacree from about 300 to 900 feet, but confined to the gully above Lough Acree and to the neighbouring rocks. First observed here by Miss Kinahan, in 1893.
- Gnaphallium sylvaticum**, Linn.—Gravelly places by the shore of Lough Easky, and luxuriant on dry banks in the Mass Valley.
- Hieracium Iricum**, Fries.—Sparingly in rocky places above Lough Acree, at about 450 feet. The only Hawkweed observed in the district except the ubiquitous *H. Pilosella*.
- Vaccinium Vitis-Idæa**, Linn.—On Knockacree at 1,400 feet, and abundant round Cloonacool lough to 1,350 feet.
- Salix herbacea**, Linn.—At Lugdoon, at Cloonacool lough, and on the mountain east of Lough Easky, descending to 1,200 feet. Very stunted where it clings to the wavy foliations of the gneiss, but well-developed when growing in the grassy or mossy capping of the rocks.
- Epipactis palustris**, Crantz.—Abundant in one spot on the northern shore of Lough Talt.
- Juncus obtusiflorus**, Ehrh.—In a marsh below Dromore West, and sparingly near the margin of Lough Acree. Apparently a new record for District IX.
- J. supinus** var. **fluitans**, Lamk.—A characteristic plant of the lakes in this district, occurring in Lough Acree, Lough Easky, Lough Glendarragh, and Cloonacool lough, and also in many of the loughans in the central plateau. The young shoots developed by this viviparous form in the deep water of these lakes are exquisite examples of extreme tenuity of leaf, and exhibit perhaps the nearest approach amongst the Irish phanerogams to truly capillary foliage. When detached from the parent and stranded on the lake shores the young plants are very puzzling, and easily mistaken for forms of *Scirpus acicularis*.
- Sparganium affine**, Schnzl.—In Lough Ramduff near Lough Easky, and again in Lough Glendarragh, where it covers a large surface and flowers and fruits freely at a height of 1,332 feet.
- Osmunda regalis**, Linn.—Appears to be very rare in the district. Only one large patch observed, by a stream near Croagh, north of Lough Easky.
- Botrychium Lunaria**, Sw.—In pastures near the old tower below Dromore West.
- Adiantum Capillus-Veneris**, Linn.—Specimens of this species gathered on limestone rocks by the river below Dromore West were sent me near the end of July last, by Mr. John Quirk, who informs me that it grows in this station in considerable quantity. The plant was reported from this locality by Mr. R. Warren, in 1891.

**Equisetum variegatum** var. **majus**, Syme.—Abundant on the stony shores of Lough Talt.

**Lycopodium Selago**, Linn.—This species, rarely met with in abundance in east Ireland, occurs in profusion in the high-lying wet bogs N.E. of Easky lough.

**L. clavatum**, Linn.—Sparsely on the grassy hill-slopes west of Lough Talt, at 600 feet.

I am indebted to Mr. Arthur Bennett for assistance in determining some of the critical species observed, and to Messrs. H. and J. Groves for naming a few specimens of *Chara* gathered. These latter all belong to the common species *C. fragilis* and *C. vulgaris* which occur in all twelve of the Irish botanical districts.

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## CORRESPONDENCE.

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### PROF. R. TATE'S VISIT TO BELFAST.

Allow me to correct an erroneous impression which is conveyed by the note in November number of the *Irish Naturalist* respecting Prof. Ralph Tate's recent visit to Belfast. Prof. Tate did not honour Belfast Naturalists' Field Club by a visit, or, to put it plainly, the Club did not seize the opportunity to honour itself by receiving its distinguished founder when he revisited Belfast. Prof. Tate was invited by a former President of the Club, Mr. John Anderson, J.P., F.G.S., one of the original members; but he had accepted the prior invitation of Mr. Joseph Wright, F.G.S., and was the guest of the latter gentleman during his stay here. To quote the words of the Professor, the visit was intended for \* \* \* "those who helped to make my sojourn at Belfast the most pleasant episode of my life." For the benefit of the younger members of the Belfast Club it may be well to mention that Prof. Tate's work in the Secondary rocks of Ireland, done over thirty years ago, gave us the most complete exposition of those rocks which has yet appeared. Subsequently appointed Professor of Geology and Natural History in Adelaide University, he has done an immense amount of work in South Australia, not only as a palæontologist, but also as a conchologist and a botanist, and has risen to the foremost place amongst Australasian naturalists. He has occupied the position of President of the Royal Society of South Australia, and of the Adelaide Naturalists' Field Club, of which he also was founder. There has been much said of late as to inter-communication of naturalists, and it is not creditable to the Belfast Club that no advantage was taken of this, the final visit of its foremost member.

S. A. STEWART, Belfast.

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## NOTES ON SOME CASUALS IN COUNTY ANTRIM.

BY J. H. DAVIES.

**GALIUM MOLLUGO**, Linn.—The usual English habitat for this plant is “hedges and thickets,” whereas in Ireland it is principally “grassy lawns,” which is exceedingly suggestive of the species having been introduced here with seed. It occurs in a large field at Glenmore, where there are several conspicuous patches of it, and where it is thoroughly well established, but although the field has not been disturbed for a long period of years, there would appear to be a possibility of its being an introduction. Mr. Stewart informs me that he has this year found it at Whitewell, Glengormley, in County Antrim. In this country it is decidedly rare, being absent from by far the larger portion of the island, and in the north, though it occurs in Down, Antrim, Derry and Armagh, it has not been observed in any of the other counties. There seems, however, to be some ground for regarding this Bedstraw as a casual, but it may be indigenous. At Glenarm it has certainly held its place for about half a century.

**SOLANUM NIGRUM**, Linn.—The Black Nightshade, which is of rare occurrence in Ireland, having been found in only four of the twelve districts of *Cybele Hibernica*, has this year appeared as a weed in cultivated ground at Glenmore, near Lisburn. It seems to be a very capricious plant and without permanence in any of its Irish localities. Like *Hyoscyamus niger*, which has also been seen at Glenmore, and is now lost, it springs up for one season, or it may be for two or three seasons in succession, and is not afterwards seen in the same place. In the Copeland Islands, and in the neighbourhood of Donaghadee, where it is recorded to have been noticed by Campbell, it has since been sought for by several observers, but cannot now be found. Rev. S. A. Brennan, who noticed it for five consecutive years, 1867 to 1871, near Cushendun, informs me that it has not subsequently been observed there. Mr. Richard Hanna met with it together with a goodly number of other out-of-the-way casuals on rubbish heaps near some of the Belfast distilleries and flour-mills, as noted in the remarkable list of plants supplied by him to the Supplement to the

"Flora N. E. of Ireland" (p. 141), but all these casuals were known to have been introduced with imported grain, and it is not to be seen there now.

In the Glenmore locality the plant did not appear until late in June, and its pretty white flowers, which close in the afternoon, were first seen in the latter part of July. The fruit of the earliest flowers attains its full growth by the end of August, but does not begin to assume the blackness characteristic of its maturity until about the first week in October. Of the enormous number of berries produced, only comparatively few have time to ripen before the plant dies; but when it is considered that a single berry contains upwards of sixty seeds (more than three times as many as there are in a berry of its congener *S. Dulcamara*), it seems remarkable that, with this possibility of reproduction, the Black Nightshade should be so fitful and inconstant in all its localities. The lower branches are procumbent (rooting at many of the joints), and those of one plant cover a space of about three square yards. A branch bearing the first flowers, that was cut off in July, and placed in a jar of water kept in the open air very soon threw out numerous strong roots, produced fully formed fruit, continued to grow and flourish, and to put forth its flowers until the end of September. Notwithstanding this, it is rather a tender annual, and its leaves, which begin to fade early in October, are killed by the first frost.

*POLYGONUM SACHALINENSE*, Schmidt.—This plant, an herbaceous perennial, native only in the Sachalin Islands, and not previously recorded as occurring in Ireland, grows at Lisburn, in waste ground in an extensive enclosure between the old mill-race and the Lagan, where the river and canal are joined, and where there is an old dry dock which is used for the repairing of lighters that ply on the Lagan canal. The dock is mentioned, because, as will afterwards be seen, it seems not unlikely that it may have some bearing on the introduction of the plant to this place, where it is in some abundance, and though with every appearance of having been there for a long time, it was only first recognised at the end of September of the present year. It was found amongst a mass of tall-growing nettles (*Urtica dioica*) from which at a short

<sup>1</sup> "*Polygonum sachalinense*, F. Schmidt, ex Maxim. Prim. Fl. Amur. 233.—Ins. Sachalin." *Index Kewensis*.

distance it was hardly distinguishable, but from its overtopping the surrounding growth my attention was specially attracted. A gentleman, one of the owners of the land, who was present on the occasion, when asked how it came to be planted there replied, "Planted? Oh, no! it was not planted; it grows wild here." A Yorkshire botanist, Mr. William Foggitt, an old and valued friend, and one of my most frequent companions on botanical excursions so far back as the early fifties, in sending me a short time ago a collection of British casuals, sent also some dried specimens of this *Polygonum* as a plant, which, on account of its alleged economic value, was claiming the attention of North of England agriculturists. It would appear that the species was first brought into England, under the name of Sachalin, in 1869, as a forage plant. It was said that it yields from eighty to one hundred and twenty tons of green fodder to the acre, and that horses are especially fond of it. Mr. Foggitt informs me also that it was stated in the newspapers that the farmers of Wensleydale, in Yorkshire, were planting it on the bare oozy hillsides where no serviceable herbage will grow, but so far he is without information as to the result of the experiment. Its beauty seems to have recommended it to horticulturists, and it is now to be seen in many gardens in Yorkshire. A magnificent bushy plant, attaining a height of from eight to ten feet, with long branched racemes of delicate greenish-yellow flowers, springing from the axil of nearly every leaf, it is not to be wondered that it should be prized as an additional ornament for borders and shubberies. On noticing the plant at Lisburn, the dried specimens received from my friend were at once brought to mind, and on comparison they were found to be identical. The most probable explanation of the occurrence of the Sachalin here, seems to be that the seeds may have been brought by the lighters which carry, from Belfast to Lisburn, coal that has been shipped in the North of England; and that they have thus found their way to the ground near the canal dock which has been mentioned.

PLANTAGO MEDIA, Linn.—Several plants in a lawn near Lisburn. The grass of the lawn being usually kept closely shorn, there is little chance of the plant spreading from seed, and indeed I have only once seen it in flower at this place, but the leaves, lying flat on the ground, as is their habit, for



the most part escape uninjured the knives of the lawn-mower, so that this fragrant and most beautiful of British Plantains may survive. Mr. Praeger some years ago met with it on the Curran of Larne, where it has since been sought for, but it seems entirely to have disappeared from that locality.

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include five crocodiles, a lizard, and a tortoise from Dr. E. G. Fenton; a hawk from R. H. M. Orpen, Esq.; a pair of Japanese Doves from J. B. O'Callaghan, Esq.; a Muscovy Duck from Mrs. Harford; three Llamas from J. Nelson, Esq.; a Hedgehog from W. C. Pim-Evans, Esq.; an Otter from J. Clibborn, Esq.; and a pair of Fantail Pigeons from Miss O'Farrell.

7,623 persons visited the Gardens in October.

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### DUBLIN MICROSCOPICAL CLUB.

OCTOBER 15.—The Club met at the house of Dr. R. F. SCHARFF.

Prof. G. A. J. COLE exhibited sections, accompanied by specimens, of the junctions of diverse igneous rocks at Orior Quarry, Co. Tyrone. Considerable mingling of highly silicated and basic rocks seems to have occurred, but it is difficult to determine what the original types were. The highly silicated rock consists, when found in clean veins, almost entirely of a felspar, sometimes showing microcline-twinning, and these veins graduate into a true granite.

Prof. T. JOHNSON exhibited preparations of *Prasiola stipitata*, Suhr., a green alga which is of interest in that it is generally regarded as a connecting link between the green algæ (*Ulvaceæ*, &c.) and the *Bangiacea*, a group of red algæ. Reference to the tetraspores, oospheres and spermatia of various authors was made. The material was gathered in March last, by a sea-weed party of the Dublin Naturalists' Field Club, at half-tide on the coast north of Skerries. The only previous record of the species as Irish is in Jessen's monograph of *Prasiola*:—'Specimina Hibernica nominis *Ulvæ furfuraceæ* inscripta in collectione Binderi asservantur.' The preparations and illustrations shown were due to Miss Knowles.

Mr. G. H. CARPENTER showed *Onesinda minutissima*, Cb., a spider of the family *Theridiidæ*, discovered at Ardara, Co. Donegal, by Rev. W. J. Johnson, and new to the Irish fauna. It does not seem to have yet been observed out of the British Islands, but has occurred both in England (Dorset), and in Scotland (Balmoral). It is perhaps the smallest spider

known, measuring only one mm. in length. In structure it is remarkable by the great convexity of the sternum. The palp of the female bears a claw; this character separates it from the *Erigonina*, according to Rev. O. P. Cambridge its true position is near *Pholcomma*.

Dr. McWEENEY showed the germinated sclerotia of *Peziza sclerotiorum*, also known as *P. postuma* (Berk.). This lives parasitically on potatoes in Ireland, especially along the Western seaboard, and causes a dangerous disease. The sclerotia were gathered in full germination in Co. Donegal last July. He also showed sclerotia artificially produced from the ascospores of the *Peziza* by planting them on sterilised half cylinders of potato in test-tubes. Reference was also made to a smaller, more adherent form of sclerotium, resembling mouse's excrement, also found on the plants affected by *P. sclerotiorum*. This smaller form did not produce a *Peziza*—only a conidial fruitification known as *Botrytis*. The potatoes suffering from *Peziza* disease were generally affected with *Botrytis* disease also; but there appeared to be no essential connection between the two maladies.

Mr. A. VAUGHAN JENNINGS showed preparations of the peach-coloured Bacterium, *Chromatium Okenii*. This form is specially interesting on account of its large size, its distinctive colouring, and its habit of living in water containing sulphuretted hydrogen. Sulphur is liberated by the organism, and deposited in granules in the protoplasm, and the sulphuretted hydrogen is regarded as due to its power of breaking up the sulphates of lime and soda in solution. Apart from this physiological interest, the form is of value as illustrating the pleomorphism of the Schizomycetes. The motile flagellate type which, nearly half a century ago was named by Ehrenberg *Monas Okenii*, is only a stage in a varied life-history. Other stages are the 'sperillum' form known as *Ophidomonas sanguineum*, the filamentous form *Beggiatoa roseo-persicina*, and the aggregations of 'cocci' constituting the *Clathrocystis roseo-persicinus* of Cohn. The 'coccus' condition has been described as arising from the filamentous form; but the specimens exhibited indicate that after the motile forms have passed into the 'zooglæa' stage, they too may break up into aggregates of cocci like simple forms of "*Clathrocystis*."

Dr. C. HERBERT HURST showed a section of the cochlea of a Rabbit.

Prof. A. C. HADDON showed the *Phyllosoma* larva of the crustacean *Scyllarus arctus*.

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#### BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 27.—The winter session was inaugurated by a social meeting in the Exhibition Hall. The company was a large one, filling the available space in the main hall, and comprising a good representation of the membership of the Club, with many friends. There was an interesting exhibition arranged in the hall, comprising botanical, conchological, geological, and entomological collections; photographs, seals, and microscopic specimens. In the minor hall displays of the X-rays were given by W. J. Walker. The side hall was devoted to the lantern exhibition of a series of slides depicting

botanical, geological, and archæological subjects, the photographs shown being the work of F. C. Bigger, Professor Cole, W. J. Fennell, W. Gray, A. R. Hogg, Dr. MacWeeney, J. St. J. Phillips, and R. J. Welch. A collection of photos of wild flowers in their natural habitat by that capable artist, R. J. Welch, was much admired. The exhibits of the botanical section comprised British and exotic ferns, illustrated by fresh-cut fronds and growing plants, supplied by W. H. Phillips (honorary treasurer) and Charles M'Kimm (curator of Botanic Gardens Park); and recent additions to the Irish flora by R. Lloyd Praeger. Professor MacWeeney, of Dublin, exhibited some bacterial cultures and slides, and a select series of Irish fungi, including some that cause disease of the potato plant. A compact collection under the departmental title of "Marine Life" comprised a number of books illustrative of marine life, lent by the Free Library, and some models of marine life, lent by the Queen's College. Henry Hanna, A.M., showed a collection of invertebrates and a series of slides, for which the Club's prize had been awarded, while seaweeds collected on last season's dredging excursions were exhibited by Prof. Johnston and Miss Hensman. Prof. A. C. Haddon contributed some examples of commensalism and symbiosis from the marine fauna of Ireland and other countries; and Mrs. J. T. Tatlow had a collection of seaweeds from Roundstone, Connemara, and a series of shells collected on Magilligan Strand, County Derry. The conchological section comprised the above, and a collection of land shells by R. J. Welch. A. G. Wilson, Hon. Sec., displayed rocks and miscellaneous objects of interest, including specimens of Irish fresh-water pearls and the pearl mussel (*Unio margaritifera*), and some primitive forms of lamps. The geological exhibits comprised photographs of features of the high Alps, by the late W. F. Donkin, from the geological department of the Royal College of Science, Dublin (Prof. Grenville A. J. Cole, President of the Dublin Field Club); crush conglomerates (with microscopic section) from the Isle of Man, Tertiary dykes from County Down (Miss M. K. Andrews); opal and chalcedony from the rhyolitic area of County Antrim, rhyolites from Kirkinriola and Cloughwater (Mr. Robert Bell); fossil wood perforated by insects, from the Gault of Ventnor, Isle of Wight (Mr. J. O. Campbell); microscopic sections of rocks and fossils (Mr. William Gray); rocks collected on Field Club excursion to County Cavan, rocks of Slieve Gallion, County Derry (Alec G. Wilson); junction of granite and Ordovician from the new waterworks tunnel at Newcastle (Leo M. Bell); microscopic section of riebeckite granophyre from Isle of Skye (J. St. J. Phillips); Lias and Greensand fossils (George M'Clean); banded and altered shale from waterworks, Newcastle (Robert Young); fossils from Cretaceous rocks of Kent, Rhætic fossils from Bath; specimens from lead mines, Foxdale, Isle of Man (Miss S. M. Thompson). To the microscopic section the following contributed:—Rev. John Andrew (President of section), Henry Hanna, A. R. Hogg, W. S. M'Kee, Joseph Wright, Dr. Lorrain Smith, Dr. Cecil Shaw.

In the entomological department J. T. Tatlow showed a collection of butterflies from the Austrian Tyrol. Among the miscellaneous attrac-

tions, the great seals of England, exhibited by John Vinycomb, formed a distinctive feature.

At eight o'clock the President, Lavens W. Ewart, took the chair. The President, who was received with applause, said—I have to offer a welcome on behalf of the Club to our visitors, and hope they may have an enjoyable and profitable evening, and I have especially to express our thanks to those who have come to help us in the business of the present meeting. Many of them have come from afar, and we are grateful to all from far and near. I should like to say a few words on a subject of much importance at the present time, that of the Giant's Causeway, and it is surely a subject which concerns the Club. As most of those present must be aware, a few speculators have banded themselves together to endeavour to exclude the public from free access to this truly gigantic creation in order to make money out of it for themselves, and they have invoked the Court of Chancery to establish them in this undertaking. Three gentlemen, of whom, unfortunately, I am one, have been served with writs in respect of, so-called trespass, and the battle has begun. A committee had already been formed to protect the rights of the public, and they are defending the action. Owing to the fact that the Causeway Syndicate is a public company they cannot be required to give security for costs, and as their capital consists of, I am informed, but £7, whether we win or lose we—that is to say, the Causeway defence committee—will have to pay our own costs. Our solicitors, Messrs. Greer and Hamilton, of Ballymoney, estimate that the costs may amount to £400, and this sum at least we must raise. We ask for help in the matter of collecting subscriptions, and collecting lists will be supplied to all who will take them. We earnestly ask all those who value liberty to take lists, and get their friends to take them, so that practical interest may be aroused on all sides in asserting the independence of the public. Large subscriptions, as a rule, are not asked for, but small sums given by the many, for it is a matter which concerns the many. Evidence is also wanted from those who have known of the Causeway as a public resort for forty or fifty years or more. I shall not occupy your time longer, but direct your attention to the different exhibits mentioned in the programme.

The remainder of the evening passed quickly over.

OCTOBER 31.—BOTANICAL SECTION. A pleasing and interesting feature was the presentation of a set of mounted *Hieracia* to Mr. S. A. Stewart. This collection is being issued in four fascicles of twenty-five specimens each, by Messrs. E. F. and W. R. Linton. Rev. C. H. WADDELL, in presenting the first fascicle to Mr. Stewart on behalf of the subscribers, read the following inscription:—"Set of British *Hieracia* presented to Samuel Alexander Stewart, F.B.S.E., in recognition of his valuable services to Irish Botany, and especially in this genus, and as a mark of their affection and esteem by Members of the Botanical Section of the Belfast Naturalists' Field Club and other friends." Messrs. C. H. Waddell, J. H. Davies, and others, spoke of Mr. Stewart's great services to Irish Botany, and of the value of his "Flora of N.E. Ireland," and

testified how willing he always was to place his wide experience and accurate knowledge at the service of any who were really interested in the science. Mr. Stewart replied, and said it would afford him much pleasure to help any of the members in their study of the *Hieracia* or in any way he could. Some recent additions to the local flora were then discussed, including *Solanum nigrum* which has been found near Lambeg, probably only as a casual. The rest of the time was given to the examination and description of *Composita*, and especially the genus *Hieracium*.

#### DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 10.—The Winter Session was opened by a *Conversazione* at the Royal Irish Academy, which was largely attended. The President (Prof. G. A. J. COLE) opened the meeting at 8 o'clock. In the name of the Club, he welcomed the representatives of the Belfast and Cork Field Clubs who were present, and also the many local visitors. At 8.15 and at 9.15 lantern displays were given in the lecture hall. The subjects illustrated included Prehistoric Remains of Co. Antrim, by Prof. Haddon and G. Coffey; rare Fungi, by Greenwood Pim; Sea-birds and their nests on Lambay Island, by R. Welch and Greenwood Pim; the Field Club Union Excursion to Cavan, by R. Welch; and Wild Flowers in their homes, by R. Welch. The scientific exhibits which covered the tables were as follows:—

Prof. G. A. J. Cole (President)—Forms of Silica in Rocks, illustrated by specimens and microscopic sections; G. H. Carpenter—1. Some Curious Insect Larvæ; 2. New Irish Spiders; Hon. R. E. Dillon—Irish Lepidoptera, illustrating protective coloration, &c.; A. H. Foord—Specimens of Rocks from the Lava-flows and Geysers of Iceland; W. Gray (B.N.F.C.)—A fine Zeolite from Co. Antrim; Mrs. W. S. Green—Sea-weeds collected in Co. Kerry, 1896; Prof. A. C. Haddon—Animal Partnerships: Examples of Commensalism and Symbiosis; J. N. Halbert—Water Insects; Dr. C. Herbert Hurst—Microscopic Preparations, illustrating the structure of the Heads of Insects; A. Vaughan Jennings—Flowering Plants and Fungi from the Eastern Alps; Prof. T. Johnson—Irish Marine Algæ collected with the collaboration of Miss Knowles and Miss Hensman in 1896; Miss M. C. Knowles—Flowering Plants from Co. Tyrone, 1896; D. M'Arde—Some rare Mosses and Hepatics; A. R. Nichols—Marine Shells collected on the Waterford Coast, 1896; Greenwood Pim—*Restrepia striata* and *Ceropegia elegans* in flower; W. H. Phillips (B.N.F.C.)—Varieties of British Ferns, illustrated by fresh and dried fronds; R. Lloyd Praeger—Additions to the List of Irish Flowering Plants, 1894-96; Dr. R. F. Scharff—New Crustacea from the West Coast of Ireland; Mrs. J. T. Tatlow—1. Sea-weeds collected at Roundstone, 1896; 2. Dried Specimens of alpine and other Plants grown at Dundrum, 1896; J. T. Tatlow—Butterflies from the Austrian Tyrol, 1896; Miss S. M. Thompson (B.N.F.C.)—1. Scotch Erratics from Boulder-clays of Belfast District; 2. Microscopic Sections of Riebeckite Eurite from Ailsa Craig and Skye; R. Welch (B.N.F.C.)—1. Irish Land and Fresh-water Mollusca; 2. Photographs of Wild Flowers, etc

## CORK NATURALISTS' FIELD CLUB.

AUGUST 22.—The month's excursion took place, a good party going to the Waterfall station and walking thence to Ballinhassig Glen, taking on the way some bogs, which yielded amongst other plants the Lesser Skull-cap (*Scutellaria minor*), Sneeze-wort (*Achillea Ptarmica*), Branched Bur-reed (*Sparganium ramosum*), Bog Pimpernel (*Anagallis tenella*), Bog Asphodel (*Narthecium ossifragum*), Pale Butterwort (*Pinguicula lusitanica*), in flower, and *Pinguicula grandiflora*.

Large tracts of moor were crossed which were a magnificent sight, with the gorse and heather in full bloom.

Mr. J. Porter, B.E., Bandon, who acted as guide, explained the geology of the district. Waterfall and Ballinhassig stations, on the Cork, Bandon, and South Coast Railway, are on the northern and southern sides respectively of one of the main east and west anticlinal hill-ranges. The core of the arching fold is formed of the Dingle Beds, which have been laid bare on the broad summit of the range, while the Carboniferous rocks cover the flanks.

SEPTEMBER 5.—The last excursion of the season came off, when the Club visited Rock Close, Blarney, by kind permission of Sir George Colthurst, and after exploring the curious rocks, &c., walked to St. Ann's Hydropathic, where tea was provided.

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 NOTES.

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 ZOOLOGY.

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 INSECTS.

**Abundance of *Acherontia atropos*.**—From the British entomological magazines it appears that caterpillars of the Death's-head moth have been more common than usual in England and Scotland this year. A similar visitation appears to have prevailed in Ireland, as during the summer months I received a number of specimens from different parts of the country—Cos. Dublin, Meath, and Wexford.

GEO. H. CARPENTER.

***Asteroscopus sphinx* in Co. Dublin.**—As Mr. W. F. de V. Kane in his recent list of Irish Moths, gives but two localities, Galway and Westmeath, for *Asteroscopus sphinx*, it may be of interest to note that my brother and I took a few specimens of this moth here in Co. Dublin, at light, early in November, 1893 and 1894; and this year, on November 2nd, two specimens, one flying round ivy and the other at light. In every instance they were males.

G. P. FARRAN, Templeogue.

[We have recently heard of the capture of this moth at Dundrum, also in Co. Dublin, by Mr. George Low, and in Co. Waterford by Rev. W. W. Flemyng.—EDS.]

**Mixodia palustrana** In Co. Wicklow.—On Whit Monday, May 25th (this year) while ascending Lugnaquilla, Co. Wicklow, I took a few specimens of a tortrix, which turns out to be *Mixodia palustrana*. I cannot find any previous report of its occurrence in Ireland. *M. schulziana* was on the wing at the same time and place.

GEORGE V. HART, Howth.

**Clifton Nonparell (*Catocala fraxini*)** at Londonderry.—A specimen of this very rare moth came into Mr. R. B. Thompson's house, Marlborough Street, Derry, by an open window during the night. The date was about 10th September last. Mr. Thompson brought the insect to me for examination.

D. C. CAMPBELL, Londonderry.

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#### MOLLUSCS.

**Helix arbustorum** In Co. Derry.—It is interesting to find this shell turning up again so soon in another new locality. Mr. Robert Bell, a member of the B.N.F.C., while fossil-hunting in an old quarry at Tamlaght, on the borders of the county (near Coagh, Co. Tyrone), found it fairly plentiful, and brought me a few specimens.

R. WELCH, Belfast.

**Helix fusca**.—I have searched carefully for this rare shell for year, in likely places—mountain glens and damp woods—but without success till lately, when I got one specimen on river-bank at Newcastle, Co. Down, on rejectamenta after flood, and four specimens this month in the ravine of Glenariff, Co. Antrim. Professor R. Tate found it many years ago common in winter in certain damp woods near Belfast, usually on the Wood-rush (*Luzula sylvatica*), and it has also been recorded from several mountain glens in the same district. Dr. Scharff noted it on Beech trees this summer at Clonbrock, Co. Galway.

R. WELCH, Belfast.

**Slugs of Ireland**.—Wanted living examples of the following species:—*Limax marginatus*, *Agriolimax leviss*, *Amalia gagates*, *Ariem intermedius*, and *Geomalacus maculosus*.

WALTER E. COLLINGE, F.Z.S., Mason College, Birmingham.

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#### BIRDS.

**Kingfisher** In Co. Dublin.—When travelling on the D.W. and W. Railway last September I noticed a Kingfisher flying over the water between Williamstown and Booterstown. Some years ago I have seen them where the Blackrock People's Park is now, but till the occasion mentioned, I have not seen one for a long time.

GREENWOOD PIM, Monkstown, Dublin.

**A White Swallow.**—Having shot a perfectly white Swallow or Swift on my lands at Camass near Bruff, Co. Limerick, on the 25th inst. I should be glad if any of your readers could inform me if they ever have seen one. The common Swallows were hunting this bird as if they did not like it.

J. V. BEVAN. [In *Limerick Chronicle*, August 28.]

[Mr. Williams reports that this specimen is a Swallow (*Hirundo rustica*) and a genuine albino, having pink eyes. He has received this year two other white Swallows, which, however, had eyes of the normal colour, and also an albino Sand martin (*Cotyle riparia*) from other Irish localities. —Eds.]

**Birds of Connemara.**—Referring to Mr. Witherby's statement that he has met with the Dunlin, as Mr. Palmer has the Ringed Plover, in the breeding season on Lough Corrib, I beg to say that no one need be suprised at either, for both species have a wide breeding-range on the Irish inland lakes.

I have a list of eighteen counties in which the Dunlin has either been found breeding or met with in June under circumstances denoting that it bred there. I have taken Dunlins' eggs in Londonderry, Donegal, and Westmeath, and seen it on many a lake in June, including the Shannon lakes and callows of the Shannon down to the Clare shores of Lough Derg.

I have found a Ringed Plover's nest on Lough Sheelin under a willow. That Oyster-catchers should prefer the tops of islands to the shingly beach is nothing unusual. On the Donegal coast last June I saw many nests, usually in crannies or hollows of the rocks, far up above the tide. On the Saltees they breed more frequently in hollows of the turfy sod on the top of the great hill, 200 feet high, than on the shingly beach. I saw one Oyster-catcher's nest there among the beans in a bean-field. They usually select spots on the hill where knobs of rock surround the nesting-hollow, but sometimes breed on the flat turf among short bracken.

In parts of Connemara, where there are no sea-cliffs, I should expect Black Guillemots to breed under the huge boulders, to be found in so many places, forming a chaos of rock. I have seen the birds there. At the Cliffs of Moher I saw none, but Black Guillemots were seen evidently breeding about a low limestone island off the little port of Fisherstreet, in the horizontal fissures of which they must have had their breeding nook. Fisherstreet is over a mile from the cliffs.

R. J. USSHER, Cappagh.

**Carrion Crow (Corvus Corone) in Co. Antrim.**—Whilst conchologising in the woods round Murlough Bay, during the early part of September last, my friend Mr. J. Ray Hardy picked up a recently dead specimen of this bird. It was a fully plumaged bird of the year and quite fresh. The incident would have passed without comment on our part, if a remark made by Mr. R. Welch (who was with us) to the effect



that "the Crow is a rare bird in Ireland," had not led me to think that a record of the fact might interest Irish ornithologists. During the day we more than once heard the (to us) familiar cry of the Crow, and saw the birds themselves, either flying singly or associated with parties of Rooks and Jackdaws; and on a subsequent day we saw and recognised the cry of three individuals flying over the bog on the road between Ballycastle and Ballintoy. We have both been familiar with the Crow in England since boyhood, and Mr. Hardy has observed it frequently in various parts of Co. Kerry, and has now in his collection skins and eggs taken by himself in the woods in Gap of Dunloe—so there is no possibility of mistake.

R. STANDEN, Manchester Museum.

**Fork-tailed Petrel (*Oceanodroma leucorhoa*) near Londonderry.**—About 20th October Mr. Buckle, of Culmore, near Londonderry, shot a specimen of this species on the shores of Lough Foyle.

D. C. CAMPBELL, Londonderry.

**Bird Notes from Co. Cork.**—A good specimen of the Squacco Heron (*Ardea ralloides*) was shot near Ballinacourty, County Waterford, on the 12th September, 1895 (no doubt the one referred to by Mr. E. Williams as having been shot in County Cork, see Vol. v., No. 2, *Irish Naturalist*), and a Ruff (*Machetes pugnax*) near Blarney, on the 20th February, 1896. The reports which I have received of Quail, *Coturnix communis*, from Co. Cork this year, show that the distribution has been pretty general over the county; in the locality of Midleton they appear to have been more numerous than elsewhere.

W. BENNETT BARRINGTON, Cork.

#### GEOLOGY.

**Cave at Westport.**—Referring to the note in the *Irish Naturalist* for October (page 276) as to the cave near Westport "called Aglemore," I believe that the place specified is evidently Ailemore, and the cave is nothing more than the underground passage of a mountain-stream. As far as I can understand, it has never been explored, and I doubt very much if a man could push his way through. I have thought of trying it, but the idea quite escaped my memory when the season was most favourable. All the same, the place is well worth a visit; and, though tourists will be disappointed of a three and a half miles walk underground, and though the Aile caves do not surpass those of Mitchelstown, a very pleasant day can be spent in the vicinity. The entrance to the underground passage is at the base of a limestone cliff of about thirty feet high, and concave in shape, formed of stratified limestone, which falls occasionally from the roof in huge square blocks.

JOSEPH M. M'BRIDE, Westport.

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The Belfast Naturalists' Field Club ; The Dublin Naturalists' Field Club ;  
The Armagh Natural History and Philosophical Society ;  
The Cork Naturalists' Field Club ; The Limerick and Clare Field Club.*

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AND

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

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 ERRATA.

- Page 7, line 12, for "fitted," read "pitted."  
 " 7, " 15 from bottom, for "snail," read "soil."  
 " 8, " 22, for "subtriata," read "substriata."  
 " 57, " 5, for "Otiorrhinchus," read "Barynotus."  
 " 171, " 4 from bottom, for "Typhæda" read "Typhæa," and for  
 "norifer," read "nodifer."  
 " 214, " 5, for "sylvestre," read "erectum."  
 " 217, " 5 from bottom, after "rotundata," insert "var. alba."  
 " 217, " 2 " " "Hyalinia," insert "nitidula, var. Helmsii."  
 " 218, " 20 for "were," read "was."  
 " 253, " 6 from bottom, after "lichenologist," insert "and Judge  
 Borwick."

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Plate 1 was inserted by error in the number with back to p. 201. In the volume it must face page 201.

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# The Irish Naturalist.

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## VOLUME VI.

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### THE LAND MOLLUSCA OF BALLYCASTLE AND DISTRICT, CO. ANTRIM.

BY ROBERT STANDEN.

(Read before the Conchological Society of Great Britain and Ireland,  
10th December, 1896.)

EARLY in the month of September last I visited Ballycastle, Co. Antrim, in company with Dr. G. W. Chaster and Mr. J. Ray Hardy, and we were there joined by Mr. R. Welch, whose recommendation had induced us to choose this place as the scene of our investigations; and to his hearty co-operation and prior knowledge of the district we are indebted for no small portion of the success and pleasure attending our trip. The Antrim Arms Hotel was chosen as our headquarters, and I would strongly advise any naturalists, who may feel inclined to follow our footsteps, to put up at this comfortable old hostelry—which is just “home”—where they will find the genial host and hostess, Mr. and Mrs. Hunter, most kindly disposed to wink at the various “messes” inseparable from the cleaning and preliminary preservation of specimens, and other operations of the naturalist, which my brother-collectors must know the difficulty of carrying out at an ordinary hotel.

Our chief object was to obtain as full and complete a knowledge as possible of the molluscan fauna of the district, both marine and non-marine, and during our week's stay most of our time, when not engaged in marine work, was devoted to searching the surrounding country for land-shells. By using a car to convey us quickly to any desired point, and then working across country to another point where our car caught us up, we were enabled to get over a considerable extent of ground during a day, and, altogether, we worked about sixteen miles of the coastline and intervening ground pretty thoroughly. Our researches extended on the one hand over the magnificent promontory of

Fair Head, which marks the northern point of the Antrim coast; and thence to the lovely wooded amphitheatre surrounding the Bay of Murlough, one of the most charming spots in the Kingdom; and, on the other hand, to Whitepark Bay, the sand-dunes and cliff-talus of which we searched from Port Braddan to Ballintoy. The cliffs along the shore towards Sheep Island and Carrick-a-Rede; the golf-links, sand-dunes, and riverside near Ballycastle, and delightful little glens on the right hand of the riverside road leading towards Glenshesk, and running therefrom into the high land, were all carefully examined, and yielded many good things. Wherever practicable, we made a point of bringing away bagsful of moss-shakings and rejectamenta, &c., for future examination at home, after drying and sieving. From the "pockets" of windblown shells on the dunes at Whitepark Bay we obtained a large quantity of exceptionally rich material. These "pockets" were found to contain an extraordinary accumulation of minute land-shells brought down by wind and rain from the herbage and bushes on the Chalk talus at foot of cliffs, or maybe washed over the cliffs from above. Most of the shells are "dead," and much worn by being blown to and fro amongst the sand, but many are in good condition, and some are alive—these probably live for a time upon the vegetable matter and plentiful supply of rabbits' droppings blown into the hollows along with them. It would require a vast amount of searching in the ordinary way to gain such an accurate knowledge of the molluscan fauna of a given locality as is afforded by the systematic investigation of material judiciously selected from such "pockets."

The geological features of the district are extremely diversified and replete with interest, but an adequate description is quite beyond the scope of this paper, and I must refer my readers to Prof. G. A. J. Cole's "Scenery and Geology of County Antrim," where the subject is most lucidly dealt with. I may, however, notice one or two salient characters of the coastline. The high basaltic cliffs are the most striking feature, but here and there they are replaced by fine Chalk cliffs, bounded, as at Whitepark and Murlough, by a sloping talus, the hummocky grassy slopes of which are formed by the Chalk having slipped in irregular masses over the soft Lias beds underneath.

This talus is *the place par excellence* for land-shells of many species, and the varied vegetation growing thereon adapts it especially to the requirements of molluscan life—particularly when, as at Murlough, it happens to be well wooded, for here we get many forms of slugs not met with in less sheltered and dryer situations.

The various streams and small lakes examined were remarkably barren, the only fluviatile mollusc found being a small form of *Limnæa truncatula* in a swampy place on Fair Head. Mr. R. Welch has, however, taken *Limnæa peregra* and *L. palustris* in a ditch on Lemanagh Mountain, above Whitepark, in 1889; and *Ancylus fluviatilis* in Portaleen Glen, just south of Murlough, in 1893.

As regards previous conchological work in this district: although Thompson, the famous Irish naturalist, gives many records for Co. Antrim and North of Ireland generally, in his "Natural History of Ireland," vol. iv., and presumably includes Ballycastle, he only mentions the place specifically as a locality for *Helix virgata*. His remark "generally distributed" is often used, and usually refers to all Ireland. Probably he had so many Antrim records for any fairly common species that he confined his localities as far as possible to those counties where he had to depend upon the co-operation of correspondents and friends. Mr. R. Welch has collected about thirty species in the district on various visits during the past few years; and by his fortunate discovery of *Helix arbustorum* at Murlough in May last, has added another to the very few recorded stations for it in Ireland. He has also collected several species on Rathlin Island (which we had not time to visit), and I note these records in the list. Miss O'Connor, of Ballycastle, kindly showed us her collection of exotic shells, and embodied amongst them I noticed a few nice examples of the larger species of Helices common to the district, and collected by her in the neighbourhood.

The classification and nomenclature employed in the sub-joined list is that given in "Irish Land and Freshwater Mollusca," by Dr. Scharff.<sup>1</sup>

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<sup>1</sup> *Irish Nat.*, vol. I., 1892.



(N.B.—Whenever “Glenshesk” is used to indicate locality of any particular species, it must be understood as referring to the little glens, already mentioned, on road leading from Ballycastle to Glenshesk proper).

**Vitrina pellucida**, Müller.—Good-sized dead specimens were fairly common at Murlough; and many small living ones in the “pockets” of windblown shells at Whitepark.

**Hyalinia cellaria**, Müller.—Common at Murlough, and under stones on roadside going towards Glenshesk. Found at Ballintoy by Mr. Welch in 1889.

**Hy. Draparnaudi**, Beck.—At Murlough, along with many immature examples, we took a few exceptionally large specimens of this fine shell. Mr. Welch also got it there in 1894. Although not recorded for Antrim in Dr. Scharff's list, this species will probably be found more commonly as research extends. Large adult shells are, in my experience, not very plentiful, and the strong resemblance borne by the immature shell to *Hy. cellaria* will doubtless account for its being often overlooked by collectors unfamiliar with the differential characteristics of the two species.

**Hy. allaria**, Miller.—Common throughout the district; at Murlough, Glenshesk, and in the “pockets” at Whitepark, the type and greenish-white var. *viridula* are about equal in number. Some of our specimens from Murlough bear a strong likeness to *Hy. glaber*, but Mr. Thomas Rogers, to whom I have shown them, doubts their identity with that species. Rathlin Island (Welch, 1894).

**Hy. nitidula**, Drap.—Not uncommon at Murlough. One of my specimens has the last whorl pure white from the point where the second season's growth commences. One fine example of the white var. *Helmi* occurred on the wall of an old outbuilding near the path leading through the woods.

**Hy. pura**, Alder.—We found this species sparingly at Murlough, Glenshesk, and Whitepark, along with the brown var. *nitidosa*, Fér.

**Hy. radiatula**, Alder.—This, along with var. *viridescens-alba*, is very common at Murlough, Glenshesk, and in the “pockets” at Whitepark. Mr. Welch took it at Torr Head, south of Murlough, and at Ballintoy, in 1889.

**Hy. crystallina**, Müller.—A few at Murlough, and plentifully in the “pockets” at Whitepark.

**Hy. nitida**, Müller.—A very thin and pretty form occurs in a damp spot at foot of some rocks near the footpath at Murlough.

**Hy. fulva**, Müller.—A few rather large ones amongst moss-shakings from Murlough and Glenshesk; common, but dead, in the Whitepark “pockets.”

**Arion ater**, L.—Common everywhere. Var. *brunnea* at Murlough. Thompson does not mention a northern locality for this slug.

**A. subfuscus**, Drap.—Three specimens under logs at Murlough.

**A. hortensis**, Dr.—Two specimens at Murlough.

**A. circumscriptus**, Johnston.—One characteristic full-grown example at Murlough, feeding on fungus.

**A. intermedius**, Normand.—Several specimens under logs, and on a rotten tree-stump in a dark part of the wood at Murlough. One on fungus at Glenshesk.

**Limax maximus**, L.—Abundant, and very fine and well-marked, under some rotten timber at foot of a coppice on the roadside between Fair Head and Murlough. Some extremely large shells were obtained from these specimens.

**L. marginatus**, Müller.—Very plentiful on the trees in Murlough wood. Nearly all the tufts of *Orthotrichum phyllanthemum*, which grows so abundantly there, contained the "tree-slug" in all stages of growth, and its tracks could be seen high up on the tree-trunks.

**Agriolimax agrestis**, L.—This universally common slug was met with wherever we collected, but did not occur very plentifully, and little variation was noticed.

**A. lævis**, Müller.—This species is not given for Antrim in Dr. Scharff's list, but we found it rather common in damp parts of the woods at Murlough under moss-covered stones and old logs.

**Helix pygmaea**, Drap.—Two specimens from moss-shakings at Murlough, and a few dead in the "pockets" at Whitepark.

**H. rotundata**, Müller.—Murlough and Glenshesk, not very plentiful, but beautifully marked at the latter place, where the var. *Turtoni* also occurs. Obtained by Mr. Welch on Rathlin Island, and at Torr Head in 1889.

**H. pulchella**, Müller.—At Murlough the var. *costata* only occurs, but is not common. In the sandhill "pockets" at Whitepark it occurs dead in great profusion, along with a few alive; but on the crumbling face of the Chalk cliffs, and amongst the talus at the Ballintoy end of the bay, it is living in myriads. I have carefully gone over some thousands, sorted out from the material brought home from this place, and find very few examples of the ribbed variety—not more than five per cent. Thompson says "the ribbed variety is more common than the smooth (type) on the sea-banks." Dr. Scharff remarks that type and variety are generally found together, but this does not at all agree with my experience either in England, Scotland, or Ireland: indeed I have so often found the two forms living separate, and noted the absence of intermediate forms between type and variety, that I am strongly of opinion that the ribbed form—*Helix costata*, Müller—ought to rank specifically.

**H. aculeata**, Müller.—A few nice specimens obtained from moss-shakings from Murlough and Glenshesk; also dead in the Whitepark "pockets."

**H. lamellata**, Jeff.—This exquisite little shell appears to be generally distributed throughout the district, but we did not obtain more than eight or ten specimens from moss-shakings from any one locality.

**H. hispida**, L.—Very common, and variable in form. Var. *concinna* appears to predominate in the district. At Murlough a peculiar small dark flat form occurs—Jeffreys' var. *subrufa*. Along the walk on the cliff face, going towards Sheep Island, a large, thin, globose, pale form

occurs amongst the coarse grass growing in the clefts of the rocks. This is var. *subglobosa*, Jeff.

**Hellix rufescens**, Penn.—Amongst a heap of stones on the roadside between Ballycastle and the harbour a large and distinct form was so abundant that it might be swept off the stones literally in handfuls. Scarce or absent elsewhere, being, as Thompson remarks, apparently replaced by *H. concinna*.

**H. fusca**, Mont.—Glenshesk: two specimens from moss-shakings. Mr. Welch took several specimens at Glenariff, to the south of the district, on his way to join us at Ballycastle on September 3rd, 1896.

**H. arbustorum**, L.—There is a small colony of this at Murlough, near the old limekilns, where it was discovered in May of the present year by Mr. Welch. The shells are large, and mostly typical, but a few are var. *marmorata*. This species occurs in so very few localities in Ireland that its discovery at Murlough is particularly interesting. Thompson records it for Larne, where he took many specimens. (See *Mag. of Zool. and Bot.*, vol. ii., p. 436). We brought away only a few specimens, and hope the colony will increase and multiply.

**H. virgata**, Da Costa.—On the sand-dunes by the Ballycastle golf-links there is an extensive colony of a small form of var. *submaritima*. Near the coastguard station at Ballintoy Mr. Welch took a few in 1894, and this year it is in profusion on a small bank by the roadside there, in company with *H. ericetorum*. He also took it on Rathlin Island in 1886, and at Whitepark in May last. Thompson specially mentions its Ballycastle station, and remarks on its erratic method of occurrence in one place, and then its absence for 100 miles or so.

**H. ericetorum**, Müller.—Extremely abundant at Whitepark Bay in company with *H. acuta*. After a damp night we found both species out in myriads feeding upon the rabbits' droppings, with which the scanty herbage of the sand hills is strewn. Var. *leucosona* and a white bandless form were equally common with the type, and some of the shells are unusually large.

**H. acuta**, Müller.—Abundant at Whitepark, where the principal varieties are *bizona*, *strigata*, *articulata*, and *flammulata*. Taken by Mr. Welch at Ballycastle in 1889; but we did not find it there this year.

**H. nemoralis**, Müller.—This beautiful species occurred nearly everywhere in suitable localities, exhibiting the usual forms of band-variation, and some of the less common colour-varieties: notably at Murlough, where we took some very fine red and yellow bandless shells, some of them extremely thin and fragile, but rather above the average size. With them were some pretty albolabiate and roseolabiate forms; also var. *castanea* and var. *olivacea*. At Whitepark the shells are more solid, well-coloured, and show considerable band-variation: the white-lipped form is not uncommon. On the roadside, just above the Ballycastle workhouse, we got some pretty varieties, including var. *undulata*. At Glenshesk some good examples of vars. *aurantia*, *rubella*, *coalita*, and *albolabiate* occurred. In fact the district is in no way behind other places in its show of varietal forms of this attractive species.

**H. aspersa**, Müller.—The constancy of marking exhibited by this species throughout Ireland has often been noted, and the vast number of specimens observed in our district were, generally, no exception to the rule. At Whitepark nothing approaching any particular "variety" was noticed amongst the thousands we saw. At Murlough a little less uniformity occurred, and one good typical var. *undulata* was taken, along with a form approaching *grisea*, on rocks near the footpath. A very dark and almost unicolorous specimen was found in Miss O'Connor's greenhouse. Otherwise the shells everywhere looked much alike, and their good and unweathered condition was remarkable, considering the exposed places in which many were living. The Chalk cliffs at Whitepark presented a wonderful spectacle. In many parts they are fitted with regularly-shaped holes of different sizes, and in every hole rested a *H. aspersa*, the dark shell showing up conspicuously against the white background. On one little bluff, about 4 yards by 2, we counted over 200 specimens—and this did not include those far down in the crevices.

The first impression was that the shells are resting in natural cavities caused by the weathering out of flint nodules or fossils, but a more critical examination shows all the holes to be fairly symmetrical: they are not anything like as irregular as flint-cavities, and, besides, there are no flints there. So far as I can ascertain there are no holes like these elsewhere in the county. Almost all the holes run up vertically, a few nearly so, none down, and most of them are underneath the little ledges left in the face of the cliff by weathering. Dr. Scharff alludes to this habit of *H. aspersa* in *Irish Naturalist*, vol. I, p. 118, and quotes M. Bouchard-Chantreaux's experiments, which point to the presence of an acid secretion in the animals which might have an influence in softening the hard chalk, and thus enabling the snail with its rasp-like tongue to remove the material. This is very probable, but from my own observations on some *aspersas* in captivity<sup>1</sup>, which ate enormous quantities of chalk—so much so, that the pot in which they were confined was strewed with their excreta in the form of white pellets, covering the snail to a considerable depth—I should say that the gradual gnawing away of the soft weathered chalk of the Whitepark cliffs by successive generations of *aspersas* would very well account for the remarkable holes tenanted by the shells there. The diameter of many holes is larger inside, and there is a general look of freshness immediately underneath the animals, which seems to point very conclusively to the holes being their own work.

**Gochilcopa lubrica**, Müller.—In the Whitepark "pockets" thousands occur—living and dead together—and it is fairly plentiful everywhere, together with its varieties *ovata* and *tubricoides*. Var. *hyalina* occurred at Murlough and Glenshesk, Rathlin Island, and Ballintoy, 1889 (Welch).

**Pupa angilca**, Fér.—A few very dark-coloured specimens at Murlough; some nice examples of var. *pallida* at Glenshesk, and a few dead in "pockets," Whitepark.

<sup>1</sup> *Journ. of Conch.*, vol. vii., p. 33.

**Pupa cylindracea**, Da Costa.—Common at Murlough, along with var. *curta*; fairly plentiful elsewhere; at Glenshesk an elongated pellucid form occurs sparingly.

**P. muscorum**, Müller.—Abundant in the "pockets" at Whitepark, some alive. We here got two fresh dead and three living specimens of var. *albina*.

**Vertigo edentula**, Drap.—Amongst moss-shakings from Murlough and Glenshesk we obtained a good many specimens, most of them immature; also a few fresh ones in the Whitepark "pockets."

**V. alpestris**, Alder.—The occurrence of this rare alpine species in the "pockets" at Whitepark is especially noteworthy. Several dead and two living specimens were taken. One example was picked up on the spot, and we were much interested in watching its active movements in the tube, to which it was carefully transferred from Mr. Welch's muslin sieve. Dr. Scharff says in his Irish list (1892) that the occurrence of this species practically rests on the record of a single specimen taken at Coleraine, and at time of writing he had not seen an Irish specimen. Since then, however, I have taken it at Portsalon, Co. Donegal, and sent a specimen to Dr. Scharff.

**V. pygmaea**, Drap.—Common at Whitepark, dead; and a few living ones from moss-shakings from Murlough, and Glenshesk.

**V. subtrilata**, Jeff.—Some pretty live shells amongst moss-shakings from Glenshesk and Murlough. Many dead in Whitepark "pockets."

**V. antivertigo**, Drap.—Five living specimens in a damp part of Murlough wood, amongst leaves and wet debris.

**V. pusilla**, Müller.—Another interesting and rare shell yielded by the examination of the "pockets" at Whitepark, which have proved a veritable treasure-house for the Vertigines. Both dead and living specimens occurred, and we have no doubt the species is living in abundance amongst the talus at foot of the cliffs, where we should recommend careful search by future collectors in this conchological paradise.

**V. angustior**, Jeff.—Very abundant in the Whitepark "pockets." The extreme freshness of the majority of the shells indicates that it is living near at hand, but although we searched long and carefully, in the brambles and bracken ferns which grow densely in damp low-lying places between the sand-hills, we were unsuccessful.

**Balea perversa**, L.—Abundant on the old trees in Murlough wood, and in the tufts of moss—*Orthotrichum*—growing luxuriantly on the trees.

**Clausilla bidentata**, Strom.—Common throughout the district, and somewhat variable. At Murlough the form approaches var. *tumidula*, and here, as elsewhere, some of the shells are covered with a dense coniferoid growth, but this seems not to interfere with the epidermis of the shells, which is found quite intact, and richly marked, when the green growth is cleaned off.

**Succinea putris**, L.—A small pale form in a damp part near the brook in Murlough wood.

**Carychium minimum**, Müll.—Common at Murlough, and a few taken at Glenshesk and Whitepark.

**Acme lineata**, Drap.—Found in moss-shakings in a damp corner amongst the rocks on way from Fair Head to Murlough. One living specimen was found in a tuft of *Orthotrichum* taken from a tree in Murlough wood. This is, in my experience, a singular and unusual habitat for the species, but I have long had an opinion that the species might at certain seasons become somewhat arboreal in its habits. It would be interesting to look out for this where *Acme* is known to live in woods containing mossy trees.

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### FIELD CLUB NEWS.

We have pleasure in drawing attention to the action of the Committee of the Dublin Club in opening a subscription list on behalf of the Giants' Causeway Defence Fund. It would certainly be discreditable if the gentlemen who are contesting the case on behalf of the public—one of whom is the President of our premier Field Club—did not meet with ready support from all those who would like to see the Giants' Causeway open to all students of nature in the future, as it has been in the past. The Dublin Club's subscription-sheet will be on the table at the next two meetings, and contributions will be received at any time by the Treasurer, Prof. T. Johnson, 12 Gilford Avenue, Sandymount. While on this subject we may mention the admirable lecture delivered by Mr. William Gray to the Belfast Club on November 17, on "The Origin and present Condition of the Giants' Causeway," which will no doubt stir up local interest in the matter.

The Committee of the Dublin Field Club have accepted the invitation of their brethren in Belfast to join them in a three-day excursion next July to the beautiful North Antrim coast. Ballycastle will be the base of operations, and from there the combined Clubs will penetrate to the recesses of Murlough and White Park and Glenshesk. It is hoped that members of the Cork and Limerick Clubs will also take this opportunity of visiting one of the most beautiful and interesting districts in Ireland.

Our warm congratulations to three members of the Dublin Club—Prof. A. C. Haddon, on whom the degree of D.Sc. was conferred at Cambridge last month, Mr. A. H. Foord, who has taken the Ph.D. of Munich, and Mr. H. L. Jameson, who has just obtained his B.A. degree in Natural Science at Dublin University, with first class honours and a gold medal.

Some changes are announced in the official staff of the Dublin Club for 1897. Mr. N. Colgan, Vice-President, retires, owing to pressure of work in connection with the new edition of *Cybele Hibernica*. His place is filled by Mr. R. Lloyd Praeger, whom Prof. T. Johnson succeeds as Secretary, while Prof. Johnson's post as Treasurer is filled by Mr. H. K. Gore Cuthbert.

## THE MIGRATION OF BIRDS.

ABSTRACT OF THE BRITISH ASSOCIATION COMMITTEE'S REPORT.

BY J. E. PALMER.

THE British Association Committee appointed to enquire into the subject of the Migration of Birds, after recording the observations made by the lighthouse and lightship keepers around our coasts for eight years, has now systematised and tabulated these observations in such a way as to give clear and good results. The labour has been enormous, for it was necessary to schedule more than one hundred thousand distinct observations in five different ways. This task was undertaken by Mr. W. Eagle Clarke, to whom the other members of the Committee express their deep sense of obligation. The Committee also express their indebtedness to the lighthouse authorities, and especially to the lightkeepers, whose intelligent co-operation made the work possible. As it is nearly twenty years since the Committee was first appointed, its *personnel* has undergone some change. It now consists of Professor Newton (Chairman), Mr. Jno. Cordeaux (Secretary), Mr. J. A. Harvie-Brown, Mr. R. M. Barrington, Mr. W. E. Clarke, and Rev. E. P. Knubley. The first four were original members of the Committee, as was the late Mr. A. G. More. As the Report is a long one it is necessary to omit here many details and minor points of interest. I purpose giving its substance, omitting no fact or deduction of importance, and keeping to the language of the Report as far as is consistent with sufficient condensation. It is perhaps more convenient to explain that the wording of the Report is largely used than to overcrowd the pages with quotation marks.

The Report states that the object of the enquiry was to obtain full and reliable data as to the migratory movements of birds observed on the coasts of the British Isles; and that there is now established, as regards Great Britain and Ireland, a firm basis for a sound conception of many of the phenomena of bird-migration, for it contains a plain statement of ascertained facts, and is free from theory or speculation. Much however yet remains to be learned from the observations collected; and the subject of inland migration is still un-

touched. The records on which the Report is based were made from 1880 to 1887.

The vast array of facts collected was arranged in a schedule showing for each species during each month (1) on what day, (2) coast, (3) station, (4) in what numbers, and (5) whether the occurrence was during the day or night. The results given are based on the whole of the information received from all the coasts. It is found to be impossible, at certain seasons, to distinguish between widely different *Immigratory* and *Emigratory* movements without consideration of the whole of the observations; the non-realisation of which fact has hitherto lead to misconception.

It is manifestly impossible to conduct anything approaching a really complete enquiry over the entire British area. Remembering the peculiar difficulties besetting such an investigation, the nature of the data obtained is satisfactory, and has proved surprisingly accurate and adequate for the purpose. It is often astonishing how observations made at one station are borne out by the records at others.

As to the importance of the enquiry, such a voluminous set of observations, made from the most favourable situations for witnessing bird-migration, has never before been amassed. The special nature of the work can only be fully appreciated when it is realised that in order to study the phenomena of bird-migration in the British Isles, the data on which deductions may be satisfactorily founded must be based upon observations taken synchronously at stations around the entire coasts. This cardinal condition has been accomplished for the first time in any country through the labours of the Committee. The results given are based absolutely upon the records obtained by the Committee, and the subject has been approached without preconceived ideas. The Daily Weather Reports of the Meteorological Office have been consulted and correlated with the data relating to the migratory movements.

Bird-migration, as observed in the British Isles, is perhaps more complex than in other regions, for our isles, lying between south-western Europe and the Scandinavian peninsula, Iceland, and Greenland, are directly in the course taken by legions of birds which annually make a double journey between their northern summer homes and their southern winter



quarters. Our shores form a main highway and convenient resting-places for these migrants. Our islands have a vast bird population of their own, and the majority of these birds belong to migratory species. Many species which are migratory are only partially so in our islands. Our variable climate causes much internal migration within Great Britain, and with Ireland. This occurs in winter. Migrations of a varied nature thus occurring, often through a combination of meteorological conditions, two or more distinct migratory movements are sometimes observed in progress simultaneously.

Although in passing from summer to winter haunts birds go from a northern to a more southerly clime, it does not follow that these haunts are reached by a simple movement from north to south. This is especially the case in Western Europe, where, with its irregular coast-line, more or less devious routes are followed. The situation of the British Isles is an important factor in this deviation. The distribution of birds on our coasts during migration, and the routes traversed, naturally depend on the nature of the particular movement. The principal movements are the intermigrations between our islands and the Continent.

Between Britain and the Continent pass hosts of migrants, which are either birds of passage on, or winter visitors to, our shores. The former visit our east coast in spring when passing to their northern summer haunts to the north-east of Britain, and again in autumn when going to their winter haunts in the south. The winter visitors are chiefly individuals from the ranks of migratory species which spend the winter in the British area, and go to the north-east of Europe for the summer. In autumn these numerous migrants arrive from the north-east on the eastern shores of Britain, from the Shetland Isles to the northern coast of Norfolk. During these movements the more southern portion of the east coast of England is reached after the arrival of the birds on the more northern portion. It is noteworthy that all the British birds of passage to northern Europe are either summer visitors to Scandinavia, or are regular migrants along the western shores of that peninsula; and that they all occur during migration in the Orkney and Shetland Isles, but not

in the Faröes. After arriving on our east coast these immigrants—some of them after resting for a while—move either down the coast *en route* for more southern winter quarters or to their accustomed haunts in the British Isles. The west coast do not receive directly any immigrants from Continental Europe.

An East and West Migration Route is one of the discoveries of the enquiry. During autumn a stream of migrants, largely composed of certain species, passing from south-east to north-west, and from east to west, is observed at the lighthouses and lightships along the southern section of the east coast (from Kent to the Wash). This is called the "East and West Route." At the more northerly stations of this section of coast the birds are going from south-east to north-west, and at the southerly stations the direction is from east to west. Of those going north-west some go beyond the Tees, many proceeding inland as they go. Some of the birds following this east and west route pass to the west along southern England. Immigrations from the Continent by this route are renewed during winter when there is severe cold.

Some remarkable features associated with these east to west movements are :—(1) they are frequently observed for a number of consecutive days ; (2) they often occur when there is an absence of migration on other parts of the coast ; (3) the movements appear to be confined to the daytime, and are usually timed as from soon after daylight to 1 p.m. ; (4) the flocks are chiefly composed of Larks, Rooks, and Hooded Crows, while Redbreasts, Goldcrests, Chaffinches, Greenfinches, Tree-Sparrows, and Starlings are numerous ; there are Woodcocks occasionally, and during the winter Larks, Thrushes, and Lapwings ; and (5) on some occasions these birds while passing northwards along the English east coast actually cross the migrants which are proceeding southwards. Whether this east to west stream is a branch of one that passes down the coast of Continental Europe, or whether it originates in central Europe, is not ascertained.

The conclusions relating to these migration-routes are chiefly based on the autumn data, which are more voluminous and complete than the spring records. The spring records however show that the birds retrace their flight along the

lines taken in autumn. Records of the bird movements observed at Heligoland from 1883 to 1886 by Herr Gätke have been compared with the records of Eastern Britain for the same period, but they do not bear out the supposition of a direct migratory movement between Heligoland and Britain; which places thus appear to draw their migratory hosts from different sources. Some species which make the Faröes, Iceland, and Greenland their summer homes (the Wheatear, White Wagtail, Whimbrel, &c.) are observed on passage on the western coast of Great Britain and on the Irish coasts. This movement is independent of the great stream of migrants arriving at and departing from the east coast of England in autumn and spring.

The emigratory movements on the east coast are simple: when the coast is reached the birds follow it southwards, and quit our shores on the south of England. The movements down the west coast are less simple: the route followed is only partly by the coast, the coastline not forming a direct route. At various points the flights receive large accessions. In connection with these movements the coasts of Cumberland and Lancashire lie outside the route taken; the north-east coast of Ireland is only occasionally touched; the contributory flights from Ireland are almost entirely from the southern, and particularly the south-eastern, coasts. The south-western coast of England seems to be especially affected when there are considerable movements on the south and south-east coasts of Ireland, implying that there is much intermigration between these particular portions of the English and Irish coasts.

The Irish records have been excellently kept, and the returns of specimens killed against the lighthouse and lightship lanterns around the Irish coasts have been larger and more valuable than those received from the coasts of Great Britain. The Irish coasts do not in themselves constitute a main highway for birds, but they participate along with the western shores of Great Britain in movements on the part of some birds. Probably many of the birds observed on the Irish coasts are migratory members of the Irish avifauna.

When the movements from the south-east Irish coast, already referred to, are occurring, there is often a movement

along the western coast from Slyne Head southwards. These Irish emigrations usually occur simultaneously with similar movements passing down the western coast of Great Britain, and the two streams of migrants meet and unite between the Bristol Channel and the Scilly Islands. Some of the Irish autumnal flights, however, are independent of these general movements.

The observations collected show that not only do the autumnal emigrants depart from the south-east coast of Ireland, but also that many migrants (e.g. Thrushes, Redwings, Black-birds, Chaffinches, Greenfinches, Linnets, Starlings, Larks), almost simultaneously arrive, by the same route, in Ireland, in order to winter there. These cross-channel flights are usually observed in the daytime, but at times some of these birds reach Ireland in the night.

Independently of these main Irish migratory movements, Thrushes, Larks, and Starlings occur in October and November on the northern coasts of Ireland as immigrants from Scotland. Larks are recorded by this route in the daytime. There are also east and west autumnal movements between Ireland and Great Britain on the part of Starlings, Chaffinches, Greenfinches, Larks, and sometimes various species of Thrushes. Anglesea is the chief Welsh point, and Rockabill, County Dublin, the chief Irish station, where these departures and arrivals are observed. The migratory movements noted on the west coast of Ireland are neither many nor important, and consist chiefly of movements on the part of emigratory Irish birds. There are, however, remarkable immigrations from home sources witnessed on the west coast and its islands during great cold or snow.

The records from the south coast of England are not as complete as from the other coast lines; but they point to a considerable migration taking place between this coast and the south-west of Europe, and to important movements taking place along the entire line of coast. It is possible that British emigrants, after passing down the east coast of England, may turn to the westward and skirt the south coast; but this is not shown with certainty. The continental immigrants strike the Kentish shore, and, as already stated, some pass up the east coast, while others go west, probably

to Ireland, on whose south-eastern shores the birds are recorded, almost simultaneously, as arriving from the south-east. Some of these birds, Skylarks especially, seem to go northwards towards the Outer Hebrides, being observed at a number of stations on the route thither.

The first autumnal movements begin towards the end of July on the part of species which nest in the far north, such as the Whimbrel, Knot, Green Sandpiper, Curlew Sandpiper, Turnstone, and Bar-tailed Godwit. Probably these July immigrants may be non-breeding birds. The immigration during August includes twenty-six species whose summer homes are beyond the British area, and the northern representatives of several British breeding species. September shows a marked increase in immigration both as regards species and individuals. Over forty species which do not spend the summer in Britain are recorded as migrants this month.

In October the flood of immigrants reaches its greatest height, when prodigious numbers of birds arrive; but certain species appear to have ceased to occur, having already passed. After the middle of November immigration of birds which spend the summer in the north ceases, with the exception of marine species (Ducks, Gulls, Grebes, Swans) whose movements depend on severe weather. A few other species are recorded more numerous during November than earlier, namely, the Lapland Bunting, Ring Dove, Little Auk, and the winter Grebes. The immigrants arriving by the East and West Route come from September to November, and again during the winter when severe cold occurs.

The emigration of our summer visitors begins towards the end of July, when Cuckoos and Swifts commence to go. About the same time small numbers of other species begin to move. It should be borne in mind in connection with this July movement that at this time many young birds, whose parents are busy with second families, are outcasts, and wander about until they reach the coasts, where they have been recorded. Some of the Plovers and Sandpipers also appear at the coast accompanied by their young at this time. During August much emigration among our summer visitors occurs, thirty-three species being recorded as departing. Thirty-four species which are partially migratory are recorded as emigratory in

August, though perhaps all are not necessarily passing beyond the British area. Both these classes of emigrants probably are increased in numbers by birds of the same species which pass the summer further north than the British Isles, and which, having reached our shores as immigrants, are also moving southwards along our coast line.

September witnesses the height and the close of the emigration of the bulk of the smaller British summer visitors. Over forty of these are recorded as moving off in this month, and about the same number of partial migrants. There are often tremendous rushes of migratory birds towards milder climates in this month, due to outbursts of ungenial weather. The partial migrants are much on the move in October. Emigratory birds are observed passing southwards, and feeding as they go, during the daytime; but their oversea flights are usually undertaken at night.

After the middle of November, and through the winter during cold spells, movements of a different nature take place, due to severe weather. Birds specially affected then go either to warmer districts within the British Isles, or to more southern regions. When frost sets in, particularly if there is snow and sleet, it causes an immediate rush to the coast, and especially to the western coast of Ireland, where a milder climate almost always prevails, even when there is very cold weather in other parts of the British Isles. If the cold is severe and prolonged, the isles off the south-west coast of England and Ireland are sought. Occasionally, as in December, 1882, these usually safe retreats failed the refugees; the hardy Snow Bunting perishing with the rest. The species which appear especially susceptible to cold, either constitutionally or from deprivation of food (most probably the latter), are the Missel Thrush, Song Thrush, Redwing, Fieldfare, Blackbird, Greenfinch, Linnet, Starling, Lark, Water Rail, Lapwing, Curlew, Snipe, and Woodcock. Cold weather migration is performed in both the day and night time, the more extended flights appearing to be taken in the night.

The earliest spring migrants are recorded in February, when such partial migrants as the Pied Wagtail and Lapwing return to the Orkneys and other northern stations, and certain rock-breeding seabirds revisit their nesting haunts.

There is also a return movement of Thrushes in mild weather. In March there is a considerable return of partial migrants, and of a few summer birds ; but in April the latter mostly return.

It is remarkable, in connection with the arrival of these earliest immigrants, that the great majority of them are recorded first at the south-west coasts of England and Ireland. Thus in March, out of 94 observations, 71, or 75 per cent., were made in the south-west. In April, out of 157 first records of the arrivals of summer visitors, 115, or nearly 74 per cent., are recorded from the south-west coast and Ireland. These percentages should be higher, for it must be explained that there were no spring data for Ireland in 1880 and 1881, nor for the west of England in 1883, while the east coast has been credited, in the statistics quoted, with the observations made during all the years of the enquiry. It thus appears that spring migrants, not unnaturally, appear first in the warmest parts of our islands.

In May the immigration of summer birds continues. There are arrivals of Wheatears, Warblers, Swallows, Sandpipers, and Plovers up to the end of the month. These are undoubtedly on their way to summer homes further north than the British Isles, for our own birds of the same species are then busy with nesting operations. During June, especially in the first half of the month, several species whose breeding range extends to the Polar regions appear in considerable numbers on our shores. The chief among these are the Grey Plover and Knot; less numerous are the Snow Bunting, Wigeon, Barnacle Goose, Grey Geese, Swans, the Dötterel, Turnstone, Sanderling, Ruff, Bar-tailed Godwit, Whimbrel, and a few Great Northern Divers.

In connection with the spring immigration, the observations favour the theory that the earliest arrivals are British-breeding birds. This is borne out by the well-known fact that our summer birds appear in their breeding-haunts in our islands immediately after their first appearance on our coasts. Further corroboration is found in the fact that summer birds arrive in Britain earlier than in Heligoland, where nearly all the species observed are *en route* for more northern lands than ours.

The spring emigration from Great Britain to the Continent begins early. In February, in some seasons, Geese begin to move northwards, but the chief emigratory movement is the departure of Larks and Rooks to the Continent by the East and West Route. During March these movements increase, when the Hooded Crow is also seen returning to the Continent. Emigration to the north also commences on the part of the Great Grey Shrike, Shore Lark, Swans, Geese, Gadwall, Scaup, Golden Eye, Long-tailed Duck, Red-throated Diver, and probably many others. In this month, too, the Greenfinch, Chaffinch, Twite, &c., leave their winter retreats on the west coast of Ireland. In April thirty-four species are observed to leave our shores for the north, and the emigration by the East and West Route comes to an end.

In May the emigration to the northern breeding-grounds reaches its maximum, when fifty-three species are recorded. Our emigrants from Britain are joined by others (some of the same species as those leaving us) which have wintered further south. The departure of our winter visitors and the spring birds of passage takes place from the eastern coasts of Britain and the northern isles. A few species only, such as the Redwing, Wheatear, White Wagtail, Barnacle Goose, Swans, and Wimbrel pass up our western coasts, possibly *en route* for Iceland.

Special attention has been given to the actual relation between migrational and meteorological phenomena. The data relating to the latter are taken from the "Daily Weather Reports" issued by the Meteorological Office. These reports are based on observations made at fifty-four stations distributed over Western Europe. It was necessary thus to consult the Continental as well as British weather-conditions, for it is essential that the weather prevailing where the migratory movements have their origin should be considered. An extensive series of comparisons between the two sets of phenomena shows that they are intimately associated.

It is found that in both the spring and autumn migratory periods there are spells of genial weather without marked features other than those favourable to migration. During these the migratory movements are of an even-flowing nature. If the weather proves slightly unsettled during such periods



it is a matter of indifference to the migrants ; but if more pronouncedly so, their movements are slightly quickened thereby. The duration of such favourable spells is sooner or later broken by the advent of a cyclonic period, which interferes, to a greater or lesser degree, with the progress of migratory movements. Unfavourable weather-conditions of a pronounced nature temporarily interrupt the ordinary movements. The weather incentives to migration are of different kinds. First, there may be favourable weather-periods immediately following unfavourable periods. Secondly, they may be due to unfavourable weather, such as lower temperature, which either compels the birds to move, or acts as a warning to them to do so. Thirdly, and on the other hand, genial spring weather is an incentive to a northward move. Temperature plays the most important part in the various seasonal movements.

All the great autumnal immigrations coincide with favourable weather-conditions in north-western Europe—namely, the presence of a large well-defined anticyclone over Scandinavia, with gentle gradients to the south-west. On the other hand, cyclonic conditions may prevail west of the British area, with a low pressure centre off the west of Ireland. Under these conditions the weather is clear and cold, with light variable airs, over Norway and Sweden ; while in Britain the sky is overcast, with easterly winds, and frequently with fog on the east coast. These conditions usually follow the passing away of a cyclonic spell from Scandinavia, during which ordinary migratory movements are interrupted. Movements from the east by the East and West Route are most pronounced during similar favourable weather-conditions. All the autumn movements are stimulated by a fall in the temperature. In connection with spring immigration several unusually early appearances have been recorded, and the daily weather report shows that the localities where these early occurrences took place were at the time the warmest spots in Western Europe.

A careful comparison made between the migrational and meteorological phenomena in connection with these movements from the Continent shows that all such movements, except those performed late in the season, are to be correlated

with a rise of temperature in south-west Europe, which evidently induces the birds to start northwards. In not a few instances such movements are recorded for dates on which the temperature in Britain was lower than immediately before the immigration. This indicates that the increase of warmth at the seat of emigration is the main factor influencing the northward spring movement. This rise of temperature sometimes extends over the British Isles. Apart from this simple phenomenon no other peculiar meteorological condition appears to be associated with these spring movements. The spring migration from our islands to northern breeding-grounds is influenced by the weather-conditions prevailing at the time in the British area. This emigration, however, naturally takes place later than the corresponding movement into Britain from the south: it appears to commence in April and continues during May. It is embarked upon under the same type of pressure-distribution as that which is favourable to the autumn migration, namely, a high pressure centre over Norway and Sweden, with gentle gradients to the south-west. Under these circumstances there is fine weather over the North Sea.

The anticyclonic, or fine-weather periods in April are favourable to migration if the temperature is fairly high. Cyclonic periods as a rule are unfavourable owing to their high winds and ungeniality; on the other hand, when they are mild and follow a cold spell they are favourable to a northward migration from Britain. In autumn marine species, such as Skuas, Petrels, Phalaropes, &c., are occasionally driven out of their course by gales, when they appear on our coasts in large numbers, and are sometimes driven inland.

A careful study of the subject shows that the direction of the wind has no influence as an incentive to migration, but that its force is an important factor. The birds do not appear to be concerned by ordinary winds, but they do not migrate when the winds are exceptionally high. Particular winds usually prevail during the great autumnal movements. These, although favourable, are not an incentive to migration, but are the winds that accompany the high pressure centre over Norway, already referred to.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise a Great Cyclodus from the proprietor of the *Irish Field*; a Sparrow-hawk from Mr. W. Russell; a number of Irish birds from Rev. T. B. Gibson; a Diamond Snake from Miss E. Fitzgibbon; a Black Tortoise from Mr. A. E. Jamrach; a Kestrel from Mr. K. M. Dunlop; a Nubian Goat from Master Moloney; a pair of Rabbits from Miss J. Bailey; a Stoat from Mr. W. W. Despard; a number of fish from Mr. J. Godden. A Somali Lioness, a Golden Cat, a pair of Wood Storks, a pair of Snow Geese, a Boa Constrictor, three African and three Indian Pythons, six Egyptian Snakes, four Monitors, and eight large Tortoises have been acquired by purchase.

3,940 persons visited the Gardens during November.

### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 1.—The President (Professor EVERETT) presided.

Mr. ALEXANDER TATE first submitted his report of some matters considered at the Brit. Assoc. meeting in Liverpool. He asked the special attention of the Society to two schemes affecting the working of Societies like theirs which were discussed at considerable length at those meetings. The object of the first of those schemes was to promote the formation of district unions of natural history societies. It was drawn up and submitted by Mr. George Abbott, general secretary of the South-Eastern Union of Scientific Societies, and it proposed the division of the United Kingdom into fifteen or twenty districts, in each of which the societies should be grouped together for mutual aid, counsel, and work, any existing unions to be taken advantage of and not disturbed, each union to have an annual congress, held year by year in different towns, and to be attended by delegates and members from the affiliated societies. A further suggestion was that each local society should have a corresponding member in each village in its district to look after its interests and forward in every way its objects. The working of the Yorkshire Naturalists' Union had been very successful, one important result being the training of a number of skilful workers in the various departments of natural science. What had been done in regard to the Irish Union of Natural History Societies was clearly stated by Professor Johnson, the delegate from Dublin Naturalists' Field Club, and was corroborated by himself (Mr. Tate). The second proposal was made by Professor Petrie, its object being to provide a federal staff for local museums. He alleged that the main difficulty in the management of local museums was the securing of sufficient work for and means of paying for services of highly-trained and competent men as curators, and he considered that this would be obviated if there was co-operation. The opinion of speakers who took part in the discussion was generally favourable to the scheme. It appeared that a somewhat similar idea had been mooted some years previously, and had been reported on by a sub-committee of the Museums Association, without, however, leading to any definite

result. A strong protest was made by Professor Johnson, of Dublin, against the suggestion that the curators of the local museums should be converted into mere caretakers; he referred in terms of high commendation to the abilities of a curator in the North of Ireland, but expressed his surprise that his services were not adequately remunerated.

Dr. J. LINDSAY, M.A., read an essay on the poet Dante.

Mr. W. H. PATTERSON, M.R.I.A., then read an account of a recent discovery of worked flints in submerged peat at Portrush. He explained that the West Bay at Portrush had long been known as the site of an exposure of submerged peat. The winter storms of the last two years had, by washing away great quantities of sand, caused a much larger section of peat to be visible. The thickest masses of peat were at high-water mark, in one place forming a perpendicular face of nearly six feet high. In other places the peat showed an exposed face of three or four feet, and from that down to one foot or less, according to the extent to which the sea carried away the shelving sand which sloped from the peat down to the sea. There was also a good exposure of the peat and numerous remains of large trees between tide-marks. Here one walked on the top of the deposited beds, which were probably thinned away by marine denudation. The beds of compact peat higher up on the beach, and which present faces of various heights, as referred to before, were overlaid by banks of sand from fifteen to twenty feet high, and with vegetation on their surface. The sand was fine, and seemed to be chiefly blown, but in some places a slight stratification showing pebbles was noticed. This sand had been deposited over the peat, but was now being removed by the action of the winds and waves. The peat was exceedingly compact, but contained sand, showing that it was formed within the influence of winds carrying sand, doubtless from some sea-strand. The peat could not possibly have been formed at its present level as regards sea; the land here had probably experienced a downthrow, or possibly alternations of level had taken place, and thus the sea had been enabled to encroach very considerably upon the land. The remains of the forest of large fir-trees between tide water-marks at a level where such trees could not be grown made the matter of the downthrow very evident. In many places around our shores submerged peat with tree-remains was found. On the occasion of a visit to Portrush in April, 1896, he was examining the exposed sections of peat at the West Bay, when he noticed the point of a piece of flint projecting from the weathered face, and on pulling this out it proved to be a well-formed flint-flake. A little examination with the blade of a knife showed that there were more flakes behind the one first noticed, and the result was that in two visits he collected about eighty flakes, about twelve cores, and a considerable quantity of chips, but no axes, scrapers, nor any example showing secondary workmanship. With the exception of two or three outliers, the flints were confined to an area of not more than two feet square. They formed a flattened heap; they rested on peat, and were overlaid by about one foot of exceedingly compact peat, and this in turn had been covered by about twenty feet of sand, now partially removed by sea-action.

The flints were firmly packed together; in fact, they were interlocked one with another, so that when working into the face it was sometimes difficult to get one out until the adjoining one had been loosened and dislodged. The whole find was evidently the heap which the old flintworker had formed at his feet while he sat at his work on the hard surface of the ground before some of the changes of level took place, which enabled a later growth of peat to come and cover up the surface, including the heap of flints. The flints were quite unweathered and unrolled, and had their edges as sharp as if they had been just made. Their colour was quite unchanged, being the same dull black or dark grey that freshly-broken flint presented. Many of the flakes were of exceptionally large size, with great heavy butts, while others were thin and delicately formed, reminding one of the modern gun-flint makers' flakes. The cores also resembled those from which modern flakes were struck. On the whole, the flakes and cores were much like those found in the Larne gravels, with the marked difference that instead of being rolled and weathered they were perfectly sharp and fresh. The flakes measured from one inch to five inches long, most of them, however, being about three inches. He noticed that some of those flints were marked with spots or splashes of a clear vitreous glaze, exceedingly thin and transparent, as if liquid glass had been dropped or splashed upon them. This glaze reflected the light, but seemed to be without any appreciable thickness. He presumed that silica in solution must have come in contact with some of the surfaces of the embedded flints, but further than this he could suggest no explanation of the matter.

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BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 17.—The President (Mr. L. M. EWART) in the Chair. Mr. WILLIAM GRAY delivered a lecture on "The Origin and present Condition of the Giant's Causeway," which was discussed by F. W. Lockwood, J. M'Leish, Isaac Ward, R. M. Young, and S. F. Milligan. Replying, Mr. Gray reminded the members that their President was one of the defendants in the case now coming on, by which it was sought to exclude the public from the Causeway. He appealed to the members to assist the cause of the public by subscribing to the Defence Fund.

OCTOBER 21.—GEOLOGICAL SECTION. The monthly meeting was held, when rock-specimens from the Isle of Man were shown by Miss M. K. Andrews, including some "Crush Conglomerates," whose formation has recently excited considerable interest (see "The Crush Conglomerates of the Isle of Man," by G. W. Lamplugh, F.G.S., and W. W. Watts, F.G.S., *Journ. Geol. Soc.*, Vol. 51 (1895), p. 563, and Prof. W. J. Sollas, F.R.S., *Proc. Geol. Assoc.*, 1893, pp. 92-3, and 170.) Similar rocks occur at Portraine, Lambay, and elsewhere in Ireland, resulting from earth-movements. A collection of English fossils was shown by Mr. G. M'Lean, and Mr. R. Bell exhibited some interesting boulder-clay, with pebbles of Ailsa eurite and Cushendun conglomerate, from near Glenavy.

DECEMBER 15.—Rev. J. ANDREW lectured on "The Elemental Basis and Progressive Build of the Inorganic World."

**BOTANICAL SECTION, NOVEMBER 28.**—The course of study arranged for this winter comprises the principal British Natural orders of Plants, Oliver's well-known "Lessons" being used as the text-book. *Ranunculaceæ* to *Papaveraceæ* were discussed by the aid of fresh and dried specimens contributed by members.

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**DUBLIN NATURALISTS' FIELD CLUB.**

**NOVEMBER 17.**—The **PRESIDENT** (Prof. **GRENVILLE A. J. COLE**) delivered an address on "The Natural Rights of Scenery." It was illustrated by numerous lantern-views. The speaker urged that natural scenery should be treated with respect, if only on account of its mental and moral effect on our own lives. We ourselves, as races of men, are moulded by the lands in which we live; and to use our surroundings for purposes of commercial gain or self-advertisement is to appropriate to ourselves, or to our own short generation, what is of world-wide and perpetual importance. Roads, railways, mills, could be established without permanent injury to scenery, if due care was taken by local authorities to preserve the rights of the landscape. The vagaries of the private owner were difficult to deal with, and the Scotch "Access to Mountains Bill" failed to restore moorlands to public use. Nothing short of nationalisation of scenery, a large scheme of land-nationalisation, could entirely safeguard such treasures as the Giants' Causeway. Mr. Lavens Ewart, President of the Belfast Field Club, is one of the defendants in the test-case now approaching. The charges for admission to natural scenery in Scotland and in Switzerland should be indeed a warning; long might it be before Irishmen withheld the hand of welcome to the stranger until sixpence dropped into its palm.

The paper was discussed by Rev. M. H. Close, M.A., R. Lloyd Praeger and Endymion Porter.

Prof. T. JOHNSON, D.Sc., then presented a report as Delegate from the Club to the recent meeting of the British Association at Liverpool. He stated that at the Corresponding Societies Committee the question of local unions of scientific Societies was discussed, the subject being opened by a paper by Dr. Abbott, Secretary of the S.E. Union of Scientific Societies. A sub-committee was appointed to further consider the question, and the Club's delegate acted on the sub-committee. Prof. Flinders Petrie read a paper "On a Federal Staff for Local Museums"; in the discussion which ensued the Club's delegate took part. (See above under Belfast Nat. Hist. and Phil. Society).

J. G. ROBERTSON showed a beautifully preserved fossil amphibian from the Jarrow colliery, the skeleton being quite complete; also the jaw of a larger amphibian.

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**LIMERICK NATURALISTS' FIELD CLUB.**

**NOVEMBER 17.**—Mr. F. NEALE read a paper on "Butterflies, when and where to find them," dealing with the collection and preservation of specimens, and illustrating his remarks by a fine series of insects, mostly collected in the Limerick district.

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## N O T E S.

## BOTANY.

**Irish Records in the Journal of Botany.**

Mr. F. Townsend contributes to the November number of the *Journal of Botany* a paper on *Euphrasia Salisburgensis* Funk, found last summer by Rev. E. S. Marshall on limestone rocks south of Lough Mask, Co. Mayo. This is a Scandinavian and alpine plant, not hitherto recorded from the British Isles. "The plant is eminently alpine," and it is therefore of interest to find it not much above sea-level in Co. Mayo. "It is distinguished from all other British forms by its narrow leaves and bracts, with comparatively few lateral usually aristate teeth." The paper is accompanied by an excellent plate.

In the December issue, Mr. H. B. Rendle publishes a description of *Sisyrinchium californicum*, from plants collected last June by Rev. E. S. Marshall in marshy meadows near Rosslare, Co. Wexford. To the same number, Mr. Marshall contributes a paper on the results of his collecting last summer at Clonbur, on the borders of Mayo and Galway, Claremorris, and Wexford. The paper contains a number of valuable records, among the species being *Polygala oxyptera*, *Picris echioides*, *Chenopodium rubrum*, *Polygonum maculatum*, *Zostera nana*, *Eleocharis uniglumis*, *Chara connivens* (new to Ireland), and *C. canescens*.

**Flora of the Ox Mountains.**

It was with much pleasure that I read in the December number of the *Irish Naturalist* Mr. N. Colgan's very interesting notes of the Flora of the Ox Mountains, Co. Sligo, and especially where he mentions having received specimens of the rare Maiden-Hair Fern from Mr. Quirk, taken from the banks of the Dromore West River; also stating, that in 1891, I reported the Fern from that locality. However, wishing "to give honour where honour is due," the credit of the discovery rests with Miss M'Munn, of Easky, who long before 1891 found it; but hearing from a mutual friend of Miss M'Munn's discovery, I visited the river in June, 1891, and found the fern growing profusely on the perpendicular face of the limestone rock, through which the river has cut a narrow passage eight or ten feet deep. The fern is growing on the eastern bank in two or three large patches, with smaller ones, and solitary plants, scattered along for a distance of twelve or fifteen yards; the largest patch forms a thick growth covering a span about four feet square, growing in a soft calcareous deposit from the water dripping over the rocky face of the bank. This fern appears to be very rare in the Co. Sligo, for in the *Cybele Hibernica* only one locality, four miles from the town of Sligo, is mentioned. When at Lough Talt, Mr. Colgan does not mention finding *Polypodium Dryopteris*; it used to grow on the road side between some stones at the base of the fence nearly opposite the Police Barrack, where I found it, and sent some fronds to my esteemed

and valued friend, the late A. G. More, and afterwards showed him some plants taken from that site, and growing in the garden here. The *Cybele* mentions this fern as growing only in the Counties of Antrim, Galway, Leitrim, and Kerry, and in the appendix, L. Talt, Co. Sligo, as reported by me.

ROBERT WARREN.

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## ZOOLOGY.

### Irish Notes from the Zoologist.

In the September number, Mr. Charles Langham records the capture of a Whiskered Bat in Co. Fermanagh last June. The same observer writes confirming his note on the occurrence of an Iceland Gull in Co. Sligo on June 5th. Mr. C. B. Horsbrugh writes in the October issue that he has examined a specimen of a Night Heron (*Nycticorax griseus*) shot near Fermoy in March, 1894. Mr. R. Warren states that he received, on September 4th, a Ruff shot near Easky, Co. Sligo, and remarks that there appears to have been a small flight of Ruffs to Ireland last autumn, as Mr. E. Williams received three specimens for preservation, and Mr. Ussher had two sent him from Belmullet, Co. Mayo. In the same number mention is made of a large Pike, forty nine inches long and 35 lbs. in weight, taken with a spoon-bait in Lough Conn.

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## AMPHIBIANS.

### Is the Frog a native of Ireland ?

It is curious that the question propounded by Dr. Scharff (*J. Nat.*, vol. ii.) relative to the introduction of the Common Frog into this country has not elicited more information. Mr. Ussher's explanation that the remains of frogs found in Ballynamindra cave were found in the surface stratum, removes one possible evidence of their antiquity in this country. But no one has alluded to an attempt at colonisation made previously to the one mentioned by Thompson in the grounds of Trinity College—namely, that which is referred to by O'Halloran in his "History of Ireland," published 1772. He gives the Latin verses in full, from which Dr. Scharff quotes (after Camden), headed "An account of Ireland given by Donatus Bishop of Fesulæ (or Fiesoli), near Florence, above 1100 years ago" (*sic.*) After the lines

"Nulla venena nocent, nec serpens serpit in herba  
Nec conquesta canit garrula rana lacu,"

he adds a note as follows:—"We must here remark that we never had frogs in Ireland till the reign of King William. It is true some mighty sensible members of the Royal Society in the time of Charles II. attempted to add these to the many other valuable presents sent us from England, but ineffectually; as they were of Belgic origin, it would seem they could only thrive under a Dutch Prince, and these with many other exotics were introduced at the Happy Revolution."



This testimony of a writer about seventy years after the undoubted introduction of a colony of this animal seems conclusive that at the period at which he wrote it was numerous in the country; while his assertion that at some date between 1662, when the Royal Society was founded, and 1685, when Charles II. died, a former attempt at colonisation was made (whether successfully or unsuccessfully), shows that the frog was at that time not known to be indigenous. Perhaps some one may be induced by this notice to search for some record of the futile attempt made by these "mighty sensible" Fellows. The reference as to the animals being of "Belgic origin" would seem to suggest that they were imported from Holland. Perhaps, therefore, they might have been the edible species *Rana esculenta*; and the failure, referred to by Dr. Scharff, of Dr. Birney's introduction, may have been paralleled by that of a similar importation to Ireland.

W. F. DE V. KANE.

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### BIRDS.

#### **Black-tailed Godwit in Queen's Co.**

Through the kindness of Lord Castletown, I have received, and sent to Messrs. Williams & Son for preservation, a specimen of the Black-tailed Godwit, shot near Granston Manor, Abbeyleix, on the 13th November inst.

R. J. USSHER.

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### GEOLOGY.

#### **The Determination of Fossils.**

All who have attempted to determine a miscellaneous collection of fossils from any geological formation have soon discovered the difficulty of affixing correct names to all the specimens, and if they have been doing this work with the object of publishing some paper, either dealing with the stratigraphy of a district, or attempting to correlate geological horizons in different parts of the world, they have probably given the task up in despair. A few, no doubt, have been fortunate in possessing friends whose knowledge of particular groups of fossils could be drawn upon. But it is not always that one knows the best person to apply to, or that one can be certain of a favourable reception. *Natural Science*, in its December number, has published a list of twenty-six specialists, who are willing to determine various groups of fossils from various strata, when requested to do so for purposes of publication, and this enterprising action will doubtless be welcomed by many local geologists. We hope that this list is only a first instalment, for there certainly appear to be a large number of groups of fossils in which no one is prepared to pose as an authority. We should have thought, for instance, that some one might have been found for the Trilobites, for the Belemnites, or for Palæozoic Brachiopods. Obviously, if anyone wishes to take up the study of some special division of palæontology, he need not be deterred by the lack of an opening.

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## THE FORMER ABUNDANCE OF GRANITE BOULDERS IN THE S.E. NEIGHBOURHOOD OF DUBLIN.

BY REV. MAXWELL H. CLOSE, M.A., F.G.S.

(Read before the Dublin Naturalists' Field Club, 8th December, 1896.)

THE presence and distribution of boulders in a particular district is generally very interesting, and indeed often geologically significant and important, in various ways. But unfortunately in such a neighbourhood as that of Dublin they are specially liable to be removed for various reasons. When they interfere seriously with the cultivation of the land we cannot blame the farmers for getting rid of them, and when a great deal of building material is required we cannot wonder at the contractors breaking them up and carrying them off from rough wild uncultivable places where the farmers would let them remain. But the extensive removal of them may hereafter cause perplexity to geologists, and even lead them into error, if they should be not sufficiently aware of the former state of things. These remarks apply very specially to the southeast neighbourhood of Dublin, where there has been such extensive destruction of boulders. When the Geological Survey were at work in this district they had not begun to pay as much attention to surface geology as they did afterwards, so that the Explanations of Sheet 112 say nothing on the limited subject of this communication; it seems, then, desirable that the Dublin Field Club should record the facts with which we are now concerned.

The granite boulders of this region do not generally belong to the boulder-clay. They usually lie on it, though they are often partially buried in the drift. They are generally of later date than the detrital deposits on which they rest, and have sometimes moved in a direction contrary to that in which the latter have been carried. This can be seen near the westward edge of the granite district, as, for instance, in the lower part of Glennasmole, where the deep deposit of limestone materials has come from the plain country on the west, and the overlying granite boulders from the eastward.

The extensive disappearance of these boulders from the district now in question has doubtless been observed by

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many persons. I happen to have been peculiarly well circumstanced for being impressed thereby. In the years 1834-5 my family was living at Beechwood, near the S.E. end of Rochestown Avenue, at the foot of Rochestown Hill, the most southward of the three Killiney Hills. The ground from Beechwood on towards Ballybrack was thickly sprinkled with granite boulders, large and small. This was so on both sides of the road to Ballybrack; although some clearance was going on on the lower or westward side of the road. The speckled appearance of the district, owing to the contrast between the dark green furze and the light grey boulders, was very striking; and there can be no doubt that it was this which gave name to the locality—"Ballybrack" meaning the "speckled place." There is another place of the same name a few miles off, viz.: the upward, north-westward continuation of Glencullen behind the mass of the Three Rock Mountain. It doubtless received the same name for the same reason; although the speckling is not there so strongly marked, being somewhat obscured by the heather and the peaty covering of the ground. Thirty-two years ago, although the fields on the lower, or westward side of the first-mentioned Ballybrack road, were perfectly cleared of boulders, a most interesting relic of the former state of things was preserved in a belt of plantation, near Kilbogget Farm, which is on a way or passage from near Cabinteely to the said Ballybrack road. That plantation had been made before the clearance of the land, and the contrast between the boulder-encumbered ground within it and the smooth fields on each side was most striking and interesting. I fondly hoped that, as the boulders were out of the way of the plough, they would remain there as a memorial of the past; but, on visiting the place a few days before reading this paper, I was greatly disappointed to find that they had been taken away for building purposes. No signs of them now remain except the hollows showing where the larger or more deeply sunk ones stood. I happened to meet Mr. MacCormick, who now occupies the farm; he was fully aware of the former state of the ground about there, though it was before his time.

Mr. G. H. Kinahan, of the Geological Survey, corroborates what I have said as to this locality, and speaks also of his own

recollection of a similar state of things in places about Killiney and Dalkey. Gabriel Beranger, who has left some valuable drawings depicting antiquarian and other objects, some of which have been destroyed since his time, expresses his delight at the "romantick" rocks about Dalkey, and mentions that a wheeled vehicle could not pass along the street of the village. This was doubtless largely due to the boulders now in question. He gives drawings (both dated 1776) of two of these, one a rocking-stone near the sea, about a musket-shot west of Bullock, measuring 10 ft. 9 in. by 6 ft. 2 in. by 3 ft. at its thickest side. This was very conspicuous to every passer-by; it was what glacialists call a perched block on the top of what his drawing shows to have been a *roche moutonnée*, which was weathered along some vertical joints. This stone, however, had ceased to rock a few years before he saw it; and it has since ceased to exist, that is in its integrity. He gives also a drawing of a magnificent boulder "on the top of Dalkey Hill," not necessarily meaning at the very summit. It covered a small well, and was called *Clogh Tubber Gileen*—the Stone of Gileen's Well. Its dimensions were 22 ft. 6 in. by 10 ft. 4 in. by between 11 and 12 ft. in height. Supposing it to have been rudely ellipsoidal in shape, with which the drawing is consistent, its weight must have been at least 140 tons. I made inquiry about this lately from several old people of the locality, but none of them had ever heard of it. The cromlech, with its circle of large stones round it, which existed on Dalkey Common until it was broken up to build the nearest Martello tower, was of course composed of boulders which the cromlech-builders had at hand. By way of some small relief to the melancholy account just given, let us note the survival of a fine boulder, a perched block, still standing on a *roche moutonnée* near, and visible from, the public park near Sorrento Terrace. It is somewhat cuboidal, and measures 8 by 6 by 6 feet. Its effect, however, is sadly marred by the fact that it is now in the little parterre of a villa shut in by walls. It is evidently prized by the present occupants, who perhaps belong to the Field Club; it stands, then, a good chance of being preserved. At the same time it reminds us too strongly of that melancholy sight, a caged eagle; and one is almost (not quite)

tempted to wish that some kindly building-contractor would blow it to pieces, and allow us to forget it.

A few respectable boulders can still be seen in favourable out-of-the-way places, and near the hills, in the country extending from the Killiney Hills to Stillorgan, Whitechurch, &c. But it is easy to see what became of the great majority of the field-stones; they were used up to build the walls which enclose such a large proportion of the fields in that district. Mr. Kinahan informs me that the numerous boulders lately in the valley between Enniskerry and Glencullen have been nearly all taken away to build the Catholic church at Enniskerry. He informs me also that most of the large number of boulders about Ballinteer, beyond Dundrum, were used up for building purposes a few years ago. Much of the granite for the Science and Art Museum, Kildare Street, was obtained from the boulders between Ballinteer and Dundrum. He speaks also of a great removal of boulders in late years from Redesdale on the S.E. of Dundrum, and from other places not far off.

I must not omit to mention an interesting museum of boulders, as we may call it, at Newtownpark, about a mile inland from Blackrock. The obelisk there is of ashlar work rising from a very large rusticated base; the stones of the latter are clearly all boulders gathered from the surface of the surrounding land. Some show signs of blasting; but these are only portions of much larger boulders which, in their integrity, would have been too difficult to transport to their present situation. Many of them are four feet in length. There can be no doubt that the squared blocks of the obelisk itself were cut from boulders. This structure was built in 1703; it would be impossible to make the like of it in these days without having recourse to quarrying, so that it is a most interesting memorial of the state of things in by-gone days.

The largest surviving boulder that I know of in this region is situated about a mile south of the cromlech and the ancient church of Kiltiernan. Unfortunately, a new road was made passing close to it, and a great piece has been blasted off it, which interfered with the road.

Perhaps I may be allowed to mention here the relation of the cromlechs to our present subject. These are usually, but

it would seem not invariably, composed of boulders. Though we sorely grudge that our grand Dalkey boulders should be broken up by the building-contractors and made into prim villas and terraces, often with odious fashionable Italian names, yet I think we may agree more or less cordially to some of them being appropriated by the cromlech-builders. Those men prized them for their size, they did not destroy them; though possibly, in a few cases, they may have interfered with their natural or geological interest. There can hardly be any doubt that they have sometimes been the means of preserving some of the finest boulders for us. Notwithstanding that the ordinary Philistine would think nothing at all of blasting to pieces an unusually large boulder, though it were a most striking perched block, yet it is conceivable that he might relent if he saw the boulder playing the part of the covering-stone of a cromlech. The great probability is that the top stone of the Brennanstown cromlech and that of the Shanganagh cromlech escaped demolition in this way when the surrounding ground was cleared as we now see it.

I may here observe that the removal of the boulders from the ground about a cromlech heightens the effect of the latter; it is however a factitious addition to the great interest that a cromlech must always have for us. It makes some persons imagine that the large covering-stone has been brought from some distant spot, where there were boulders, to its present position where none are now to be seen. But it is most reasonable to think that the cromlech-builders looked about for the largest boulder that they could find near enough to the desired site of their monument, and collected the smaller supporting stones around it, and then built their cromlech there.

The boulders mentioned in this paper are all of granite and rest on granite ground, except those at the western edge of the granite alluded to above; so that we have no means of knowing how far they may have travelled from their native site.

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## THE BATS OF IRELAND.

A CONTRIBUTION TO OUR KNOWLEDGE OF THEIR DISTRIBUTION.

BY H. LYSTER JAMESON, B.A.

A FEW years ago I took up the study of the species of bats which occur in Ireland, intending to retain my information until I could present a fairly complete account of the distribution of at least the commoner species, rather than to record my observations in a number of scattered notes. My experience since then, and the consideration that this paper may possibly draw out some data that are unknown to me, in the correspondence columns of the *Irish Naturalist*, prompts me to publish this list of records in its present incomplete state, rather than to wait indefinitely for data that are not forthcoming.

It is more than possible that some already published records may have been overlooked by me, but I have no doubt if such is the case, my omissions will be corrected by the readers of this Journal.

It is much to be regretted that field naturalists have paid so little attention to this group in Ireland, for we can hardly boast of having advanced very much since Prof. Kinahan wrote "as a general rule every bat seen flying about is put down in the naturalist's book as the Pipistrelle." Records of this kind are apt to be misleading and should be strongly discouraged; to say nothing of the fact, pointed out by Kinahan, that the "common bat" of parts of Clare seems to be the Lesser Horse-shoe Bat. This careless method of naming species led to the formerly frequent descriptions and record of the Pipistrelle in Great Britain as "*Vespertilio murinus*," merely because *V. murinus* is the common bat of some continental localities!

The difficulties of identification of *species* need not hinder any observing naturalist from having a clear idea of at least the *generic* distinctions, which would no doubt save many a rare *Vespertilio* from being thrown away, or, worse, recorded as *Vesperugo pipistrellus*. Even on the wing a sufficient amount may often be seen to suggest to the collector that the specimen is worth capturing, while the flight of *Vesperugo Leisleri* and *Vespertilio Daubentonii* are almost unmistakable.

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<sup>1</sup> *Proc. Dub. Nat. Hist. Soc.*, vol. I, p. 154.

I shall not say anything about methods of capture and preservation, as I have already alluded to the most successful in a previous paper.<sup>1</sup>

It is to be regretted that the scanty information at hand permits of but little generalizing with regard to questions of distribution; such data as I am able to put before the readers of the *Irish Naturalist* in these pages suggest that the three species of *Vespertilio* which have hitherto been regarded as extremely limited in their range, may be widely if not generally distributed; as is the case with the better known species of mammals, except where locally exterminated by man.

But what is likely to be the range of the Lesser Horse-shoe Bat? At present only recorded from Galway and Clare, it may possibly prove to have a limited range, and so form a marked exception to what seems to be the rule for Irish mammals generally. Further explorations alone can settle this question, as also whether or not *Vesperugo Leisleri*, now known to be fairly widely distributed in the North and East, and as far south as Cos. Wicklow and Kildare, occurs in the South and West.

But a perusal of this paper will make it evident that we are far from having complete records of the range of even the Pipistrelle and Long-eared Bats, and I can only express once more the hope that this very incomplete list will call forth some of the data, published or unpublished, that may have escaped me.

I must take this opportunity of expressing my gratitude to the many kind friends from whom I have received specimens and records, and particularly to Rev. D. C. Abbott, Mr. G. E. H. Barrett-Hamilton (for many notes collected by himself and his correspondents), Mr. R. M. Barrington (for records from Light Stations on the Irish Coast), Mr. C. Black, Mrs. Dunster-ville, Rev. R. M. P. Freeman, Mr. W. Garstin, Mr. W. F. De V. Kane, Miss Kelsall, Rev. A. Knight, Dr. W. R. MacDermott, Rev. F. W. Moeran, Mr. E. Porter, Dr. R. F. Scharff, Mr. R. J. Ussher, Mr. R. Warren, and others.

Seven species of bats are known to inhabit Ireland, six of which belong to the family *Vespertilionidæ*, represented by

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<sup>1</sup> *Irish Nat.*, 1894, p. 69.



three genera *Plecotus*, *Vespertilio*, and *Vesperugo*, the seventh to the family *Rhinolophidae*

**Rhinolophus hipposideros**, Bechstein.

LESSER HORSE-SHOE BAT.

CO. CLARE.—First recorded as Irish by Mr. F. J. Foot (*Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 152), who found it in Ballyallia cave near Ennis in 1857, and in a cave near Quin in 1859. Subsequently found by Professor Kinahan and Mr. Foot in 1861 in Vigo cave, Inchiquin; and also in a small cave in a plantation on western shore of the lake. The entrances to both these caves were overhung by ivy and ferns. Also in three caves at Edenvale near Ennis.

Prof. Kinahan regarded this species as the "Common Bat" of Co. Clare. [See Kinahan, *Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154. Also *Zoologist*, 1861, p. 7617.]

Prof. Kinahan refers to a larger bat, known to the country people in Clare, of which he did not procure a specimen, and which consequently must remain unidentified until some enterprising naturalist can secure it.

CO. GALWAY.—A specimen was captured by Prof. King in June, 1858, in a house in Galway into which it had flown. It was exhibited before the Dublin University Zoological and Botanical Association in 1859.

There are two specimens in the Science and Art Museum, Dublin, taken at Cool Park, and presented by the late Mr. A. G. More.

[I may here refer to an account of what appears to have been a *Rhinolophus* from Co. Westmeath, mentioned by Mr. M'Coy in a paper before the Dublin Natural History Society, which paper was reported in *Saunders's News-letter*, Feb. 12th, 1845. The scanty description suggests *R. ferrumequinum*, which is not known to inhabit Ireland.]

**Plecotus auritus**, Linn.

LONG-EARED BAT.

CO. DONEGAL.—Mr. Barrett-Hamilton informs me that one was seen at the lantern at Arranmore Light-station in June, 1889, by J. F. Fortune. This species is recorded by J. V. Stewart. (*London's Mag. Nat. Hist.*, vol. v., 1832, p. 578).

CO. LONDONDERRY.—Colony discovered in June, 1835, "under slates of Foyle House, above the city."—"Ordnance Survey of Co. Londonderry," by Lieut.-Col. Colby. Dublin, 1835.)

CO. ANTRIM.—Two specimens in Science and Art Museum, Dublin, from Cushendun, presented by Rev. S. A. Brennan, July 24th, 1895. A female was sent to me by Mr. C. Black, from Langford Lodge, Crumlin, in April, 1895. I received a specimen on July 22nd, 1896, with Antrim post-mark, but unaccompanied by sender's name.

CO. DOWN.—"Met with everywhere."—(Alex. Knox, M.D., "History of Co. Down"; 1875.)

CO. ARMAGH.—Loughgilly; common; I have found the species there myself, and have since received specimens. I have also received it from Poyntzpass (Dr. W. R. MacDermott); and from Drumbanagher (Rev. F. W. Moeran).

CO. MONAGHAN.—Mr. W. F. De V. Kane tells me that this species occurs at Drumreask.

CO. CAVAN.—I found a large colony in the tower of Kilmore Cathedral, in July, 1896, during the Field Club's excursion to that district.

CO. FERMANAGH.—Bohoe Caves; Rev. A. Knight (recorded by me, *Irish Nat.*, April, 1896).

CO. TYRONE.—Aughnacloy (Kinahan; *Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154). Mr. Barrett-Hamilton has been informed by Mr. C. Irvine that this species is common in Tyrone and Fermanagh.

CO. LOUTH.—There is a large colony in the roof of Charlestown church; and I have also found specimens in Louth church, and Killencoole church. I have received specimens from Knockbridge and Stephentown.

CO. MEATH.—A specimen in the Science and Art Museum, Dublin, is labelled "Nobber, Co. Meath."

CO. DUBLIN.—"Common in many localities," (Kinahan; *Proc. Dub. Nat. Hist. Soc.* vol. ii., p. 154); recorded as "frequent" by Barrington (*Brit. Association Guide to Cos. Dublin and Wicklow*, 1878). There is a specimen from Rathfarnham in the Science and Art Museum, two specimens labelled "Dublin" in Trinity College Museum, and specimens have been sent to Mr. Williams from Lucan and the city.

CO. WICKLOW.—"Frequent" (Barrington, *Brit. Assoc. Guide*). Mr. C. J. Patten has a specimen from Bray in his collection; M'Coy records a large colony in the roof of Castlemacadam church (Report of *Dub. Nat. Hist. Soc.*, in *Saunders's News-letter*, Feb. 12, 1845).

CO. WEXFORD.—Mr. Barrett-Hamilton tells me this species occurs at Kilmanock, and at Ballyhyland.

CO. KILDARE.—Specimen taken by Mr. F. Haughton, formerly in Royal Dublin Society's collection (Kinahan; *Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154).

CO. CARLOW.—A specimen from Oak Park was sent to me by Mr. Barrett-Hamilton.

KGNG'S CO.—Mr. Barrett-Hamilton informs me that this species occurs at Edenderry.

CO. LONGFORD.—Specimen in British Museum from this county, presented by the late Dr. Dobson.

CO. WATERFORD.—Common at Cappagh (Mr. R. J. Ussher); a large colony in Cappagh church. There is a specimen in Science and Art Museum, Dublin, from Dungarvan, presented by Mr. Ussher.

CO. CORK.—"Common" (Cusack; *History of Co. Cork*); Thompson says (*Nat. Hist. Ireland*) "Dr. R. Ball considers it more common than the Pipistrelle about Youghal." Castlefreke (Darling, *Zoologist*, 1893, p. 294).

CO. KERRY.—Thompson tells us that "Mr. F. J. Neligan is of opinion that the Long-eared Bat is more common than the Pipistrelle in Co. Kerry." A specimen was taken at Teraght Light-house, nine miles off the coast, on November 17th, 1891, and sent to Mr. Barrington.

CO. TIPPERARY.—Mr. H. J. Charbonnier, of Bristol, informs me that he received a specimen from Carrick-on-Suir in September, 1893.

CO. LIMERICK.—Mr. Barrett-Hamilton has received records of this species from Limerick.

CO. GALWAY.—Hon. R. F. Dillon tells me that the Long-eared Bat occurs at Clonbrock.

CO. MAYO.—Ballina; "not common" (Mr. R. Warren).

GENERAL.—It may be worth noting that there is a buff-coloured individual of this species in the Science and Art Museum, Dublin, labelled "Ireland." It is strange that in the "Guide to Belfast and adjoining Counties," published by the Belfast Naturalists' Field Club, this bat is merely recorded as "having been observed" in that district, "but the Pipistrelle alone is common."

The partiality of this species for the roofs of churches should make it a matter of comparative simplicity to determine its exact range in Ireland. I have also found it in a hole in an old building, about four feet from the ground, and Mr. Knight took it in the caves at Bohoe.

I am familiar with the Long-eared Bat on the wing at night, and have usually found it flying low down along hedge-rows or in old country lanes with high hedges on either side. Early in the evening it can often be identified on the wing, owing to its immense ears.

### *Vespertilio mystacinus*, Leisler.

#### WHISKERED BAT.

CO. FERMANAGH.—A specimen was killed in Bohoe rectory on July 10th, 1895, by Rev. A. Knight (see my paper *J. Nat.*, April, 1896). This specimen is now in the Science and Art Museum, Dublin.

Another was sent to me from Bellisle, Lisbellaw, by Mr. R. Porter, in August, 1896. This specimen was captured in a room, and is now in my collection.

Mr. Charles Langham records a specimen captured at Tempo Manor in June, 1896.—(*Zoologist*, 1896, p. 350.)

CO. LOUTH.—I have twice taken this species at Killencoole, where I have reason to believe it is not uncommon; both specimens were captured in the summer of 1894; the first I knocked down with a carriage-whip, when on the wing, the second I captured a few days later in the roof of an outhouse. I have also received a young specimen from Braganstown, found clinging to the wall of the house by Mr. W. Garstin. It is much more darkly coloured than the adult specimens. These three specimens are in my collection.

CO. CLARE.—The first Irish record of this species is by Kinahan; a specimen was brought to him by a cat, at Feakle, Co. Clare. This specimen, first recorded as *V. Daubentonii* and exhibited as such before the

Dublin Natural History Society in Feb., 1853, was subsequently discovered to be *V. mystacinus* and recorded under this name.—(*Proc. Dub. N. H. Soc.*, vol. i., p. 148.)

### **Vespertilio Nattereri, Kuhl.**

#### **NATTERER'S BAT—REDDISH-GREY BAT.**

Co. DONEGAL.—One found dead at Carrablagh, by Mr. H. C. Hart, in June, 1891, now in Science and Art Museum, Dublin (*Zoologist*, 1891, p. 271).

Co. FERMANAGH.—I found, on looking over some specimens of *V. Daubentonii*, sent me from Bohoe caves by Rev. A. Knight, two specimens of this bat; they were killed at dusk in the cave, in company with the specimens of Daubenton's Bat, and a *Plecotus auritus*.

Co. LOUTH.—One captured at Dundalk in June, 1893, and recorded by me (*Irish Nat.*, August, 1893).

Co. WICKLOW.—A specimen was killed by Mr. G. Mangan at the Scalp in 1845.—(M'Coy, *Ann. and Mag. Nat. Hist.* (1), vol. xv., 1845, p. 270.)

The various records from "Dublin," "Wicklow," "Enniskerry," near the city," &c., evidently refer to this specimen.

Co. LONGFORD.—A specimen in British Museum, presented by Dr. Dobson, is from this country.

[Co. KILDARE? See under *V. Daubentonii*.]

### **Vespertilio Daubentonii, Leisler.**

#### **DAUBENTON'S BAT.**

Co. DONEGAL.—Lydekker (*British Mammals*, p. 44) states that this species has been recorded from Co. Donegal.

Co. LONDONDERRY.—A specimen was obtained by the Ordnance collectors in 1838. (Thompson, "Natural History of Ireland.")

Co. DOWN.—Knox records this species in his "History of Co. Down" as "very rare," not stating any locality. Possibly he refers to the Derry specimen.

Co. FERMANAGH.—I found two large colonies of this bat in Bohoe caves in July, 1895, and subsequently received other specimens from Rev. A. Knight from the same locality. Some of these are in the Dublin Museum.—(*Irish Nat.*, April, 1896.)

Co. LOUTH.—I observed a number of specimens flying over the river at Braganstown (River Glyde) and knocked one down with a carriage-whip; this specimen I have in my collection. They came out early at first, flying fairly high, but even then the pale colour of the fur on the underside made them appear quite distinct from other species. Later, when it became darker, they adopted their peculiar method of flight, skimming over the surface of the water and occasionally touching the surface, leaving a faint ripple behind them. Mr. W. Garstin, who was with me when I secured my specimen, told me he was familiar with this bat on the river at Braganstown, but had never suspected that it was a rare species. Possibly other observers may have remarked it elsewhere, passing it by as a Pipistrelle.

Co. KILDARE.—A colony was discovered in June, 1853, by the late Prof. Kinahan, at Tankardstown Bridge, between Kildare and Queen's County, in a hole in the masonry, about four feet above water-level. First observed by Mr. F. Haughton on the River Barrow. These specimens, collected by Prof. Kinahan, were at first identified as *V. Nattereri* (*Dub. Nat. History Review*, vol. i., p. 22), and the mistake was subsequently corrected, pp. 148-9. The confusion about the identification, and the records of the discovery, suggest that Daubenton's Bat was accompanied by *V. Nattereri* at Tankardstown, and it is definitely stated that one specimen had a fringe of bristles on the interfemoral membrane (p. 87), which could not, therefore, have been *V. Daubentonii*. There is nothing to prevent the two species having occurred in the same hole, as there were Pipistrelles along with them also; and the discovery by Mr. Knight of the Reddish-grey Bat in company with *Vespertilio Daubentonii* at Bohoe supports this conclusion.

Co. WEXFORD.—Mr. R. M. Barrington received a specimen from Lucifer Shoals Light-ship which was caught "flying low over the deck" at 7.30 p.m. on April 21st, 1891. The Light-ship is nine miles from the mainland.

### **Vesperugo pipistrellus, Schreber.**

#### COMMON BAT—PIPISTRELLE.

Co. DONEGAL.—Ballyshannon, "plentiful" (Alingham's "Ballyshannon," Londonderry, 1879.); I have observed it at Cloghan, near Stranorlar; there is a specimen in Dublin Museum labelled "Co. Donegal," presented by Mr. Hart.

J. V. Stewart ("Mammals and Birds of Donegal," *Loudon's Mag. Nat. Hist.*, vol. v., 1832) speaks of "*Vespertilio murinus*, the Short-eared Bat," probably referring to this species.

Co. ANTRIM.—"The only common species" (Belfast Naturalists' Field Club "Guide to Belfast and adjacent Counties"); I have received specimens from Mr. C. Black, Langford Lodge, Crumlin, in June, 1894; and in August, 1895, I found three complete skulls of this species in pellets cast up by owls, also sent from Langford Lodge by Mr. Black. Mr. C. J. Patten has a specimen from Antrim town in his collection.

Co. DOWN.—"Met with everywhere" (Knox, *Hist. Co. Down*); I have received this species from Crossgar.

Co. ARMAGH.—At Loughgilly I found this species extremely plentiful; I have also seen it at Poyntzpass.

Co. MONAGHAN.—Mr. W. F. De V. Kane informs me that the Pipistrelle occurs at Drumreske; and I have received a specimen from Rev. D. C. Abbot, taken at Monaghan town.

Co. FERMANAGH.—On July 11th, 1895, I found a large colony in Bohoe Church (*Irish Naturalist*, April, 1896); and Mr. E. Porter sent me, in July, 1896, a number of specimens taken in an old coal-house near the lake at Lisbellaw. Mr. Barrett-Hamilton has been informed of its occurrence at Castle Irvine.

Co. CAVAN.—When in Cavan with the Field Club excursion in July, 1896, I found a colony of this Bat at Farnham House, and secured several specimens. I have since received specimens from Killeshandra.

Co. TYRONE.—I have received a specimen from Dungannon, sent by Mrs. Dunsterville.

Co. LOUTH.—I have met with this species plentifully at Killenchoole and Charlestown, and have received specimens from Dundalk (Mr. G. J. Garratt), and Collon (Rev. R. M. P. Freeman).

Co. DUBLIN.—Common (Kinahan, *Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154; Barrington, "Brit. Association Guide to Cos. of Dublin and Wicklow," 1878). Kinahan mentions a specimen from Dundrum.

Co. WICKLOW.—See under Dublin.

Co. WEXFORD.—Mr. Barrett-Hamilton informs me that this is the commonest species at Kilmanock, and that it occurs at Ballyhyland; also that there is a stuffed specimen in White's Hotel, Wexford, which was caught in a room in the hotel.

Co. KILDARE.—One captured at Levetstown in 1853 (J. R. Kinahan, *Dub. N. H. Review*, vol. i., p. 25). Found in company with *V. Daubentonii* at Tankardstown.

Co. CARLOW.—Mr. Barrett-Hamilton tells me that he received a specimen from Mr. P. Beresford, taken at Fenagh in Sept., 1890.

Co. LONGFORD.—A male in British Museum, presented by Dr. Dobson, is from this county.

Co. WATERFORD.—Common at Cappagh (Mr. R. J. Ussher).

Co. CORK.—"Common" (Cusack, *Hist. Co. Cork*); Youghal, Thompson (see under *Plecotus auritus*). I received specimens from Mallow captured by Miss F. Massy in August and September, 1893.

Co. KERRY.—Thompson (see under *P. auritus*); mentioned also by Kinahan (*Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154).

Co. LIMERICK.—"Plentiful" (Mr. H. Martin, per Mr. Barrett-Hamilton).

Co. MAYO.—Ballina, common (Mr. R. Warren).

Co. SLIGO.—Ballymote, one captured by myself in June, 1892.

### *Vesperugo Leisleri*, Kuhl.

#### LEISLER'S BAT—HAIRY-ARMED BAT.

Co. ANTRIM.—First recorded as Irish by Prof. Kinahan in *Proceedings of Belfast Nat. Hist. and Phil. Society*, April, 1860, from specimens taken at Belvoir Park in 1848, and in Belfast in 1858. (See Kinahan, *Proc. Dub. Nat. Hist. Soc.*, vol. ii., p. 154.) I have received it from Langford Lodge (Mr. C. Black).

Co. DOWN.—I received from Mrs. Dunsterville a specimen taken at Newry in August, 1894. (See under Antrim, "Belvoir Park.")

Co. ARMAGH.—Found in numbers in 1868 and 1874 in demense at Tanderagee by Mr. Barrington (*Zoologist*, 1874, p. 4017); and at Tartaraghan in 1875, by Rev. G. Robinson (J. Gatcombe, *Zoologist*, 1875, p. 4419). I frequently observed this Bat at Loughgilly, and have in my collection a male which I shot there in June, 1891.

CO. FERMANAGH.—Mr. Barrington found a colony in the roof of a boat-house at Grum Castle in June, 1882 (*Zoologist*, 1883, p. 116). Mr. C. J. Patten has in his collection a specimen taken at Derrylin in 1887. A specimen taken in a room in Bohoe Rectory was sent to me in July, 1895.

CO. CAVAN.—While I was in Cavan with the Field Clubs in July, 1896, Mr. S. Jones brought me a specimen, which he had picked up dead in the town of Cavan. Since then I have received specimens from Killashandra.

CO. LOUTH.—I have shot this species at Killenchoole and Braganstown, at both of which places it is very plentiful.

CO. DUBLIN.—Glasnevin, July, 1874 (J. D. Ogilby, *Zoologist*, 1874, p. 4236); there are specimens in the Dublin Museum labelled "Dublin," "Finglas," and "Dunsink"; a specimen was shot at Carrickmines by Mr. E. C. Barrington (*Zoologist*, 1893, p. 427); I have received a specimen from Blackrock (Miss E. J. Kelsall), and have observed it on the wing in the same locality.

CO. WICKLOW.—Fassaroe, Bray (Barrington, *Zoologist*, 1875, p. 4532); Mr. Barrington has met with this species more than once since, and I have seen it on the wing at Fassaroe.

CO. KILDARE.—Specimen shot at Levitstown by Mr. F. Haughton in June, 1874.

CO. GALWAY.—Hon. R. E. Dillon tells me he is familiar with a large bat at Clonbrock, but a specimen he sent me unfortunately never reached me; and as we have so far no certain West of Ireland records of *V. Leisleri*, we must wait for specimens before assuming that this species occurs there.

With regard to the reported occurrence of *V. noctula* in Ireland, and certain questions relating to *V. Leisleri* which are raised thereby, I hope shortly to publish another paper.

#### BATS AT LIGHTHOUSES.

The following records from the Irish Light-stations, as reported by Mr. Barrington's correspondents in the "Migration" schedules, have been supplied to me by Mr. Barrington:—

1884. Rockabill Lighthouse (5 miles off Dublin Coast): "July 14th—Bats about light all night; wind light, S.W." This is the first entry of "bats" Mr. Barrington received from his correspondents.

1886. Fastnet Lighthouse (8 miles from coast of Cork): "October 3rd one bat seen, sleeps in cleft on rock."

1889. Arranmore: see under *Plecotus auritus*.

1891. Lucifer Shoals Lightship (9 miles off Wexford coast): "April 21st—Bat caught at 7.30 p.m., flying low about ship, striking man on watch; it died next day. Wind N.E., moderate; weather clear." This specimen was sent to Mr. Barrington and proved to be *V. Daubentonii*.

Blackrock, Mayo (lighthouse, 9 miles off shore): "August 18th—one bat about rock at night."

Tearaght Lighthouse (9 miles off coast of Kerry).—On 17th November, a Long-eared Bat flew into one of the houses at dusk. Mr. Barrington received this specimen on January 23rd, 1892.

1892. Drogheda, N. light: May 13th—"Two bats in evening, flying close to station; wind light, S.W.; first seen here." June 9th—"Three bats flying about station at 10 p.m." (Lighthouse at end of sand-hills near shore.)

1894. Drogheda, N.: June 12th—"Several bats flying about at 9.30 p.m. Wind moderate, N. Weather gloomy. First seen for a long time."

I regret that I can procure no information as to the occurrence of Bats on the islands off the Irish Coast; possibly some readers of the *Irish Naturalist* can produce some such records.

## A PLUME-MOTH NEW TO THE BRITISH ISLES.

BY CHARLES G. BARRETT, F.E.S.

AMONG some Micro-lepidoptera recently sent to me for examination by Mr. W. F. de V. Kane are several specimens of *Platyptilia tesseradactyla*, L. (*Fischeri*, Z.), a very pretty little "plume" moth not previously known to occur within the limits of the United Kingdom. It is much like *Platyptilia gonodactylus*—the species found among *Tussilago farfara*, but less than one-half its size, yet having a very similar form of wings and dark triangular blotch on the fore-wings before the fissure. Outside this blotch we find white transverse bars on the dark grey-brown ground-colour, and before it are two or three dark spots. The hind wings are dark smoky fuscous, with a yellowish dash in the cilia at the tip of each fissure, and a blackish spot on that of the hind lobe.

These specimens were taken by Mr. Kane and the Hon. R. F. Dillon, near Clonbrock, and elsewhere in the County Galway, flying about a species of *Gnaphalium* on dry banks near bogs. The insect is widely distributed on the Continent, and it is somewhat remarkable that it has not yet been discovered in Great Britain. I think that the occurrence of so interesting a novelty in Ireland should be recorded at once in the Magazine conducted in Dublin, and beg therefore to forward this note at the same time as I record the discovery in the *Entomologists' Monthly Magazine*.



## FURTHER OBSERVATIONS ON THE DEVELOPMENT OF MELANISM IN MOTHS.

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

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I DESIRE to record a further corroboration of the arguments contained in my paper dealing with the remarkable instance of melanism in *Camplogramma bilineata* (*Irish Nat.*, vol. v., p. 74.) I referred therein to three examples of *Dianthæcia capsophila* taken on the same island off the Kerry coast, in which I discovered the variety *isolata* of the former insect, and stated that they also showed remarkable melanic tendencies. I desire now to record my success in breeding this summer seven examples of *D. capsophila* from larvæ there found. They all are melanic also, one specimen especially being almost a unicolorous black, the hind wings somewhat paler at base. On the fore wings can be distinguished only partial traces of outlines round the stigmata, one or two minute dots on the costa, one on the inner margin, and the chequers of the fringe. It is, therefore, evident that, as I pointed out in the paper above referred to, the local environments other than climatic conditions (which are the same as those of the mainland a few miles distant) have influenced this noctuid as well as the geometer. And as I have bred specimens of *D. capsophila* from other islands off the Irish coast—namely, from Inishmore (Aran), and one situated opposite Renvyle, Connemara, which are not melanic, it results that some especial peculiarity attaches to the rock-island in question off Kerry. As I have already discussed this, it is not necessary to enter upon it again.

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## A FRENCH TRAVELLER IN IRELAND.

**Irlande et Cavernes Anglaises.** Par E. A. MARTEL. Paris, 1897.  
(Librarie Ch. Delagrave.)

THIS book is the outcome of the travels of its accomplished author during the summer of 1895. He states that he has been induced to write it, firstly by the successful issue of his explorations of the caves, and secondly, because of the "admiration and interest which the natural beauties of Ireland and its archæological treasures, both too little known by travellers" have given him. "Ireland," he says, "has been called the land of the Great Elk, and of the Giant's Causeway," thus defining it by its two principal scientific curiosities: the majestic fossil deer, and the marvellous basaltic columns of the County Antrim. "But," he continues, "the definition is incomplete: Ireland is also the country of unequalled sea-cliffs, of charming lakes with hundreds of islets, of mysterious subterranean rivers; of unexplained cromlechs and enigmatic round-towers, of enchanting and luxuriant parks and scenery, of heathen legends, mystical beliefs, and heroic traditions!"

It will be seen from these quotations that Monsieur Martel has carried away from his stay among us a rose-coloured impression of the country. Of the state of the people his conclusions are as cheerful. He deprecates the importance which former writers, especially Mlle. de Bovet, in her "Trois Mois en Irlande," have given to the political contests and disorders of the time. He finds everywhere he went, "the aspect of the country, the animals and the people much less miserable than I had expected; innkeepers and drivers, fishermen and farmers, barge-men and labourers, all owned that for the past five or six years a universal reaction from the former state of misery had set in to relieve everyone." He proceeds to say that he does not wish to attempt to estimate the reasons for, or the extent of the change—he merely wishes to state its effect on the pleasure of the tourist. "Whatever may be said of the beggars, they are less persecuting than in too-hackneyed Italy—the reception met with everywhere is more affable, the good humour and native cordiality of the worthy Irish make them eminently sympathetic; the hotels of the larger towns, and those of the Causeway, Kilkee, Killarney, etc., lack nothing of the comfort and excel in charming simplicity those of Switzerland," and even in the remote villages where the search for unknown caves led him, "the inns were such as would be commended in Dalmatia and in Greece, or even (must it be owned?) in many of the chief cantonal towns of the Cevennes or Dauphiné."

After this handsome testimony to the charms of travel in Ireland, Monsieur Martel describes the exploration of the Marble Arch cave in Enniskillen. He had here the assistance of Mr. Jameson, who had been deputed by the Fauna and Flora Committee of the Royal Irish Academy to accompany him. The curious underground river was explored by

means of a portable boat. It was found to be closed by the rock descending to or below the surface, causing siphons whence the waters emerge. The plan of the different galleries and passages is most complicated. The connection between two of them was discovered by the finding on the sand of the riverside in one passage of a little wooden collecting-box dropped by Mr. Jameson some days before in another cave.

After several days spent here, Monsieur Martel explored Arch cave, and then proceeded to the North and West of Ireland. We have not space to follow his travels nor his appreciative notices of the interesting archaeological remains of Clonmacnois, the Aran Islands, and the Rock of Cashel, which latter he describes as one of the principal curiosities, not only of Ireland, but of Europe. Nor can we do more than mention his enthusiastic admiration for Killarney, which, he tells, will more than bear comparison with the most renowned beauty-spots of Europe.

In the immediate neighbourhood of Dublin he finds much of interest and beauty. Especially he was interested in the wonderful tumuli of New Grange and Dowth, and in the remarkable discoveries which Mr. Coffey has made in them. He adds that it is impossible to avoid being impressed by the analogies of construction between these remains and those of Troy and Mycenæ.

The illustrations are not the least of the attractions of this appreciative and entertaining book. Taken in great part from photographs, they have been selected with care, and show many varied aspects of the scenery and ruins of Ireland. Some have been supplied by Mr. Welch, who has done so much to add to our knowledge of picturesque Ireland.

We can strongly recommend this book not only to intending tourists but to Irish people in general, and particularly to the Irish Tourists' Association, an account of the formation of which is given on page 11. A description of some of the English caves concludes the volume.

R. F. S.

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts comprise a Hooded Crow from Mr. Herbert Brown, two Capuchin Monkeys and four Ringed Snakes from Judge Boyd, a Barn Owl from Mr. H. Freith, a Pheasant from Mr. B. Ireland, and a monkey from Dr. Joy. Two Lion cubs were born in the Gardens on December 16th, and five Cape Hunting Dogs on January 4th. A Teguxin and a pair of Shovellers have been acquired by purchase.

3,380 persons visited the Gardens during December.

## DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 19.—The Club met at the house of Mr. G. H. CARPENTER, who showed specimens of the larva of the dipteran *Simulium*, taken at Carton, Maynooth. These highly interesting aquatic larvæ are fully described by Prof. Miall in his recent book on the "Natural History of Aquatic Insects." Fastened by a sucker at the hinder end of the body, they set up currents in the water and sweep food into their mouths by means of a pair of processes with long fringes situated on the head.

Prof. T. JOHNSON showed a preparation of a microscopic green disc-like alga, *Pringsheimia scutata*, Rke., which is found as an epiphyte on *Polysiphonia*, *Zostera*, and other marine plants. It is closely related to *Mycoidea parasitica*, which causes a coffee disease, and to *Phycopeltis*, of which Mr. Jennings recently described two new species before the Royal Irish Academy. *P. scutata* was added to the list of Irish marine algæ on the B.N.F.C. dredging excursion in July last in Belfast Bay, and is recorded by Miss Hensman and the writer in the *Irish Naturalist* for October, 1896.

Mr. GREENWOOD PIM showed a remarkable mould parasitic on leaves of Rape, sent him by Rev. Canon Russell from near Tullamore. It belongs to the genus *Ramularia*. Mr. Masee of Kew, to whom specimens were submitted, writes that he had no hesitation in stating it to be a typical *Ramularia*—but undescribed specifically. It is intended to publish a description of it in an early number of the *Journal of Botany*, under the name of *Ramularia rapæ*.

Mr. MCARDLE exhibited a specimen of *Lepidostoma setacea*, Web. (Lindberg), bearing perianths on short lateral branches. The plant, though widely distributed in Ireland, is remarkable in the form of its leaves, which are transversely placed on the stem and divided into two or three setaceous segments, incurved and jointed by transverse septa; those near the apex of a shoot become nearly verticillate, which gives the plant a remarkable appearance; in this way it approaches closely one other Læverwort, *Blepharostoma trichophylla*, Linn. (Dumort). Sir Wm. Hooker states in his "British Jungermaniæ" that the resemblance of these two plants when under the microscope to *Conferva verticillata* is worthy of remark.

Mr. R. J. MITCHELL showed several photo-micrographs of sections of rocks and plant-stems.

Rev. CANON RUSSELL exhibited the wing of a Chalcid-fly, and called attention to four rings set in the fork of the stigma in which an offshoot from the subcostal vein terminates. These discs, so far as he can learn, have not been noticed heretofore. A fine nerve was observed passing near or through one or more of these rings, which the exhibitor believes may be traced all along the subcostal vein, to a row (or rows) of oval or round vesicles at the base of the wing, closely resembling the so-called otoconia or otoliths found in the halteres of the diptera. Mr. Russell showed a sketch from the pen of a correspondent of a balancer of *Sarcophaga carnaria*, in which a similar arrangement is apparent.

Whether these bodies are organs of smell or sound, Mr. Russell leaves to the judgment of those who know more about the matter than he does, to decide.

DECEMBER 17th.—The Club met at the house of DR. McWEENEY, who showed Widal's method of diagnosing typhoid fever. The blood or serum of the patient is mingled with a pure living cultivation of *Bacillus typhosus*. Should the case be one of typhoid the bacilli quickly lose their motility and become agglomerated. If the disease be other than typhoid, or should the blood be derived from a healthy person, the active movements of the bacilli are not interfered with and agglutination does not occur. Bacilli other than typhoid fail to give the reaction with typhoid blood. These points were successively demonstrated by means of serum of a typhoid patient contained in a capillary tube and cultures of *B. typhosus* and *B. pyocyaneus* in broth. The test seemed likely to become one of the most valuable methods of diagnosing typhoid.

Prof. COLE showed a rock-section given to him by Prof. J. W. Judd, cut from a specimen collected on Rockall by Capt. Hoskyns in 1863. The rock from this remote Atlantic islet was described by Prof. Judd in a paper read before the Royal Irish Academy in November, 1896.

Mr. GREENWOOD PIM showed an alga, *Nodularia Harveyana*, growing on a living and healthy palm leaf in the Trinity College Gardens. The very unusual nidus and the velvety appearance to the naked eye induced the exhibitor at first to regard it as a black mould resembling *Sporoschisma*.

Prof. T. JOHNSON showed a preparation of *Monoblepharis insignis*, R. Thaxter, an aquatic fungus found by Prof. Thaxter, to whom the exhibitor was indebted for the slide, on submerged twigs in ponds and ditches in Massachusetts and Maine. *Monoblepharis* is remarkable as being the only fungus possessing motile male organs or antherozoids, uniciliate and half the size of the biciliate zoospores. Thaxter's illustrations (*Botanical Gazette*, 8th Oct., 1895), were shown. *Monoblepharis* is allied to the genus *Saprolegnia*, one species of which is the salmon-disease fungus.

Mr. McARDLE exhibited a specimen of *Lejeunea Holtii*, Spruce, which was gathered on shady rocks below Torc Waterfall, Killarney, by Mr. G. A. Holt, of Manchester, in 1885. The plant resembles *L. flava*, Swartz, but differs from every other European *Lejeunea* in the perianths being borne on short branchlets which normally put forth no sub-floral innovations, such as more or less exist in all our other species. The specimen exhibited showed perianths; and the pale reddish tinge of the foliage, which is remarkable, and is not seen in any other species, was to be observed. The re-discovery would be of interest and botanical importance; it has not been found amongst the numerous gatherings made by Mr. McArdle, or by any person that he is aware of, since 1885.

Dr. C. HERBERT HURST exhibited preparations illustrating the structure of the larval gnat.

Mr. A. VAUGHAN JENNINGS showed a preparation made by Mr. Coppen Jones, F.L.S., of Davos Platz, showing the branched or mycelial stage of the organism causing tuberculosis. It is now being recognized by bacteriologists that the so-called Tubercle Bacillus may be only a stage

in the life-history of some higher fungus, probably related to *Actinomyces*, and Mr. Jones' investigations and preparations seem to place the matter beyond doubt.

Mr. Jennings also exhibited a new genus of Bacteria of remarkable stellate form, probably related to the *Pasteuria* of Metschnikoff.

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#### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 5.—Mr. L. L. Macassey, B.L., read a paper entitled "A Run through the Mourne Mountains." It was illustrated with a fine series of photo slides, by Mr. R. Welch.

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#### BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 26.—The Geological section met, the principal attraction being a fine collection of Vesuvian lavas, recently presented to the Natural History and Philosophical Society, who kindly lent them for the occasion. Various forms of flint were also shown by G. M'Lean. The honorary secretary exhibited a specimen from near Annalong of that rare rock variolite, presented by Professor Cole, who recently rediscovered this very obscure dyke; also a copy of the new index-map of the Geological Survey of Ireland, received on behalf of the Club from Mr. Nolan, who had kindly coloured it by hand. A boulder of the famous Shap granite found in glacial drift in Yorkshire, obtained from Mr. Platnauer, of York Museum, by Miss M. K. Andrews (who also presented some Isle of Man rocks), was presented; also specimens from Messrs. R. Bell and G. M'Lean. Mr. L. M. Bell exhibited and presented very fine examples of eurite, intruding in masses and veins into Ordovician rocks, from Newcastle Waterworks. A letter from the chairman of the Botanical section (Rev. C. H. Waddell), suggesting a joint meeting of the sections later in the season, was read and approved. The desirability of acquiring apparatus for rock-slicing was also discussed, and a subscription started for the purpose.

DECEMBER 26.—The geological section had a successful excursion to Dromore. Rev. David Thompson met them on arrival, and conducted them to the cathedral, and to the fine old cross, which was successfully restored some years ago. A fine section of boulder clay in a brickfield shows a lower layer of tough blue clay, capped by an almost equal depth of red clay. Special interest attached to the question whether this difference in colour indicated two different periods of deposition, but the conclusion arrived at was that there was no proof of such unconformability, the difference in colour being probably due to oxidation of the upper layer. Erratics from Ailsa Craig, Cushendall, and other distant localities, occur in the section. The splendid fort, finely placed in a protecting bend of the Lagan, was visited in a storm of wind and misty rain.

The section met again at the Museum on 31st inst., when Mr. W. J. Fennell showed some excellent photographs made at Dromore. Mr. R. Bell exhibited part of a fossil crab from the chloritic sands of Colin Glen, and ripple-marked Trias from Crow Glen; Mr. A. G. Wilson, granites from Slieve Gallion (Derry), and Galway.

Prof. Sollas' paper and map of the eskers of Ireland was exhibited by the honorary secretary. Mr. G. MacLean presented specimens of steatite and lithomarge to the section. The suggestion that Professor Cole should again be invited to hold a class in Belfast in spring was cordially welcomed, and the secretary instructed to communicate with him as to possible arrangements. After devoting half an hour to determining the specific gravity of some rocks, the meeting terminated.

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#### DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 8.—The PRESIDENT in the Chair. The minutes having been read, the President called for nominations of officers and committee for 1897, and read the following list of nominations made by the committee:—President, Prof. G. A. J. Cole; Vice-President, R. Lloyd Praeger; Secretary, Prof. T. Johnson; Treasurer, H. H. G. Cuthbert; Committee, G. H. Carpenter, J. J. Dowling, Rev. T. B. Gibson, Miss Hensman, C. H. Hurst, Miss Kelsall, E. J. McWeeney, R. J. Mitchell, G. Pim, H. J. Seymour, Miss Singleton, Mrs. Tatlow.

Rev. MAXWELL H. CLOSE read a paper "On the Former Abundance of Granite Boulders in the Killiney District and elsewhere," which appears in our present issue.

Rev. W. S. GREEN, M.A., Inspector of Fisheries, exhibited a series of lantern-slides of photographs taken on the expedition sent out last June to explore the vicinity of the islet of Rockall, in the North-east Atlantic, and briefly described the experiences of the party and the results of their cruise. The PRESIDENT added some information relative to the geology of the Rockall plateau, and Mr. Praeger, as a member of the expedition, made a few remarks.

Mr. GREENWOOD PIM exhibited the "Animated Oat" *Avena sterilis*, which possesses long kneed twisted awns, which are very sensitive to moisture, and by their twisting and untwisting force the seed into the ground. He also exhibited a new fungus disease of the Rape (*Ramularia* sp.), which will shortly be named and described.

Mr. PRAEGER showed some rare Irish flowering plants collected in 1896, an account of which will appear in these pages.

The PRESIDENT announced that the Committee had had before them the question of the proposed closing of the Giants' Causeway, and had decided to open a subscription list in aid of the Defence Fund, and that contributions would be received at this and subsequent meetings. A number of members entered their names on the list during the evening.

**JANUARY 12.**—The Annual General Meeting was held, the President (Prof. Cole) in the chair. The minutes of the previous meeting having been read and signed, the Secretary (Mr. Praeger) read the annual report of the Committee, of which the following is an abstract:—the membership stands at 200, 23 new members having been elected during the year, and 17 struck off. Five winter meetings were held, and were well attended; in addition a successful *conversazione* took place at the opening of the Winter Session. The seven summer excursions arranged by the Committee were all carried out satisfactorily. The best thanks of the Club are due to Count Considine, Mr. Samuel Jones (Cavan), and Mr. J. G. Nutting, for facilities rendered on these excursions. The inter-Club work, for the development of which the Irish Field Club Union was founded, has been steadily carried on. The Committee charged with the investigation of the cryptogamic flora of Dublin and Wicklow report that progress is being made. The Committee of the Club recommend a grant of £10 to the Editors of the *Irish Naturalist*, and another at the rate of 2d. per head on the Club membership to the Field Club Union Committee, to assist in defraying the expenses of the year 1896. The best thanks of the Committee are due to the Council of the Royal Irish Academy for continued permission to hold the Club meetings in their rooms. The Committee have opened a Club subscription-list in connection with the Giant's Causeway Defence Fund.

Prof. Johnson then submitted his report and statement of account as Treasurer, which showed a balance of £37 18s. 11d. in the Club's favour. The adoption of the report and accounts was moved by Mr. A. Shackleton, seconded by Mr. J. E. Palmer, and passed after a discussion, and resolution referring to the Committee the drafting of a rule on the subject of new members depositing their entrance-fee prior to election. The Chairman declared the following office-bearers for 1897 elected according to the rules:—President, Prof. G. A. J. Cole, F.G.S.; Vice-President, R. Lloyd Praeger, B.A., B.E.; Secretary, Prof. T. Johnson, D.Sc., F.L.S.; Treasurer, H. Gore Cuthbert; Committee, G. H. Carpenter, B.Sc., J. J. Dowling, Rev. T. B. Gibson, M.A., Miss Hensman, C. H. Hurst, Miss E. J. Kelsall, E. J. M'Weeney, M.D., R. J. Mitchell, Greenwood Pim, M.A., H. J. Seymour, Miss Singleton, Mrs. J. T. Tatlow. A grant of £10 to the Editor of the *Irish Naturalist*, as recommended in the report, was proposed by Prof. Johnson, seconded by Miss Kelsall, supported by Mr. A. Shackleton, and passed; as was also the grant recommended to the Field Club Union, on the motion of Dr. Hurst, seconded by Mr. J. F. Shackleton. On the motion of Mr. J. J. Dowling, seconded by Mrs. Ross, the best thanks of the Club were voted to the Council of the Royal Irish Academy, for their courtesy in allowing the Club to meet in their rooms during the year. A vote of thanks to the press for regularly reporting the proceedings of the Club was passed at the motion of Miss M'Intosh, seconded by Mr. A. Roycroft. Miss M. F. Johnson, Miss S. Paxton, and Miss E. Paxton, were elected members of the Club.

A discussion ensued relative to places to be visited during the coming summer, and other matters. Dr. Hurst stated that he was authorised by



Prof. Herdman, President of the Liverpool Marine Biological Association, to invite members to join that Society's Easter trip to Port Erin, Isle of Man.

#### LIMERICK NATURALISTS' FIELD CLUB.

**JANUARY 14.**—The fourth annual meeting of the Limerick Naturalists' Field Club was held in the Board-room of the Savings Bank. The attendance was very large, the Board-room being inconveniently over crowded. Mr. Archibald Murray, President of the Club, occupied the chair.

The Chairman having opened the proceedings,

Mr. Neale, Hon. Secretary, read the annual report, of which the following is an abstract:—

The Committee are pleased to be able to state that the record has been one of unbroken progress, not only in numbers, so far as the increase of mere membership is concerned, but also in the increased interest taken in its working, both as to meetings and excursions. This has been proved in regard to the former by the response to the proposal that a course of botanical lectures would be carried out in the now current session, should a sufficient number be found willing to attend them. No less than fifty entered their names within ten days after the announcement had been made, and almost four-fifths of these have attended the lectures held up to the present.

The excursions of the Club during 1896 were successful, and the four carried out were well attended. The wet weather of the latter part of the summer and autumn compelled the abandonment of the other two, much to the regret of all concerned. The thanks of the Club are due to E. J. Phelps, Esq., of Waterpark, Castleconnell, for his invitation to provide tea at Doon Island wood. The meetings and excursions of the Club during 1896 were—January 23rd, Annual Meeting; February 18th, adjournment of same; March 3rd, Photomicrographic Demonstration, with hints on slide making, by Drs. W. A. and G. Fogerty; March 24th, Microscopic Fungi, by Mr. W. Thorp; April 14th, Lantern Exhibition by the Photo' Section; November 17th, Butterflies, how and where to find them, by Mr. F. Neale; December 11th, Irish Animals, old and new, by Mr. G. H. Carpenter. Excursions—May 14th, Caherconlish—Ahern's Carboniferous Limestone Quarry, the Demesne, and the Porphyritic Basalt exposure in the vicinity; June 11th, Iniscaltra, or Holy Island, Lough Derg; July 15th, Ciamaltha, or Keeper Hill, Co. Tipperary; July, 31st, Glenomera Wood and Valley, Co. Clare.

It is a matter for regret that we cannot yet say much actual field work has been done by our members in any department of natural science, the only botanical record of interest reported during the year being the occurrence of Viper's Bugloss (*Echium vulgare*) found growing on the railway line near Foynes by Mr. R. D. O'Brien. In ornithological matters it may be well to note that the Nightjar was comparatively

abundant on the higher edges of Cratloe wood last summer, and that an albino example of the Common Swallow was taken near Croom. A new Irish insect has again been added to the list by your Secretary, who, in July, in Cratloe wood, took several examples of an interesting long-horned arboreal orthopteron, known to science as *Meconoma varia*, a very beautiful little creature of the grasshopper tribe, whose life appears to be spent in the pupa and imago stages, amongst the oak-trees of such woods as it frequents. The discovery of the ground-beetle *Panageus crux-major*, which was reported in 1895 as having been taken at Finlough, Co. Clare, and made such a stir as a Germanic insect hitherto confined to the S.E. of England, has again been taken at same place in fair abundance, thus demonstrating that it may be looked upon as a resident, and not a straggling casual or erratic member of the genus, which had lost its way, as the single specimen of 1895 was supposed to be. A future is apparently before the Photographic Section of the Club, which was only established in February last. It has already good work to show.

The year has witnessed a gain in membership of 60. Starting a year ago with 50, there were on the 31st December last 110 names on the list. Some mention has been made from time to time as to opening an Archæological section, but no decision has so far been come to. A suitable place of meeting has been a matter demanding the serious attention of the Committee during the year, and an arrangement has been made with the Trustees of the Savings Bank for the use of its board-room. The hearty thanks of the Club are due to the Committee of the Free Library for so kindly placing the use of its board-room, with gas, etc., at our disposal throughout the year and entirely free of charge.

The report was put and adopted.

Mr. Joseph Stewart, Treasurer, submitted the balance sheet, which was considered satisfactory, there being at present a credit balance of £7 17s. 5d. He moved that the financial statement be adopted.

Mr. Neale seconded the resolution, which was passed unanimously.

The Secretary nominated Dr. W. A. Fogerty as President for 1897, Mr. J. Greene Barry and Mr. B. Barrington as Vice-Presidents; Treasurer, Mr. Joseph Stewart; Committee, Miss Ebrill, Mrs. R. Gibson, Mr. R. D. O'Brien, Mr. P. O'Meehan, Mr. E. Taylor; Secretary of the Photographic Section, Dr. George Fogerty; and General Secretary, Mr. F. Neale. These gentlemen had been recommended by the last meeting of the Club.

The appointments as proposed were made unanimously.

Mr. Barry proposed a resolution connected with an Antiquarian section, as follows:—"That it is desirable to have an Antiquarian section in connection with this Club, and that the same be, and is hereby, established."

Mr. James Frost, J.P., seconded the proposition.

The resolution was passed unanimously.

This closed the ordinary business, and a magic-lantern display followed of photographic views taken by members of the Club, amongst whom were—Mr. F. B. Angley, Canon Hadyn, Mr. Griffith, Mr. Webb, Miss Bennis, Mr. Sams, Mr. Fogerty, Mr. B. Barrington, Miss Ebrill, Miss

Evans, Mr. Joseph Stewart, and Mr. Parker. Besides these, several photos by non-members were exhibited. Mr. R. Welch, of the Belfast Naturalists' Field Club, sent some photos of wild-flowers in their natural position, birds' nests, geological slides, and antiquarian remains.

The exhibits in the body of the room were as follow:—Natural History Exhibits—Birds, shells, fishes, insects, fossils, seaweeds, and dried plants; snakes, scorpions, etc., in spirit; skull of *Bos longifrons*, etc., etc. Irish Antiquities—Stone and bronze implements, celts, coins, ornaments, etc. Photo-micrographic apparatus, with prints and transparencies of botanical, zoological, and other subjects. Photographic Prints—Rock formations, sections, outcrops, etc.; also scenery, antiquities, animals, etc., etc.

In another part of the building, Dr. Laird explained the powers of the Röntgen Rays. During the evening a musical programme was gone through under the conductorship of Mr. Kendal Irwin, Mrs. Fogerty, and some other ladies and gentlemen kindly assisting.

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### FIELD CLUB NEWS.

On another page we publish a report of the Annual Meeting of the Limerick Club, which took place on 14th inst. The success of this meeting affords a striking proof of the rapidly-increasing popularity of this, the youngest, of the Irish Field Clubs. During the year the membership has risen by over 100 per cent., and on the present occasion the large attendance taxed to the utmost the capacity of the fine board-room of the Savings Bank, where the meeting was held.

At the Annual Meeting of the Dublin Club, held on January 12, Dr. Hurst stated that he was authorised by Prof. Herdman, President of the Liverpool Biological Association, to invite members of the Club to take part in the Association's Easter excursion to Port Erin, Isle of Man. This is an excellent opportunity for students of Marine Biology. We feel sure that Prof. Herdman would extend the invitation to the Belfast Club, should any of the northern members wish to avail themselves of it.

Miss Thompson, Secretary of the Geological Section of the Belfast Club, writes:—

The Club has frequently had reason to acknowledge gratefully much kind assistance from the officers of the Geological Survey of Ireland. Since the formation of the Geological Section of the Club in 1893, Mr. M'Henry has rendered invaluable assistance by undertaking the laborious task of inspecting all unknown erratics and naming their place of origin, for publication in the Annual Report. A copy of the new Index map just published by the Survey has been presented to the Club by Mr. Nolan, who has furthermore coloured the divisions included in each memoir, which greatly enhances its value for rapid reference.

On December 10th and 11th, Mr. G. H. Carpenter, B.Sc. lectured, as delegate from the Dublin Club, before the Clubs of Cork and Limerick on the subject of "Irish Animals, Old and New." In Limerick the meeting was held in the Town Hall, in Cork in the ball-room of the Imperial Hotel, and there was a large audience at both places.

The Limerick Club has just inaugurated a course of lectures on botany by Dr. W. A. Fogerty which promises to be highly successful. The number of applicants for tickets was almost inconveniently large, and if supplemented by field work in the spring, the course should be of much service in arousing interest in the as yet imperfectly known flora of the district.

The Cork Club also propose to hold courses of lectures early next year. Miss Martin has undertaken a botanical series, while the secretary, Mr. J. L. Copeman, will contribute discourses on insects.

It is very desirable that our Clubs should possess herbariums easily available, for purposes of study or comparison, to all their members. The nucleus of such a collection was recently presented to the Belfast Club by Miss S. M. Thompson, to whom it was originally given by the late Mr. William Darragh, Curator of the Belfast Museum. The Collection comprises 433 species, and was made by his son, Mr. John Darragh, one of the original members of the Club, during the year ending March, 1865. It has therefore a certain historical interest, dating from the second year of the Club's existence, when the presence and teaching of Prof. Ralph Tate had aroused such a keen interest in the study of natural history about Belfast—an interest which resulted in the establishment of the first Irish Field Club. The practical value of such a collection is shown by the constant reference made to it during the monthly botanical meetings organized by the Rev. C. H. Waddell.

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## NOTES.

### BOTANY.

#### PHANEROGAMS.

#### ***Euphrasia Salisburgensis*, Funk, in Co. Galway.**

In August, 1892, while botanising in the rough limestone country by the south-eastern shore of Lough Corrib, near the little village of Mea-lough, we noticed a curious-looking *Euphrasia*, and collected a few specimens of it. These were sorted away and forgotten until recently, when having occasion to turn through our *Euphrasia* cover, we were struck by their resemblance to Mr. Townsend's figure and description of *E. Salisburgensis* in the November number of the *Journal of Botany*. We have forwarded specimens to Mr. Townsend, who writes:—"they are more typical than the Mayo plant gathered by Mr. Marshall, bracts narrower, teeth longer, more patent and aristate. The finding of this species in another county is a very valuable confirmation of *Euphrasia Salisburgensis*, Funk, being a native of Ireland."

H. & J. GROVES.

## ZOOLOGY.

## Distribution of British Marine Plankton.

Many of the organisms commonly found in the plankton of the sea around the British Coast exhibit remarkable variations in their relative abundance at particular localities from year to year, but little is known as to the extent and causes of such variations. As a number of naturalists make use of the tow-net at many places around the coast, especially during the summer, much valuable information would be obtained, if in all cases records were kept of the presence or absence of a limited number of the commoner species, and these records subsequently brought together.

In the hope that Irish naturalists may be willing to assist in obtaining such information, I send a short list of organisms, the presence or absence of which I would ask to have recorded at any locality and as often as the tow-net may be used during the year 1897. *Halosphera viridis*, *Noctiluca miliaris*, *Aurelia aurita* (including *Ephyra*), *Agalmopsis*, *Muggiæa atlantica*, *Horniphora plumosa*, *Beroe*, *Tomopteris*, *Anomalocera Patersoni*, *Doliolum*, *Salpa*. Where the generic name only is given in the above list, the specific name of the specimens taken should be added. Should any doubt exist, preserved specimens should be kept.

In making a record the following should be stated:—DATE; HOUR; LOCALITY. (With as much accuracy as possible). DEPTH. (depth of water and maximum depth at which net has been worked); QUANTITY—(0. Absent; 1. Few only; 2. Moderately plentiful; 3. Exceptionally abundant.) Observations on the temperature of the sea, and notes on wind, tide, &c., will also be of value. Records should be sent in before January 31st, 1898, or forwarded from time to time to me at the Marine Biological Association, Plymouth.

E. J. ALLEN.

## INSECTS.

## Entomological Notes.

COLEOPTERA.—In the canal between Poyntzpass and Scarva I met with *Coelambus v. lineatus*, *Noterus clavicornis* and *Ilybius fuliginosus*. A young friend brought me some beetles which he had captured at Portrush in August last, among these were *Amara fulva*, *A. bifrons* and *A. ovata*; *Anchomenus dorsalis*, *Calathus micropterus*, *Bembidium rufescens*, *B. saxatile*, *Cercyon littoralis*, *Ocytus morio*, *O. cupreus*, *Xantholinus glabratus*, *X. distans*, *Necrodes littoralis* (a small form), *Geotrupes vernalis* and *Otiorrhynchus atroscutellus*. The specimens had all been picked up on the sand-hills. Mrs. Johnson brought me a few beetles from the sand-hills at Newcastle, Co. Down. Her opportunities for collecting were unfortunately limited and she got but few; the following were her captures:—*Brosicus cephalotes*, *Calathus fuscus*, *Bembidium littorale*, *Coccinella xi. punctata*, *Aphodius scybalaris* and *Otiorrhynchus muscorum*.

In moss from my own fields I took *Pterostichus versicolor*, *Anchomenus dorsalis*, *Bembidium obtusum*, *Quedius fuliginosus*, *Q. molochinus*, *Q. rufipes*, *Philonthus intermedius*, *Stenus speculator*, *S. latifrons*, *Scydmanus collaris*, *Anisotoma calcarata*, *Atomaria basalis*, *Longitarsus melanocephalus*, De G., *Psylliodes napi*, *Apteropoda orbiculata*, *Cassida flaveola*, *Apion dichroum*, *Otiorrhinchus schönherrii*, *Hypera punctata*, *H. polygani*, *Sitones suturalis*, &c.

HEMIPTERA.—I have made but few captures in the order and none of special note; the following are all I can record:—*Tropicoris rufipes*, *Stygnus rusticus*, *S. arenarius* and *Miris calcaratus*.

HYMENOPTERA.—In this immediate neighbourhood in addition to those mentioned in my last note (*Irish Nat.*, vol. v., p. 273), I have met with *Halictus cylindricus* making its burrows in a bank near a small lake, *Megachile centuncularis* hard at work on rose-leaves in my garden, *Myrmica sulcinodis* in moss. On Bray Head in August I met with a working *Bombus venustus* on heather, and while clambering along the cliff captured a number of *Vespa germanica* which were evidently attracted by honey-dew on the leaves of the Coltsfoot, for I was able to box them with but little difficulty, and those which I saw to be *V. vulgaris*, and consequently rejected, frequently fell down to the ground as if stupified by what they were imbibing. In the same locality I took *Lasius flavus*, *Formica fusca* and *Leptothorax acervorum*. I had no net with me, being only on a hurried visit, or I might have obtained other specimens.

LEPIDOPTERA.—Sugar proved an utter failure, for scarcely any moths came to it, and those of the commonest description.—In my own dairy I took a nice *Crocallis elinguarua*, and on the way to Loughbrickland captured it again and a specimen of *Hyponomeuta cagnagellus*. In the grounds here, I captured *Triphana comes*, a nice red form; these were taken in July. August and September were practically a blank owing to the very wet weather. Since then my only capture has been *Cheimatobia brumata*, which was very plentiful in November.

W. F. JOHNSON.

#### Coleoptera taken at Tempo, Enniskillen.

During the spring and summer of 1896 I secured a number of beetles, mostly by sweeping in a marshy meadow. A few were found under stones, bark, &c., and some among moss. I have to thank Mr. Halbert for kindly identifying most of them for me, and I have furnished him with a list of the species taken (about 200 species) for use in compiling the Catalogue of Irish beetles on which he is engaged in collaboration with Rev. W. F. Johnson and Mr. Carpenter. The following are among the scarcer and more noteworthy species:—*Carabus monilis*, *Pelophila borealis*, *Coelambus quinquelineatus*, *Tachyporus obtusus*, var. *nitidicollis*, *Leistrotrophus nebulosus*, *Baptolinus alternans*, *Olophrum piceum*, *Necrodes littoralis*, *Halysia conglobata*, *Rhisophagus dispar*, *Dermestes lardarius*, *Geotrupes vernalis*, *Telephorus nigricans*, *T. patudosus*, *Ptilinus pectinicornis*, *Chrysomela fastuosa*, *Deporaus betulae*, *Phyllobius argentatus*, *P. pomona*, *Barynotus Schonherrii*, *Hylobius abietis*, *Grypidius equiseti*, *Eriirrhinus aethiops*, *Dorytomus maculatus*.

C. LANGHAM.

**Tachypus pallipes, a Beetle new to Ireland.**

I may mention that in June last, at Coolmore, Co. Donegal, I took this species, which I believe to be new to Ireland, in numbers.

C. LANGHAM.

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AMPHIBIANS.

**Is the Frog a native of Ireland?**

We are gradually becoming better acquainted with the early history of the Frog in Ireland. Mr. de V. Kane's note in last month's *Irish Naturalist*, containing an additional, though somewhat vague, record of the introduction of the Frog into this country, is very interesting. But as I have shown before, the fact of any one introducing an animal into a country, does not necessarily prove that the same kind of animal did not previously exist there. Many people at the present moment would deny that the freshwater crayfish inhabits Ireland, if they were shown one, but nevertheless, that animal is common enough in brooks and rivers in most parts of the country. Their denying the existence of the species therefore only proves their ignorance—nothing more. Moreover, even Saint Donatus's graphic description of Ireland on which we mainly found our belief in the former absence of the Frog can be interpreted in two ways. "Nec conquesta canit garrula rana lacu" which might be translated by "no noisy frog croaks in the lake," may merely indicate that Saint Donatus, not being accustomed to be annoyed by *noisy* frogs in his native Ireland, was particularly struck by the very different habit of the Italian Frog. The Irish Frog is silent—even during the breeding season it calls to its mate in a scarcely audible voice, whilst the common Italian Frog, which belongs to a different species, makes the air in the evening loudly ring with a tremendous uproar. Hence when Laurenti first described the two species of frogs, he called the Irish Frog, which of course also occurs on the Continent, *Rana muta*—the *mute* Frog.

R. F. SCHARFF.

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BIRDS.

**The Carrion Crow (*Corvus corone*) In Ireland.**

In the *Irish Naturalist* of last December, Mr. Standen drew attention to the occurrence in the North of Ireland of the Carrion Crow. I am glad to hear that the publication of this note has been productive of a more lively interest being taken in the Crow family. Through Mr. Ussher's efforts, the Dublin Museum has been enriched by an undoubtedly Irish specimen of the Black or Carrion Crow; Mr. Hardy, of the Manchester Museum, having kindly presented a specimen shot in 1863 in the Gap of Dunloe (Kerry).

Most people are aware, I think, that there are two kind of crows in the British Islands, and the Black Crow is common in England, but very rare in Ireland. The Grey or Hooded Crow is common in Ireland and rare in England. Many similar cases of distribution in two closely allied species are known to naturalists, not only in birds but in many groups of invertebrate animals. Their range suggests that perhaps a great interval of time elapsed between the original migrations to the British Islands of the two species. We might assume that the Grey Crow arrived first from the Continent and spread all over Great Britain and Ireland, and that the Black Crow has come more recently and supplanted the former in those parts nearest to the Continent. This supposition would explain the fact that in the more remote parts of the British Islands from the Continent, viz., in Ireland and Scotland, the Grey Crow is more abundant than the Black. It matters little whether we call the two crows races, varieties or species. Certain it is that the two forms present no structural differences, that their eggs are often undistinguishable, and that they frequently interbreed.

Young Rooks are often mistaken for Crows in Ireland and indeed they are very much alike, but Mr. R. M. Barrington pointed out to me that the bases of the body feathers are in the former always grey and in the latter white. We have therefore a very simple method by means of which these two species can at once be distinguished by merely lifting the feathers a little and examining their under parts.

R. F. SCHARFF.

#### **Stock-dove at Drogheda.**

On the evening of the 6th inst. I shot a Stock-dove at Blackhall, Drogheda. I have been looking out for them for many years, but never saw one before, though I have shot many hundreds of Ring-doves. It is a level and wooded locality, and about 20 miles from the place where Lord Clermont first saw the Stock-dove in 1875.

G. H. PENTLAND.

#### **Surf Scoter in Killala Bay.**

On the 19th inst. when punt-shooting near Killala, in the Moyne Channel, I met a pair of Surf Scoters; the female was secured, but the male, a fine adult bird, escaped with a broken wing. The bird obtained is only the fifth specimen as yet known to have been shot in Ireland, The first was shot in Belfast in 1846; the second at Clontarf, Co. Dublin, in October, 1880; and a third, a young female or male, shot in Crookhaven Harbour, Co. Cork, in November, 1888. While Mr. Sheridan, of Achill, Co. Mayo, speaks of shooting one there with a rifle bullet in 1870.

ROBERT WARREN.

[We hear that Mr. Warren has since shot the male, and that both birds have been secured for the Dublin Museum.—EDS.]



### **Fork-tailed Petrel on Lough Foyle.**

My attention has been called to a note in the *Irish Naturalist* (vol. v., p. 320) in which my name appears as having shot a "Fork-tailed Petrel on the shores of Lough Foyle." That I shot such a bird is true, but the information given by the correspondent, Mr. D. C. Campbell, is not strictly correct. As it would appear from his note that his information was supplied by me, I think it well to send this contradiction.

I am engaged in making a survey of Lough Foyle, and cover a distance of about 12 miles on the lough daily, hence I have most exceptional opportunity of observing the appearance of the various birds which frequent Lough Foyle.

CLAUDE W. BUCKLE.

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### **MAMMALS.**

#### **A Plague of Rats at Cushendun.**

These rodents have rapidly increased during the summer and autumn; every hedge-row is burrowed with them—hundreds have been killed, and still they are very numerous. The Stoats seem to have succumbed to some disease, as they were very numerous in the district; this may explain the multiplicity of rats. Starlings have also decreased for some reason.

SL. ARTHUR BRENNAN.

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### **GEOLOGY.**

#### **The Kerry Bog Disaster.**

The recent disastrous bog-slide in Kerry has furnished an opportunity for the scientific investigation of these curious phenomena which has not been neglected. The Royal Dublin Society without loss of time appointed a Committee, consisting of Prof. Sollas, Mr. Praeger, Dr. Dixon, and Mr. Delap to investigate the circumstances of the outburst; their report was laid before the Society on January 19, and will be published shortly. Prof. Cole visited the spot as early as possible, and has published in *Nature* of January 16th his account of the disaster and its geological aspects. It is to be hoped that these reports may lead to a systematic investigation relating to the stability of bogs. Serious damage has on many occasions been done by bog-bursts in Ireland; and there can be no doubt that simple precautions properly applied would obviate the risk of further disasters of the kind.

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## FIELD DAYS IN ULSTER

BY THE REV. HILDERIC FRIEND.

## I.—THE SLOBLANDS OF BELFAST.

DURING the Whitsuntide holidays of 1896 I spent ten days in the North of Ireland. My chief object was to discover fresh-water annelids, of which I felt convinced a large number of species yet remained unknown. My campaign was so far successful that I discovered a goodly number of species which have never yet been described by our authorities in this branch of science. I had, unfortunately, to remove from my old home in Cumberland just as I was in the midst of drawing and describing my specimens, and have only now been able to resume the study. I hope that the publication of these notes will lead a number of readers of the *Irish Naturalist* to do for the aquatic worms what they so readily and successfully did for the terrestrial species; and if as many consignments reach me as I received in 1892-4, I shall doubtless be able this year to publish a very satisfactory list, and so bring up our knowledge of Irish annelids to the level of other countries. As my work last year was undertaken for the Royal Irish Academy, I do not in this preliminary report give any descriptions of new species, but simply place on record the work done, with a view to helping other workers who may wish to take up a subject which has not yet been exhausted.

I landed at Belfast just as the sun rose on Whit Tuesday, May 26th, 1896. For weeks there had been little or no rain, and while the dry weather with which I was favoured enabled me to get about with the greatest ease and comfort, it closed many possible hunting-grounds in the way of ditches and gutters, which in wet weather abound in annelids. I was fortunate in having Mr. Bigger as my patron, and he had secured the services of a gentleman who knew the locality thoroughly, and was not afraid to be seen grubbing in the ditches and pools. We proceeded during the forenoon to explore with great care the estuarine flats in the neighbourhood of the docks. For some time our labours were in vain. Not a trace could be found of anything in the shape of worms, and in fact every form of life seemed to be scarce. By dint of

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careful and patient toil, however, we eventually coaxed from the "slob" land, as my companion termed it, some specimens. These included a *Planorbis* among the mollusca, the so-called horse-leech, three or four freshwater worms, together with *Allurus tetraedrus*, *Allolobophora chlorotica* (both type and variety), *A. turgida*, and *A. subrubicunda*. After a while we came down to the Connswater, where we made a splendid discovery. As I turned over the green seaweed which lay in considerable lumps on the stone-paved sides of this tidal stream, I found the stones in many places quite blood-red with minute worms. They were very healthy and active, but it was perfectly easy to secure a large "bag," and I took away as many specimens as I needed. Having placed some in spirits I endeavoured to keep the rest alive, as it is most desirable that every new species should be described from living material. I found, however, as I continued my stay in the country that the alga began to decompose, resulting in the death of my worms. I had consequently to throw away my collection from this locality, which I did without regret, because my guide had kindly promised me a fresh supply at any future time. I availed myself of his kind services after reaching home, and was well rewarded.

I may here remark that such localities as these are yielding most valuable results, because by their means we are able to derive information which is calculated to help in the solution of the problems connected with the distribution of annelids. We find that certain genera are semi-aquatic—capable of living either on land or in the water. Others we ascertain to be capable of existing either in fresh or brackish water; while we further learn that some genera which have representatives on the shores of our inland seas or fresh-water lochs, are also represented by other species on the sea-shore. There is a large and fascinating field for research here, and as Belfast is practically the only place in Ireland where I was able systematically to examine the slob-land, tidal streams, and estuarine flats, I am hoping that when correspondents send me gleanings from similar places in other parts of the country some very valuable discoveries may be made. It may be interesting, for example, to note that the annelid-fauna of the Solway yields a number of species which I did not find at Belfast, and *vice versa*; so

that at Castlebellingham, Bray, Cork, Kerry, and elsewhere, many new captures may be expected.

I must guard the collector against one or two possible sources of error. In the first place it must not be supposed that all the water-worms are red, brightly coloured, or easily detected. White worms abound in many places, and in fact the colour varies immensely; and in the next place let it not be supposed that no worms exist if they cannot be detected with the eye or even with a lens. I shall have to describe specimens taken at different places, the very existence of which I did not suspect until I had my material under the microscope.

On examining my Belfast specimens I found many things of interest; respecting which, one or two notes must for the present suffice.

#### **Heterochaeta costata**, Clap.

This interesting creature was found somewhat sparingly among the seaweed. As it has been fully described by others I shall only give my own observations, that the results may be compared or contrasted with those of others.<sup>1</sup> The worm is from half to three quarters of an inch in length, and of a greenish brown hue. It is remarkable for its fan-shaped setæ, which occur on segments v. to xii. or xiii. In the hinder segments, about one forked seta in each bundle. I found as many as 70 segments in one worm; the body transparent, œsophagus with chloragogen cells, beginning in segment vi. A pair of enlarged vessels or hearts in viii. The amount of constriction and annulation varies. The system of blood vessels in segments i. to viii. is worthy of careful study. The large ventral vessel in front of segment viii. gives off a complex network in each segment. A diagram is necessary to make the matter clear.

#### **Uncinals littoralis** (O.F.M.)

I find the following notes in my records:—

So delicate that it fell to pieces when being examined. Could see no nephridia or other organs to answer thereto. Brain seen extending back to segment iii. A small worm  $\frac{1}{4}$  to  $\frac{3}{8}$  inch long, very pale, but with red blood and enlarged heart in viii. setigerous segment. No eyespots seen; dark-celled intestine commencing in segment iv. Its motion in water very jerky and peculiar. Tendency to fission behind segment xv. of one specimen. Prostomium with delicate cilia. Four sets of setæ in each of the hinder segments, but two sets or bundles only in first three or four. Very liable to attacks from a parasite which fixes itself in glands of the setæ. Hence the worm often appears to have a large number of capillary or hair-like setæ. This is an ingenious device, and shows how low in the scale of life mimicry operates.<sup>2</sup>

<sup>1</sup> See Beddard, Monograph of Oligochaeta, pp. 257-8; Benham, Q.J.M.S., xxxiii., p. 107 seq.; Claperede, Beobacht. über Anat. 1863, p. 25.

<sup>2</sup> For ref. see Beddard, op. cit., pp. 395-6.

The rest of my material consisted of two or three species new to science, and these will be described elsewhere. In the afternoon I visited the Botanic Gardens in the hope of obtaining some specimens of earthworms. The soil however was too dry, and though I might have been able to discover something of interest if I had been guided to the right spots, the Curator was not at hand just at the time, and the workmen were of course unable to help me. I found also at Mr. Bigger's garden in the evening the same absence of specimens owing to the continued drought.

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## THE DISTRIBUTION OF BIRDS BREEDING IN IRELAND.

BY R. J. USSHER.

In 1894, under the invaluable guidance of the late Mr. A. G. More, I presented a report,<sup>1</sup> on the above subject to the Royal Irish Academy; since then, personal explorations as well as the kind help of my correspondents have added new facts, and it may be well to give to the readers of the *Irish Naturalist* in a popular form the results I have arrived at up to this, in the hope that some of them may aid me further to fill up gaps in my information.

To make these statistics more readable I have grouped the species, selecting in the first case all birds that breed throughout the whole or nearly the whole of Ireland, and having so disposed of these commoner species, I have attempted to present a view of the distribution of the rest according to the nature of their haunts, which restrict them to certain counties, or where this is unsuitable, then on some other basis of arrangement.

### I.—BREEDING BIRDS GENERALLY DISTRIBUTED.

For convenience I place in the first group sixty-seven species which I have ascertained to breed in every county in Ireland, except where stated. I include the Quail, as it

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<sup>1</sup> *Proceedings R.I.A.*, 3rd Series, vol. iii, No. 3.

formerly bred all over Ireland, though it has now disappeared from most counties.

Kestrel.	Goldfinch.
Sparrow-Hawk.	Lesser Redpoll ( <i>except Kerry</i> ).
Long-eared Owl.	Linnet.
Barn-Owl.	Bullfinch.
Spotted Flycatcher.	Starling.
Dipper ( <i>except Armagh, Longford</i> ).	Hooded Crow.
Mistle-Thrush.	Rook.
Song-Thrush.	Jackdaw.
Blackbird.	Magpie.
Hedge-Sparrow.	Swallow.
Redbreast.	House-Martin.
Stonechat ( <i>except Meath</i> ).	Swift.
Wheatear ( <i>except Longford, Westmeath, Kilkenny</i> ).	Cuckoo.
Sedge-Warbler.	Kingfisher ( <i>except Roscommon</i> ).
Whitethroat ( <i>except Carlow</i> ).	Wood Pigeon.
Willow-Warbler.	Red Grouse.
Chiff-Chaff.	Pheasant.
Goldcrest.	Partridge.
Wren.	Quail ( <i>formerly widespread, but has now disappeared from many counties</i> ).
Creeper.	Corn Crake.
Great Tit.	Water Rail.
Blue Tit.	Water Hen.
Coal Tit.	Coot.
Long-tailed Tit.	Lapwing.
Pied Wagtail.	Woodcock ( <i>except Meath</i> ).
Grey Wagtail.	Snipe.
Meadow Pipit.	Common Sandpiper ( <i>except Kilkenny, Carlow ? Louth ? Wexford ?</i> ).
Skylark.	Redshank ( <i>except Dublin, Carlow, Waterford</i> ).
Reed Bunting ( <i>except Carlow</i> ).	Little Grebe.
Corn Bunting ( <i>except Monaghan, King's Co., Leitrim</i> ).	Heron.
Yellow Hammer.	Wild Duck.
Chaffinch.	Teal.
House-Sparrow.	
Greenfinch.	

These exceptions merely denote blanks in my information, and do not mean, for instance, that the Stonechat does not breed in Meath nor the Whitethroat in Carlow; but in the case of the Redshank some of the blanks may really represent its absence as a breeding species.

The above sixty-seven species, though heterogeneous in so many respects, are all inland breeders, and as such are dispersed throughout Ireland.

## II.—TWENTY-THREE SPECIES BREEDING IN CLIFFS AND ROCKS.

The asterisk is used to denote the counties in which each species breeds, and the letter H to indicate where the species formerly bred, but has ceased to do so.

SPECIES.	MARITIME COUNTIES.											INLAND COUNTIES.											
	Donegal.	London-derry.	Antrim.	Down.	Louth.	Dublin.	Wicklow.	Wexford.	Waterford.	Cork.	Kerry.	Clare.	Galway.	Mayo.	Sligo.	Tyrone.	Fermanagh.	Leitrim.	Flocommon.	Westmeath.	Tipperary.	Limerick.	
Golden Eagle, . . . . .	*	H	H	H	.	.	.	.	H	.	*	.	*	.	H	H	.	.	.	.	.	.	H
White-tailed Eagle, . . . . .	H	.	H	H?	.	H	H	H	H	H	.	H	H	.	.	.	.	.	.	.	.	.	.
Peregrine Falcon, . . . . .	.	H	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Rock Pipit, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Chough, . . . . .	.	.	.	.	.	H	.	H	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Raven, . . . . .	.	H	.	.	.	H	.	H	.	.	.	.	.	.	.	H	H	H	.	.	.	.	.
Rock Dove, . . . . .	.	.	.	.	.	H	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Oyster-catcher, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Common Gull, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Herring Gull, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Lesser Black-backed Gull, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Great Black-backed Gull, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Kittiwake, . . . . .	.	.	.	.	.	.	.	.	H	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Manx Shearwater, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Fork-tailed Petrel, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Storm Petrel, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Razor-bill, . . . . .	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.
Common Guillemot, . . . . .	.	.	.	.	.	.	H	.	H?	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Black Guillemot, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Puffin, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Cormorant, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Shag, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Gannet, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

It will be observed from this table that both the Eagles are becoming extinct. It is to be feared that collectors will destroy what the gamekeeper and the shepherd have left.

The Peregrine, Chough, and Raven breed in mountain-cliffs as well as those on the coast, though in the case of the two latter species, such inland nesting-places have become more and more deserted.

The Rock-Pipit breeds on low-lying shores, as in Louth, and possibly Limerick on the lower Shannon, as well as in sea-cliffs.

The Oyster-catcher, in nearly every case I have seen, breeds on rocks or rocky ground, as on the tops of rocky islands.

The Common Gull breeds on low rocky islets in lakes in the West of Ireland, usually but not always near the coast, but also in a few instances on sea-cliffs and marine islands.

The Lesser Black-backed Gull is an inland as well as a marine breeder, nesting on the great bogs and on islands in the larger lakes both in the inland counties denoted in the table and in inland parts of maritime counties.

The Great Black-backed Gull nests on low rocks where the site is favourable, and even on a sandbank, besides its usual positions, the summits of rocky islands known as "stacks."

The Manx Shearwater and the Petrels breed in the talus so often found on sea-cliffs and lofty islands, whether it be covered with peat or formed of loose stone.

The Puffin, though inhabiting similar places to the latter, breeds more extensively in the peat-covered tops of lofty islands and cliffs, but never I believe resorts to low-lying coasts.

The Cormorant has several breeding colonies in trees on islands in lakes in Galway, Mayo, and Roscommon.

It will be observed in the above table that the peninsular counties which jut out westwards into the Atlantic are the richest in rock-breeders, Donegal, Mayo, Galway and Kerry each exhibiting twenty species or upwards.

### III.—SEVEN SPECIES BREEDING ON MOUNTAINS AND MOORS.

	Donegal.	Londonderry.	Antrim.	Tyrone.	Down.	Armagh.	Monaghan.	Fermanagh.	Cavan.	Lonsford.	Westmeath.	Meath.	Louth.	Dublin.	Wicklow.	Kildare.	Queen's Co.	King's Co.	Kilkenny.	Carlow.	Wexford.	Tipperary.	Waterford.	Cork.	Kerry.	Limerick.	Clare.	Galway.	Roscommon.	Mayo.	Sligo.	Leitrim.		
Hen-Harrier, . .	H	H	?	H													H																	
Merlin, . . . .																																		
Ring-Ouzel, . .																																		
Twite, . . . .																																		
Nightjar, . . .																																		
Golden Plover, .																																		
Curlew, . . . .																																		



The Hen Harrier is fast disappearing before the game-keeper. It is difficult to ascertain where a bird thus marked out for destruction still breeds, but there seems sufficient reason for stating that it does so in Kerry and Galway.

The Twite breeds still more commonly on elevated rocky coasts than on inland mountains.

The Nightjar is very scarce in the North and West of Ireland.

The Golden Plover breeds on bogs not much above the sea-level in Connemara, but usually on mountains.

The Curlew breeds both on bogs and mountains, usually on the great red bogs covered with heather which occupy so much of the inland counties.

IV.—FIFTEEN SPECIES THAT BREED ON LAKES AND MARSHES.

	Donegal.	Londonderry.	Antrim.	Tyrone.	Down.	Armagh.	Monaghan.	Fermanagh.	Cavan.	Longford.	Westmeath.	Meath.	Louth.	Dublin.	Wicklow.	Kildare.	Queen's Co.	King's Co.	Kilkenny.	Carlow.	Wexford.	Tipperary.	Waterford.	Cork.	Kerry.	Limerick.	Clare.	Galway.	Connemara.	Mayo.				
Marsh Harrier,	H?	H	H	H	H		H	H												H											H			
Spotted Oriole,								e?					e?									e?										H		
Dunlin,			e?	e?	e?			e?	e?													e?												
Ringed Plover,																																		
Common Tern,								e?							H																			
Black-headed Gull,								e?																										
Red-throated Diver,	e?																																	
Great Crested Grebe,																																		
Mute Swan,		H																																
Pintail,																																		
Shoveller,																																		
Wigeon,			e?	e?			H	e?																										
Pochar,		e?	e?																															
Tufted Duck,		e?	e?																															
Red-breasted Merganser.	e	e?	e?																															

The circumstances of these species preclude their exhibiting that similarity of distribution which can be traced in the previous tables.

The Marsh-Harrier, formerly widespread, has been exterminated in most of its old haunts. Lord Castletown is the only proprietor I know of who extends protection to it, in his extensive marshes in the Queen's County.

The Spotted Crake is only recorded to have bred in one instance, in Roscommon, before 1853, when Col. Irwin found the eggs, presented by him to the Dublin Museum. But there is reason to suppose that it has bred in the other counties indicated.

The Dunlin has a wide range in the breeding season, and has been found nesting on elevated mountains as well as on low-lying lake-shores in the centre of Ireland, and marshes near the sea.

The Ringed Plover and Common Tern both breed on sea-coasts and islands as well as on islands and shores of many inland lakes.

The Red-throated Diver has been found breeding in one mountainous district full of moorland lakes in Donegal, but the persistent taking of its eggs must soon drive it from this haunt, if that has not been already done.

The distribution of the Mute Swan is in part of an artificial character, though on several large lakes there are practically wild flocks which receive no care.

The Shoveller and Tufted Duck are two species which are extending their breeding-range, that of the Shoveller embracing eastern and southern counties where the Tufted Duck is not known to breed.

The Pintail, Wigeon, and Pochard are three species respecting whose breeding in Ireland we want much more definite information. I have myself only met with the Wigeon in one or two instances in the breeding season, and have never seen the nest or young of any of the three. Still it is impossible to overlook the many statements that have been made of their having bred.

The Red-breasted Merganser, after the Mallard and Teal, is the commonest breeding duck in Ireland.

V.—FOUR SPECIES BREEDING IN LOW-LYING MARITIME LOCALITIES.

	Donegal.	Londonderry.	Antrim.	Down.	Louth.	Dublin.	Wicklow.	Wexford.	Waterford.	Cork.	Kerry.	Limerick.	Clare.	Galway.	Mayo.	Sligo.
Sheldrake, . . .	•	•	•	•	•	•	H	•	•	H	•	•	•	•	•	•
Sandwich Tern, . . .	H	•	•	•	•	H	•	•	•	•	•	•	•	•	•	•
Arctic Tern, . . .	•	•	•	•	•?	?	•	•	•	•	•	•	•	•	•	•
Lesser Tern, . . .	•	•	•	•?	•	•	•	•	•	•	•	•	•	•	•	•

The Sheldrake breeds far up the estuary of the Shannon in Clare and Limerick.

The Sandwich Tern is at present known to breed only on one island in a lake near the coast of Mayo, which is strictly preserved.

The Arctic Tern departs from its usual marine breeding-habits, by nesting on inland lakes in eastern Mayo, and possibly elsewhere.

VI.—FOUR RARER WARBLERS, WHOSE DISTRIBUTION IS BEING GRADUALLY TRACED UP, AND WHICH ARE POSSIBLY INCREASING IN IRELAND.

	Donegal.	Antrim.	Tyrone.	Down.	Armagh.	Fermanagh.	Cavan.	Longford.	Westmeath.	Meath.	Louth.	Dublin.	Wicklow.	Kildare.	Queen's Co.	Kilkenny.	Carlow.	Wexford.	Tipperary.	Waterford.	Cork.	Kerry.	Limerick.	Clare.	Galway.	Roscommon.	Mayo.	Sligo.	Leitrim.
Garden Warbler, . . .	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Blackcap, . . .	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Wood Warbler, . . .	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Grasshopper-Warbler, . . .	•?	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

In the cases of the first two species above, the many marks of interrogation result from the birds having been seen in summer, though the nest has not been found in those cases, or, if found, then only in isolated instances. Still even this amount of evidence, on good authority, in the cases of birds

hardly known even by name where they occur, is worth recording. The eggs of the Wood Warbler have been taken at Clonbrock in Galway, where the bird is seen annually, as it also is at Powerscourt in Co. Wicklow.

The Grasshopper-Warbler has so wide a range that, allowing for the difficulty of getting information about this nocturnal songster, it probably extends its range in summer over Ireland, except in the extreme West. It is by far the most common species of the four, while the Wood Warbler is the rarest.

VII.—TWO SPECIES THAT BREED IN CONIFERS, AND ARE GAINING GROUND.

	Donegal.	Antrim.	Tyrone.	Down.	Armagh.	Monaghan.	Fermanagh.	Cavan.	Loughford.	Westmeath.	Meath.	Dublin.	Wicklow.	Kildare.	Queen's Co.	King's Co.	Carlow.	Wexford.	Tipperary.	Waterford.	Cork.	Kerry.	Galway.	Roscommon.	Mayo.	Sligo.	Leitrim.
Crossbill.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Siskin.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

The uncertainty expressed in so many cases as to the Crossbill breeding results from its gipsy habits, breeding one year in a place where it is not found the next. It is practically a bird of modern introduction, owing to increase of fir plantations. From the same cause the Siskin seems to breed more permanently and extensively than it used to do. It is much more common in summer than was supposed.

VIII.—THREE NEW-COMERS OR SPECIES NOT HEARD OF UNTIL RECENT YEARS.

	Antrim.	Tyrone.	Down.	Armagh.	Louth.	Dublin.	Wicklow.	Queen's Co.	King's Co.	Carlow.
Redstart.	.	.	.	.	.	.	.	.	.	.
Tree-Sparrow.	.	.	.	.	.	.	.	.	.	.
Stock-Dove.	.	.	.	.	.	.	.	.	.	.

The Redstart, announced in 1885 to breed at Powerscourt, has since been found breeding in a second locality in Wicklow, and in 1894 I found it breeding in Tyrone.

The Tree-Sparrow, first announced in 1852, is apparently still confined to the vicinity of the Co. Dublin coast.

The Stock-Dove, first noticed in the north-east of Ireland in 1875, has now extended to Queen's County and Carlow, where it breeds, and a specimen has been announced from Galway (*Irish Naturalist*, 1896, p. 192).

IX.—THREE SPECIES WHOSE BREEDING RANGE IS RESTRICTED TO A PART OF IRELAND.

	Donegal.	Antrim.	Tyrone.	Down.	Armagh.	Monaghan.	Fermanagh.	Cavan.	Longford.	Westmeath	Louth.	Dublin.	Kildare.	Queen's Co.	King's Co.	Kilkenny.	Carlow.	Wexford.	Tipperary.	Waterford.	Cork.	Galway.	Roscommon.	Mayo.	Sligo.	Lettin.
Whinchat, . . . . .	.	.	.	.	?	?	.	.	.	?	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.
Yellow Wagtail, . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Jay, . . . . .	.	.	H.	.	.	.	.	.	.	?	.	H.	.	.	.	.	.	.	.	.	H.	.	.	.	.	.

With the exception of two pairs of Whinchats seen near the Nore in Co. Kilkenny by Mr. H. C. Hart on 5th July, 1884, I have no evidence of the species breeding south of Dublin. It is not uncommon in parts of the North and North-west.

The Yellow Wagtail breeds round the shores of Lough Neagh in Ulster, and on islands in Lough Corrib, Mask and Carra in Connaught.

Besides these widely separated districts there is no other record of its nest having been found in Ireland except once in the Co. Dublin by Mr. Williams.

The Jay's breeding-range extends over that part of Ireland drained by the rivers that flow out at Waterford Harbour. It formerly included counties from which the species afterwards disappeared, but it seems to be now extending in some districts.

## X.—FIVE SPECIES CONCERNING WHOSE BREEDING IN IRELAND WE HAVE NOW LITTLE OR NO EVIDENCE.

	Donegal.	Londonderry.	Antrim.	Down.	Armagh.	Dublin.	Wicklow.	Queen's Co.	Wexford.	Waterford.	Cork.	Kerry.	Mayo.	Sligo.
Common Buzzard, . . . .	H	H	H	H	.	.	.	.	.	.	.	.	.	.
Woodlark, . . . . .	.	.	H?	H?	H?	H	e?	.	.	H	e?	.	.	.
Carrion-Crow, . . . . .	.	.	H	.	.	.	.	H?	.	.	H	.	.	.
Turtle-Dove, . . . . .	.	.	.	H	.	H	.	.	.	.	.	H	.	.
Roseate Tern, . . . . .	.	.	.	H	.	H	.	.	H	.	.	.	.	.

The Buzzard, which Thompson recorded as breeding in four northern counties, seems to have been quite exterminated since his time.

In 1894 the Woodlark was found breeding in Co. Wicklow (*Irish Nat.*, 1894, p. 137). It may still linger in Northern Cork, but though formerly well known it seems to have been almost exterminated by bird-catchers.

The Carrion Crow's rarity in Ireland has been on record since the time of King John. Since Thompson noted its former occurrence in Antrim, Lord Castletown has known of it in the Queen's County, and Mr. Corbet has shot both old and young near Queenstown Harbour, and others mention it from Mayo, but the most satisfactory instance occurred in Kerry in 1864, when Mr. J. R. Hardy obtained eggs and a specimen of the bird which he has presented to the Science and Art Museum, Dublin.

The Turtle-Dove is stated by Thompson to have bred once in Down and once in Kerry. A female with eggs in her ovary was shot in Co. Dublin; but though this species appears in certain localities almost regularly in ones and twos, it disappears again without being known to breed.

The Roseate Tern is recorded by Thompson to have bred in Down, Dublin, and Wexford, but at the present day no breeding-place of this species in Ireland is known.

The Bittern has been omitted from these lists, as the last instance of its breeding in Ireland, recorded by Thompson, took place over fifty years ago.

A LIST OF IRISH OSTRACODA  
COMPILED FROM BRADY AND NORMAN'S CATALOGUE.

BY R. F. SCHARFF, PH.D.

THE only paper ever published exclusively on Irish Ostracod Crustaceans is one on the species observed in Belfast Lough by the late Dr. Malcomson (*Proc. Belfast Nat. Field Club*, 1884-5). No separate complete list of the Irish Ostracoda has appeared in print, and I venture therefore to present one to the readers of the *Irish Naturalist*, in the hope that the study of this interesting group of animals may thereby be facilitated. Anyone in Ireland who wishes to investigate Ostracods can thus at a glance see what species have been recorded from the inland waters or the sea surrounding this country.<sup>1</sup>

The list of the species as here given has been compiled from Brady and Norman's "Monograph of the Marine and Freshwater Ostracoda of the North Atlantic and of North-western Europe." This very important and excellent work was communicated to the Royal Dublin Society by Prof. Haddon and was published in the *Transactions* of the Society. The first part appeared in 1889, and it was completed in 1896. Figures of most of the species are given by the authors, and many descriptions of new species appear here for the first time. There are altogether 27 freshwater and 120 marine species.

I have marked with an asterisk (\*) those species which have never been found elsewhere except in Ireland or the surrounding seas.

IRISH FRESHWATER OSTRACODA.

**Cyprididæ.**

*Cypria exsculpta* (Fisch.)  
*C. ophthalmica* (Jurine.)  
*C. laevis* (O. F. Müll.)  
*C. serena* (Koch)  
*Cypris fuscata* (Jurine.)  
*C. incongruens*, Ramd.  
*C. pubera*, O. F. Müll.  
*C. reticulata*, Zadd.  
*C. prasina*, Fisch.  
*C. bispinosa*, Lucas.  
*Erypetocypris reptans* (Baird.)

*Cypridopsis vidua* (O. F. Müll.)  
*C. aculeata* (Lilljeb.)  
*C. villosa* (Jurine.)  
*C. variegata*, Brady and Norm.  
*Potamocypris fulva*, Brady.  
*Notodromas monacha* (O. F. Müll.)  
*Candona candida* (O. F. Müll.)  
\**C. elongata*, Brady and Norm.  
*C. lactea*, Baird.  
*C. pubescens* (Koch.)  
*C. Kingsleii*, Brady and Roberts.  
*C. fabaeformis* (Fisch.)

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<sup>1</sup> I hope shortly to publish a map indicating the boundaries of the Irish Marine area, as we propose to define them in the new arrangement of the Collection of Irish Marine Animals in the Dublin Museum.

**Darwinulidæ.**

*Darwinula Stevensoni*, Brady and Roberts.

**Cytheridæ.**

*Metacypris cordata*, Brady & Roberts.  
*Limnocythere Sancti-patricii*, Brady and Roberts.

*Cytheridea lacustris* (G. O. Sars.)

## IRISH MARINE OSTRACODA.

**Cytheridæ.**

\**Aglaiia complanata*, Brady and Roberts.

*Paracypris polita*, G. O. Sars.

*Pontocypris mytiloides* (Norm.)

*P. hispida*, G. O. Sars.

*P. acupunctata*, Brady.

*P. trigonella*, G. O. Sars.

*Anchistrochells acerosa* (Brady.)

*Argilloccia cylindrica*, G. O. Sars.

*Bairdia inflata*, Norm.

*B. obtusata*, G. O. Sars.

*Cythere lutea*, Müll.

*C. pellucida*, Baird.

*C. confusa*, Brady and Norm.

*C. porcellanea*, Brady.

*C. macallana*, Brady.

*C. tenera*, Brady.

*C. semipunctata*, Brady.

*C. badia*, Norm.

*C. crispata*, Brady.

\**C. cribrosa*, Brady, Crossk., and Roberts.

*C. sulcifera*, Brady.

*C. gibbosa*, Brady and Roberts.

*C. rubida*, Brady.

*C. albomaculata*, Baird.

*C. Robertsoni*, Brady.

*C. convexa*, Baird.

*C. marginata*, Norm.

*C. Jeffreysii*, Brady.

*C. limicola*, Norm.

*C. cuneiformis*, Brady.

*C. navicula* (Norm.)

*C. globulifera*, Brady.

*C. clutha*, Brady, Crossk., and Roberts.

*C. villosa* (G. O. Sars.)

*C. pulchella*, Brady.

*C. echinata* (G. O. Sars.)

*Cythere acanthoderma*, Brady.

*C. dasyderma*, Brady.

*C. scabrocuneata*, Brady.

*C. quadridentata*, Baird.

*C. emaciata*, Brady.

*C. tuberculata* (G. O. Sars.)

*C. concinna*, G. O. Sars.

*C. finmarchica* (G. O. Sars.)

*C. angulata* (G. O. Sars.)

*C. dimelmensis* (Norm.)

*C. antiquata* (Baird).

*C. Whitei* (Baird).

*C. Jonesii* (Baird).

*Cytheridea elongata* (Brady).

*C. papillosa*, Bosquet.

*C. punctillata*, Brady.

*C. torosa* (Jones).

*C. subflavescens*, Brady.

*C. sorbyana*, Jones.

*Eucythere declivis* (Norm.)

*Krithe bartonensis* (Jones).

*K. producta*, Brady.

*Loxococoncha impressa* (Baird).

*L. guttata* (Norm.)

*L. viridis* (Müll.)

*L. multifora* (Norm.)

*L. pusilla*, Brady and Roberts.

*L. taramindus* (Jones).

*L. fragilis*, G. O. Sars.

*Xestoleberis aurantia* (Baird).

*X. depressa*, G. O. Sars.

*Cytherura gibba* (Müll.)

*C. cornuta*, Brady.

*C. sella*, G. O. Sars.

*C. acuticostata*, G. O. Sars.

*C. striata*, G. O. Sars.

*C. angulata*, Brady.

*C. undata*, G. O. Sars.

*C. producta*, Brady.

*C. nigrescens* (Baird).



*Cytherura simplex*, Brady and Norm.

*C. similis*, G. O. Sars.

*C. fulva*, Brady and Roberts.

*C. clathrata*, G. O. Sars.

*C. cellulosa* (Norm.)

*Cytheropteron latissimum* (Norm.)

*C. punctatum*, Brady.

\**C. crassipinnatum*, Brady and Norm.

*C. alatum*, G. O. Sars.

*C. montrosiense*, Brady, Crossk.,  
and Roberts.

*C. angulatum*, Brady and Roberts.

*C. depressum*, Brady and Norm.

*Bythocythere constricta*, G. O. Sars.

*B. turgida*, G. O. Sars.

*B. recta* (Brady).

*B. simplex* (Norm.)

*Pseudocythere caudata*, G. O. Sars.

*Sclerochilus contortus* (Norm.)

*Cytherideis subulata*, Brady.

*Cytherois Fischeri* (G. O. Sars.)

#### Paradoxostomatidæ.

*Paradoxostoma variable* (Baird).

*P. ensiforme*, Brady.

*P. abbreviatum*, G. O. Sars.

*P. obliquum*, G. O. Sars.

*P. Normani*, Brady.

*P. pulchellum*, G. O. Sars.

*P. hibernicum*, Brady.

*P. arcuatum*, G. O. Sars.

*P. orchadense*, Brady and Roberts.

*P. Hodgei*, Brady.

*P. flexuosum*, Brady.

*Machærina tenuissima* (Norm.)

#### Asteropidæ.

*Asterope mariz* (Baird).

*A. teres* (Norm.)

*A. elliptica*, Philippi.

#### Cypridinidæ.

*Crossophorus imperator*, G. S. Brady.

*Philomedes interpuncta*, Baird.

*P. Macandrei* (Baird).

#### Sarsiellidæ.

\**Nematohamma obliqua*, Brady and  
Norm.

*Sarsiella capsula*, Norm.

#### Halocypridæ.

\**Conchæcia Haddoni*, Brady and Norm.

*Conchæcilla daphnoides*, Claus.

#### Polycoptidæ.

*Polycope orbicularis*, G. O. Sars.

*Polycoptis compressa* (Brady & Roberts)

## A BOOK ON FRUIT TREES.

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**Fruit Culture for Amateurs.** By S. G. WRIGHT. With an appendix on Insect and other Pests injurious to Fruit Trees by W. D. DURY. Pp. 244. 146 figs. in text. London: L. Upcott Gill, 1897. Price 3s. 6d.

A most useful work for those who take an interest in gardening work, and who wish to obtain reliable information on the best kind of fruit-trees to plant, how to plant them, and how to treat them when planted. Indeed so complete are the lists, and so extended are the many cultural directions which are given, that others besides those for whom the book portends to have been specially written, may, when seeking information, unhesitatingly turn to the pages of this work. Amateurs in the strict sense of the term may feel somewhat puzzled and disheartened at the length of some of the lists of "suitable varieties," which we think might have been somewhat curtailed, or a second and much reduced list of the best and most prolific varieties, for small gardens, might with advantage have been added. Thus in the list of apples, some of the varieties do not as a rule succeed particularly well in Irish gardens, whereas Echlinville, Peasgood Nonsuch, Bramley's Seedling, Golden Noble, New Hawthornden, are kitchen varieties which may be relied on to grow in almost any soil and situation. The author wisely draws attention to the pleasure and profit which can be derived from covering waste wall-spaces with suitable fruit-trees. On the Continent, especially in France and in Belgium, this point receives great attention, and fine crops of first-rate fruit are harvested from trees covering unsightly walls of outhouses, stables, barns, and buildings of all sorts. Such crops could be equally well obtained in Ireland.

Another point we are glad to note receives due prominence is the great importance of summer pruning of fruit-trees, and it is no exaggeration to say that it is of much more importance than the winter pruning, although in so many cases summer pruning is totally neglected. In this, as in all other cases, if the directions given by the author be followed, there will be no longer necessity for the complaint so often heard—"My fruit-trees never bear any fruit." The concluding portion of the book is occupied with a list of "Insect and other fruit Pests," which greatly adds to its general usefulness, more especially as means of combating and destroying these "Insects and other Pests" are given. Mr. Wright's name is well known in England as that of a good practical gardener and a successful fruit-grower, and he has embodied the result of many years work and observation in the book now before us, thereby earning the thanks of all who take practical interest in such matters.

F. W. M.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY OF IRELAND.

Recent gifts include an Ocellated Sand Skink from Dr. F. F. MacCabe, a Long-eared Owl from Mr. C. K. Bushe, a Badger from Mr. A. Rotheram, a pair of Pine Martens from Major J. H. Connellan, seven Ring-Snakes from Judge Boyd, and a number of freshwater fish from Mr. F. Godden.

3,581 persons visited the Gardens in January.

The Sixty-fifth Annual Report adopted at a meeting held January 26th shows encouraging progress. The number of admissions to the Gardens during the year 1896 was 124,836, an increase of 12,000 on 1895, while the receipts were £1,755 8s. *id.*, as against £1,687 19s. 5d. the previous year. Still better is the increase from member's entrance fees and subscriptions; the rise from £519 in 1895, to £745 last year, shows a marked accession of new members, though it is considered that the very special efforts put forward by the Council should have met with even greater success.

The Council lost two of their number during the year;—Mr. E. Pennington by death and Gen. Sir R. Sankey by resignation; Col. G. T. Plunkett and Mr. G. A. Stephenson were co-opted to fill the vacancies thus caused.

Among the improvements carried out during 1896, the completion of the new Goat House and Rockery is specially noticeable. The goats and ibexes will now be shown among surroundings imitative of their natural haunts, and the good stock of animals already acquired will be added to this year. The cost of the undertaking has been great; a special donation of £10 towards it by Dr. C. B. Ball is acknowledged.

Another excellent piece of work has been the alteration of the Aquarium House. Without interference with the fish tanks, a large Alligator pond has been formed in the centre of the building, while at one end have been erected heated compartments with plate-glass fronts for tropical snakes and lizards, at the other end cages and a tank for diving birds, such as Cormorants and Penguins. A glass front to this tank enables the motions of the birds, while diving, to be observed and studied. It is hoped that this house will shortly be opened to the public, when it will doubtless prove a great attraction.

Re-labelling of the animals has been carried out during the year on an extensive scale. In cages where many creatures are kept together, it is important to define which label refers to which animal, and this has been done for the Aviary and Gull-enclosures, by means of a number of water-colour drawings kindly executed by Mrs. Scharff and mounted by Miss Dixon.

This year it is intended to erect a new house and paddock for the llamas and camels; a plan of the intended structure is given and its completion will be a great gain to the Gardens. Unfortunately two camels died last year in the old house. New quarters for the marsupials are also contemplated. It is earnestly to be hoped that sufficient funds will be at the disposal of the Council for carrying out these important works

Except the loss of the two Camels just mentioned, the Society's collection has been remarkably free from deaths. The poisoning of the interesting Siamese Brown Macaque by pills administered by some ruffianly visitor is, however, a sad episode of the past year. It is satisfactory to notice that the two Anthropoid apes—the Chimpanzee and Gibbon—are still alive and flourishing.

Two litters of lion-cubs of two each, were born during the year, and three of the cubs are alive and thriving. Two new lionesses from Africa have been acquired to keep up the breeding-stock, replacing two of the old ones. A litter of four puppies born by the Cape Hunting-Dog died in three days owing to their mother's anxiety to find a concealed spot to lay them in. A second litter is expected shortly and a special burrow and den, which have been prepared, will it is hoped enable the young to be reared. The period of gestation is 80 days and the puppies are black with white patches when born, not with ochreous markings like the parents.

A large number of donations, recorded from month to month in the *Irish Naturalist*, have been received. Specially noticable are a pair of South African Crowned Cranes from Mr. L. O. Hutton, three Llamas from Mr. J. Nelson; West African crocodiles and lizards from Dr. E. J. Fenton, and a Moose-cow (of which a good photograph is given) from the Earl of Aberdeen.

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#### DUBLIN MICROSCOPTICAL CLUB.

JANUARY 21.—The Club met at the house of Dr. W. FRAZER, who exhibited different specimens of genuine Shagreen and of other materials usually so called, used for decorative purposes, covering spectacle cases, mathematical instruments, &c., with the view of eliciting information as to their nature, especially those of green colour with imbedded small rounded white masses. Any information on the subject will be thankfully received.

PROF. COLE showed grains separated from Portland Oolite by Mr. R. Welch, with similar calcareous grains, for comparison, from deposits now forming in the Great Salt Lake of Utah. In both cases an algal origin has been claimed for the grains, while many authors support an inorganic mode of deposition. Prof. Cole had been unable to detect algal structures in a large number of sections of the Utah grains.

Dr. Hurst suggested that as the organic portion of the bodies exhibited by Prof. Cole was probably exceedingly small and therefore liable to be destroyed by the effervescence caused by ordinary methods of decalcification, a method should be adopted which he had devised some years ago for a similar purpose, and which had given excellent results. The objects to be decalcified are placed, in water or a solution of corrosive sublimate, in a narrow-mouthed bottle, the greater part of the bottle being empty. A slow stream of  $\text{CO}_2$  is now passed into this bottle

for a few days, the delivery-tube not dipping into the water. The object of this is to almost—but not quite—saturate the water with CO<sub>2</sub> and so convert the calcium carbonate of the object into the soluble bicarbonate. It is essential that the CO<sub>2</sub> pressure shall not exceed the atmospheric pressure, otherwise when the pressure is released in order to remove the decalcified objects, effervescence would ensue, and the tissues might be injured thereby.

PROF. T. JOHNSON exhibited specimens of *Halicystis ovalis*, a non-cellular green-stalked alga, in some respects similar to the green alga *Botrydium granulatum*. The species was dredged in July last in Belfast Lough, has since been obtained at low water in Dalkey Sound, and in Dungarvan Bay at Helvick Point. The species is recorded in the *Irish Naturalist* for September. The first locality is partly due to Miss Hensman, the other two to Miss Knowles.

MR. M'ARDLE exhibited *Cephaloxia hibernica*, Spruce MSS. which he found at O'Sullivan's Cascade, Killarney, in 1893, when collecting for the Flora and Fauna Committee of the Royal Irish Academy. The plant resembles *Cephaloxia connivens*, Dicks., and is remarkable for the large hyaline cells of its leaves which have thick walls of delicate texture; decurrent, bifid at the apex to one-third or more of their length, segments erect or connivent, acuminate, of from two to four single cells. Out of three packets of specimens which were exhibited no fruit was found excepting young amentæ which enclose the antheridia. He also showed a drawing of the plant by Mr. Pearson, who published with it a description of the plant in the *Irish Naturalist* in December, 1894.

Dr. C. HERBERT HURST exhibited a series of sagittal sections of the anterior portion of a common earthworm, *Lumbricus herculeus*, Sav., demonstrating that the cavities of the calciferous glands in the wall of the œsophagus, are longitudinal spaces, continuous from one gland to the other of the same side and opening, in front, into the œsophageal pouch, and *having no other opening*. The direct openings of these glands into the œsophagus which had been described, were, he said, purely imaginary and non-existent.

Dr. MCWEENEY showed pure cultures of *Achorion Schonleini*, the fungus which produces the disease of skin and hair known as *Favus*. The seed material was obtained through the courtesy of Dr. Coleman from a patient in the Whitworth Hospital. It developed well on both ordinary and glycerine agar at blood heat, and microscopic slides made from the cultures displayed the peculiarities of the growth very well. The botanical position of this fungus was still obscure owing to the ascigerous condition not having been hitherto observed. The exhibitor had in view some experiments with the object of clearing up this point.

Dr. McWeeney also showed hairs affected with *Trichomyces nodosa* (Patteson), otherwise known as *Lepothrix*, the only bacterial disease of hair hitherto known. The shaft of the affected hairs was enclosed in a sort of hard nodular sheath of a dull yellow hue, others swelling up into discrete masses, or nodosities which consisted of masses of short

bacilli. He had succeeded in cultivating these organisms and would communicate further details later on.

Finally he exhibited a cultivation of the Potato disease *Peziza sclerotium*, Lib., showing enormous sclerotia in process of formation. The substratum consisted of sterilised slices of potato.

Mr. A. FRANCIS DIXON exhibited a camera for use with microscope. The instrument can be used with the microscope in a vertical position, being adapted to the draw-tube of the instrument. The whole camera except the dark slide is made of aluminium, and is so light that it does not press too severely on the rack movements of the microscope. The maker of the camera is R. Feuss, Berlin.

Mr. A. VAUGHAN JENNINGS showed under the microscope a specimen of the very rare moss *Edipodium Griffithianum*, collected near the top of Snowdon. The moss is remarkable for its broad, large-celled leaves and for the thick seta graduating into a tapering apophysis, which, in turn, is not sharply marked off from the capsule. These characters have been regarded as suggesting affinities with the *Hepaticæ*; while many systematists place the genus near *Splachnum*. More commonly the plant is reproduced by gemmæ in the axils of the leaves, as shown in the preparation. The exhibitor considered that his specimens represented a distinct variety, apparently not yet scientifically recognised; but characterized by the extreme shortening of the stem, so that the rosette of leaves and gemmæ become almost sessile on the ground.

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#### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

FEBRUARY 9TH.—Dr. HERMANN WALTER lectured on "The Mystery of Indian Fakirism."

Professor M. F. FITZGERALD, B.A., read a paper on "Contouring with Barometer in Mourne Mountains;" the paper was illustrated by diagrams and maps.

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#### BELFAST NATURALISTS' FIELD CLUB.

JANUARY 26TH.—The president (Mr. LAVENS M. EWART) in the chair. Mr. F. J. BIGGER (honorary secretary) read a paper on the discovery of a souterrain at Stranocum, in the demesne of Mr. W. Ford-Hutchinson, which was illustrated by a number of excellent drawings and sections made by Mr. W. J. Fennell, C.E., and by numerous photos taken by Mr. Alex. Tate, C.E. After some remarks by Messrs. Lockwood, Cunningham, Wilson, Dickson, and others, the president called upon Dr. W. DONNAN to read a communication on fresh-water algæ. Dr. Donnan began by showing the ease with which the study of these lowly forms of life may be carried on, as every pool or sheet of standing water teems with them. He then briefly described their position in the vegetable world, coming among the thallophytes, there being no distinction between leaf and stem. Dr. Donnan then appealed to members interested in microscopic work to co-operate with him in re-organising this branch of the Club's

work. The various algæ described were then exhibited under microscopes by Dr. Donnan and inspected by the members. After the election of three new members, the meeting closed.

**BOTANICAL SECTION—JANUARY 30TH.**—The section met when Rev. C. H. Waddell gave an account of the native Geraniums, St. John's Worts, Mallows, &c., illustrated by plants from his own and the Club's lately acquired Herbarium. Miss M. C. Knowles presented a large parcel of beautifully mounted plants, including the rare *Spiranthes Romanzoffiana*, to be added to the Club's Herbarium. It is hoped others will follow this example, and that the set may be made complete at least in common plants, and available to illustrate the monthly lectures.

## NOTES.

### Ignorance and Introduction.

In the *Entomologist* for December Mr. Purefoy informed the scientific world that he believed neither the Brimstone Butterfly (*Gonepteryx rhamni*) nor either species of *Rhamnus* to be native in Ireland, and he had filled these supposed gaps in our flora and fauna by introducing both plants and a colony of the insects into Co. Tipperary. In the succeeding number of our contemporary, Mr. W. F. de V. Kane pointed out that a glance at his list of Irish lepidoptera (in that very magazine) and at the pages of "Cybele Hibernica" would have saved Mr. Purefoy from his inaccurate statements. We are not surprised that such ignorance of the Irish flora and fauna should have been accompanied by the desire to introduce something; the risk of falsifying future distributional records would be of no account to one for whom "Cybele Hibernica" was compiled in vain.

It is sometimes thought that, provided such introductions are notified, no harm is done. We do not agree with this opinion. In the present case, Mr. Kane points out that Mr. Hart's record of *G. rhamni* from Queen's County (*J. Nat.*, vol. v., p. 87) may rest on a specimen from Mr. Purefoy's colony. These introductions throw doubt on the genuineness of any occurrence of the species within a large radius. The wild life of a country is something to be studied and treated with reverence; the introducer is almost as great an enemy to science as the exterminator.

## BOTANY.

### PHANEROGAMS.

#### A Christmas Primrose.

On Christmas Eve last Mrs. Johnson found a primrose plant in full bloom just outside Poyntzpass on the road-side between the village and Acton Glebe. Two blossoms were fully expanded and there were several buds ready to bloom.

W. F. JOHNSON.

### Flowering Plants of Co. Tyrone.

The following are some of the flowering plants collected by me in Co. Tyrone, in the beginning of July, 1896, and the localities in which I found them.

*Cochlearia anglica*, abundant along the shores of the River Foyle from a little above Dunnalong, which is close to the boundary between Co. Tyrone and Co. Derry, as far as Strabane. *Chelidonium majus*, near Omagh, at Newtownstewart, and plentiful about the village of Coalisland. *Silene anglica*, growing on waste ground near Coalisland along with *Papaver dubium* and *Lychnis alba*. *Hypericum androsæmum*, about Omagh, in glens on the sides of Mullaghcarra, and also by the shores of Lough Neagh near Washing bay. *Hypericum humifusum*, at Washing bay, and a few plants at Baronscourt. *Althæa officinalis*, at Washing bay, Lough Neagh, probably an escape. *Malva rotundifolia*, on the sands at Washing bay. *Geranium phæum*, a few plants near a ruin between Stewartstown and Coalisland. *Geranium pyrenaicum*, by the roadside near Newtownstewart. *Euonymus europæus*, in the hedges between Stewartstown and Washing bay. *Vicia angustifolia*, Strabane, and also at Washing bay. *Rubus saxatilis*, in a small glen near Strabane. *Pyrus malus* var. *mitis*, the shores of Lough Neagh near Doon Point, and also near Strabane. *Parnassia palustris*, meadows near Eva Cottage, Lough Neagh. *Sedum Telephium*, near Eva Cottage, Lough Neagh. *Sedum rupestre*, on an old wall near Omagh. *Myriophyllum spicatum*, drains at Lough Neagh, near Doon Point. *Circea alpina*, Omagh, at Newtownstewart, and abundant in Strabane glen. *Circea alpina* var. *intermedia*, Strabane glen. *Cicuta virosa*, shores of Lough Neagh at Eva Cottage. *Enanthe fistulosa*, in swampy places near Eva Cottage, Lough Neagh. *Gallium Mollugo* var. *insubricum*, at Strabane. *Filago minima*, plentiful on the sandy banks of a stream at Omagh, and also on the sands at Washing bay. *Gnaphalium sylvaticum*, roadsides about Omagh, fields at Newtownstewart, and at Strabane. *Bidens tripartita*, in a drain near Lough Muck. *Senecio sylvaticus*, in a field at Strabane and at Washing bay. *Arctium intermedium*, roadside near Washing bay. *Cnicus pratensis*, in a meadow between Coalisland and Stewartstown. *Crepis paludosa*, on sides of Mullaghcarra. *Hieracium vulgatum*, a few plants on a wall near the railway station at Newtownstewart. *Campanula rotundifolia*, a few plants at Ballymagorry, near Strabane, canal side at Strabane, and at Stewartstown. *Campanula rapunculoïdes*, roadside near Dungannon. *Lysimachia vulgaris*, by the canal near Strabane, and also at Doon Point, Lough Neagh. *Lysimachia nummularia*, apparently wild in a wood near Omagh. *Anchusa sempervirens*, Newtownstewart. *Solanum Dulcamara*, by the canal at Strabane, and by the River Strule at Omagh. *Mimulus luteus*, abundant by the Foyle from Dunnalong to Strabane, a few plants in a bog at Omagh, in a stream on the side of Bessy Bell. *Veronica montana*, Strabane glen, Baronscourt, and at Omagh. *Melampyrum pratense*, in Glen Hordial, near Omagh, and in Strabane glen. *Utricularia vulgaris*, bogs near Omagh. *Utricularia minor*, in a bog near Lough Muck. *Pinguicula lusitanica*, Bessy



Bell and Mullaghcarn. *Mentha piperita*, a few plants by the side of the canal near Strabane. *Scutellaria galericulata*, shore of Lough Catherine, Baronscourt, and also at Lough Neagh, Eva Cottage. *Galeopsis versicolor*, common in cultivated fields about Strabane. *Lamium amplexicaule*, Washing bay, Lough Neagh. *Lamium album*, roadside near Dungannon. *Chenopodium Bonus-Henricus*, near Stewartstown. *Polygonum lapathifolium*, Strabane. *Humulus Lupulus*, at Stewartstown. *Parietaria officinalis*, on walls at Strabane. *Empetrum nigrum*, on the summit of Mullaghcarn. *Listera cordata*, among heather on Bessy Bell at about 1,000 feet. *Habenaria bifolia*, on Mullaghcarn and on Bessy Bell. *Juncus glaucus*, roadside between Washing bay and Stewartstown. *Juncus supinus*, bogs at Omagh, drains at Strabane. *Sparganium simplex*, drains near Lough Muck. *Sagittaria sagittifolia*, Doon Point, Lough Neagh. *Butomus umbellatus*, Doon Point, Lough Neagh. *Scirpus pauciflorus*, mountain bogs near Omagh. *Scirpus sylvaticus*, banks of the Strule near Omagh. *Rhynchospora alba*, in a bog near Stewartstown. *Carex teretiuscula*, abundant by Lough Muck. *Carex aquatilis*, banks of the River Finn near Strabane. *Carex hirta*, by River Strule at Omagh. *Carex curta*, *Carex levigata*, *Carex pendula* and *Carex paniculata*, at the head of Strabane glen. *Milium effusum*, abundant in Strabane glen. *Catabrosa aquatica*, near Newtownstewart. *Glyceria plicata*, near Omagh. *Festuca sylvatica*, Omagh, and also plentiful in Strabane glen. *Bromus secalinus*, hedges near Strabane. *Bromus commutatus*, by the roadsides at Strabane.

*Pilularia globulifera* I found growing abundantly in a shallow drain and in swampy ground about one mile north of Washing bay. "Cybele Hibernica" gives "marshy ground about two miles from the mouth of the Blackwater near Lough Neagh" as a locality for this plant. This is apparently the place meant, but it is in District 10 instead of in District 12 as given in "Cybele."

So far as I can make out, *Silene anglica*, \**Althaea officinalis*, *Malva rotundifolia*, *Arctium intermedium*, *Hieracium vulgatum*, \**Campanula rotundifolia*, *Habenaria bifolia*, *Carex teretiuscula*, *Carex aquatilis*, *Glyceria plicata*, and *Bromus secalinus* are additions to District X of the "Cybele Hibernica." I have to thank Mr. S. A. Stewart and Mr. Praeger for the trouble they have taken in helping me to name my plants, and Mr. Praeger for sending critical specimens to specialists.

M. C. KNOWLES.

### Exuberant Growth of a Bramble.

A few days after Christmas, at St. John's Point, Co. Down, Mr. Welch and I observed a bramble that showed so remarkable a year's growth that it may be worth noting. It appeared to be a strong young plant, and grew on the seaward side of a low loose wall on a poor and exposed pasture close to the beach, and open to the sea. Five stems, arching below, but prostrate for the greater portion of their length, represented the growth of the past season. From tip to tip of two opposite stems

the distance was just 50 feet, one stem being 26 feet long, the other 24 the three remaining stems were somewhat shorter. But this was not all, for each of the stems had produced a number of secondary axillary branches. Those on the largest stem were 14 in number, and their aggregate length was 105 feet; so that this one shoot had perfected altogether 131 feet of stem! An approximate estimate showed that the plant had last season produced altogether about 500 feet of stem. The termination of each main shoot and most of the secondary branches was firmly rooted in the soil, with a large bud at the point, each ready to produce an independent plant next season. In the absence of leaf and flower, it was not possible to determine the species.

R. LLOYD PRAEGER.

#### **Gardus Crispus In Co. Down.**

As this plant is extremely rare in the North-east, it may be worth recording that it grows about the ancient church at St. John's Point, Co. Down, accompanied by *Anthriscus vulgaris*.

R. LLOYD PRAEGER.

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### ZOOLOGY.

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#### INSECTS.

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#### **Coleoptera at Poyntzpass.**

January and February are not usually looked upon as months abounding in insect life, but to those who take the trouble of searching for them in their winter quarters many insects can be found. On January 14, I had a haystack moved, and among the debris remaining where its base had been were various insects, and the following coleoptera were captured:—*Quectius boops*, *Encephalus complicans* (a curious stumpy staphylinid which is often found in ants' nests), *Stenus speculator*, *Omalium concinnum*, *Cononimus nodifer*, *Enicimus transversus*, and *Cryptophagus cellaris*; there were also a number of *Atomaria pusilla*. On February 2nd I got a couple of bags of moss from a neighbouring wood, taking it mostly from the base of fir trees. Among my captures the following may be noted:—*Aleochara cuniculorum*, a somewhat unusual locality for this insect, *Homalota longicornis*, *H. atramentaria*, *Tachyusa atra*, *Tachyporus obtusus*, and its var. *nitidicollis* (the latter I find much more common than the type in Ireland). *T. brunneus*, *Hypocyrtus ovulum*, *Philonthus splendens*, *Lathrobium quadratum*, *Stenus brunneipes*, Steph., *Lathrimæum unicolor*, *Othius myrmecophilus*, *Scydmaenus collaris*, *Anaitis ocellata* (this fine lady-bird is more usually obtained by beating fir trees in the summer, but I met with it in moss at Armagh). *Atomaria atricapilla*, *Longitarsus ater*, F., *L. suturalis*, Marsh., and *Plectroscelis concinna*. Besides there were many commoner species with the usual complement of spiders, woodlice, millipedes, with a stray caterpillar or two, and a few handsome ichneumon flies, while various "spring-tails" jerked themselves about. This will give an idea of the insect life to be found in a bunch of moss at this time of year.

W. F. JOHNSON.

### Insect Folk-Lore.

The ideas about insects held by the uninitiated and especially by country folk are peculiar. I met a man who though unable to read was yet a very good gardener, who was fully persuaded that butterflies turned into caterpillars, and I had to give him a long discourse on the subject, and even then I doubt very much whether he believed me at all.

The venomous character assigned to many insects which are perfectly harmless is also a common error with such people. A country woman assured me that the common *Telephorus fulvus* gave a very sore bite and that the bitten part would swell up. She was much astonished when I assured her that the creature could not possibly hurt her, but it was easy to see that there was a lurking doubt as to my credibility. I received a most remarkable piece of information with regard to the habits of the common House Cricket (*Acheta domestica*) from a native of Donegal, and it is to be hoped that it is only Donegal crickets that are so wicked. This person assured me that if you trod on the *toe* of a cricket (which particular toe I could not find out) the infuriated beast would at once walk off to your clothes and eat holes in them. Of course the cricket would know a person's Sunday 'shute' and pick it out for especial attention. I suggested that a cricket did not indulge in such luxurious feeding and hinted at clothes-moths, but my suggestion was treated with scorn, the implication of course being, that the moths would always be at work, whereas the cricket waited to have his toe trodden on, and then proceeded to 'take it out' of his insulter's clothes. The migratory habits of crickets have given rise to the superstition that, if crickets come to a house where there are marriageable girls or boys, a marriage will take place. What happens when there is no one to marry I could never find out. These ideas about insects are interesting if only to show what had been noticed by people in general, and I daresay many of the readers of the *Irish Naturalist* could contribute stories on this subject.

W. F. JOHNSON.

### **Agabus arcticus, Payk., a Water-beetle new to Ireland.**

An important addition has recently been made to our insect fauna by Mr. E. C. Farran, in the discovery of the water-beetle *Agabus arcticus*, Payk., when collecting last summer on Kippure, Co. Wicklow. Mr. Farran has kindly given the specimens to the Dublin Museum.

The distribution of the species is noteworthy, as in Britain it has been recorded from the extreme north of England (Northumberland district) and from the Scotch Highlands. As to the continental range the only habitat given in the European catalogue of Heyden Reitter and Weise is Lapland, but according to Canon Fowler ("British Coleoptera" vol. I, p. 195), it has also been traced across Arctic Siberia and in North America. It is closely allied to *A. Sturmii*, Payk., one of our most abundant water-beetles, but amongst other differences the much narrower form is sufficient for the detection of the rarer species. There is little doubt that a further search will reveal the presence of this interesting northern insect in other of our upland districts.

J. N. HALBERT.

### Beetles, etc., from Ardmore, Co. Waterford.

The following is a list of Coleoptera and Hemiptera-Heteroptera taken at Ardmore, Co. Waterford, close to the Blackwater estuary, in the month of September, 1896. At the time I made a few notes, added below. I have to thank Mr. Halbert for many of the determinations.

**COLEOPTERA.**—*Leistus fulvibarbis*, *Dromius nigriventris*, *Aleochara algarum*, *Philonthus bimaculatus*, *P. fimetarius*, *P. scybalarius*, *Xantholinus glabratus*, *X. linearis*, *Sunius diversus*, *Stilicus rufipes*, *S. affinis*, *Ocytus compressus*, *O. morio*, *Lathrobium multipunctum*, *Aphodius punctato-sulcatus*, *A. contaminatus*, *Onthophagus fracticornis*, *Geotrupes typhaeus*, *Timarcha violaceo-nigra*, *Chrysomela staphylea*, *C. polita*, *Galerucella tenella*, *Meloe proscarabæus*, *Apion miniatum*, *Rhynchites germanicus*, *Otiorrhynchus monticola*, *O. scabrosus*, *O. rugifrons*, *O. lignens*, *Sciaphilus muricatus*, *Strophosomus coryli*.

**HEMIPTERA-HETEROPTERA.**—*Pentatoma baccarum*, *Piezodorus lituratus*, *Syromastes marginatus*, *Nabis lativentris*, *Rhopalotomus ater*.

Nearly all the species taken are common and generally distributed, but some occurred in rather an unusual habitat. *Aleochara algarum*, Fauv., usually found on seaweed above high water mark, was abundant on the cliffs at Ardmore Head and Ardoginna. *Timarcha violaceo-nigra*, De G., a distinctively southern insect, occurred in numbers at one spot, at Glen-corran, where a small stream has cut a passage through the cliffs. *Meloe proscarabæus*, L., not often captured in the perfect form in the autumn, occurred in the woods at Paulsworth, and I picked up *Geotrupes typhaeus*, L., on the shore near the same place.

As to the Hemiptera I have nothing to note except that *Syromastes marginatus*, L., another southern insect, was abundant on Ling at Crobally.

H. GORE CUTHBERT.

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### MOLLUSCA:

#### Mollusca of Ballycastle District.

If Mr. Standen and his friends were able to examine the South-west of Ireland as thoroughly as they have done the surroundings of Ballycastle, their efforts would probably be rewarded by the discovery of some species new to the British Fauna. The "pockets" described by Mr. Standen in last month's *Irish Naturalist*, would have been passed over by an ordinary observer, and we should be grateful to him for the extreme care with which he has pursued his investigations in Ireland. We hope he will continue them this year.

I quite agree with Mr. Standen's remark about *Helix costata*. Since writing my account of the Irish L. & F. Mollusca, I have also come to the conclusion that *H. costata* and *pulchella* should be regarded as two distinct species and not as varieties of one another.

R. F. SCHARFF.

## AMPHIBIANS.

**Is the Frog a Native of Ireland?**

My friend Dr. Scharff says—in a note in the *Irish Naturalist* for February, 1897—that “the Irish Frog is silent—even during the breeding season it calls its mate in a scarcely audible voice.” If he will come out here in March on a sunny day he will hear the frogs in the pond at a distance of quarter of a mile, provided the wind be favourable. I dare say they number 500, and, extraordinary as it may seem, I recollect on one occasion mistaking the sound of 500 croaking frogs for the noise of a railway train passing over the bridge at Bray River three miles distant—a noise heard distinctly here in easterly winds.

Dr. Scharff's arguments in favour of an indigenous Irish frog are not convincing. My old and valued friend, the late Mr. A. G. More, never wavered from his opinion that it is one of our introduced vertebrates.

RICHARD M. BARRINGTON.

## BIRDS.

**The White-fronted Goose near Roscrea.**

My friend, Mr. H. C. White, of Charleville, Roscrea, shot a fine specimen of the White-fronted, or Laughing Goose (*Anser albifrons*) on January 6th. It was beautifully marked, and measured about 2 feet 6 inches, and weighed about 7 pounds. It was one of a large flock and was shot not far from above address near Borris-in-Ossory. I saw a Brambling at Borris-in-Ossory about the 9th January.

R. M. MILLER.

## MAMMALS.

**Irish Bats.**

Mr. Jameson in his notice of the Bats of Ireland, ante p. 34, has overlooked Galway as a locality for *Vespertilio Nattereri*, Kuhl. If he refers to *J. Nat.*, vol. iii., p. 116, he will see a record of my capture of this species at Clonbrock. The specimen I presented to the Museum of Natural History. I may also add that some species of bat, probably the *Pipistrelle*, is common on the Blasket Islands. The Long-eared bat is almost as common as the former in the Co. Monaghan, and in Leitrim about Mohill. I have also shot them at Bundoran in Donegal years ago, and they are common about Kenmare, Co. Kerry.

W. F. DE V. KANE.

## GEOLOGY.

**The Preservation of Erratic Blocks.**

In connection with the subject of the preservation of the boulders in the vicinity of Dublin so ably treated of in the February number of the *Irish Naturalist*, it may be well to call attention to the granite blocks resting on the Cambrian rocks of Bray Head, and to express a hope that Lord Meath's attention may be called to the advantage, in the interests of science, of preserving these great geological curiosities by giving directions that they should not be disturbed. Otherwise we may expect to see them some day broken up to build walls, &c.

J. NOLAN.

**IRISH PLANTS,  
COLLECTED CHIEFLY IN THE PROVINCE OF  
LEINSTER IN 1896.**

BY R. LLOYD PRAEGER, B.E.

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THE following paper refers to the more noteworthy plants collected by myself in Queen's Co., King's Co., Kildare, Meath, and Louth, during last summer; and I have added a few rare Wicklow plants observed during the last few years, and one or two stray notes from other counties hitherto unpublished. Plants found in 1896, of which record has already been made in these pages—such as *Medicago sylvestris*, the results of the Clonbrock and Cavan Excursions, and various short notes—are not mentioned here. I have set down only such stations as furnish an extension of range, or a confirmation of old records, or evidence as to the indigenoussness of doubtful natives. My best thanks are due to Messrs. H. and J. Groves, Rev. E. S. Marshall, Rev. W. M. Rogers, and Mr. F. Townsend, for identifying critical plants of the groups with which their names are associated; and I am under deep obligations to Mr. Arthur Bennett, for going through a very large number of specimens—indeed it is no exaggeration to say that all the plants in my list, with the exception of well-marked and non-variable species, have passed through his hands. To Mr. N. Colgan also I am indebted for kindly checking my records with the MS. of the forthcoming new edition of *Cybele Hibernica*, thereby avoiding the useless publication of stations already known, and determining which district-records were new.

The best plant in my list is *Poa palustris*, L., of which the only previously-known British station was the banks of the River Tay below Perth, where it was found by Mr. Wm. Barclay in 1889 (*Journ. Bot.*, xxvii. 273, 1889). It has a wide distribution in Europe, from Scandinavia to Turkey, and from France to Mid-Russia; so that its rarity in the British Isles, not its occurrence there, is the remarkable feature. *Polygonum mite* is likewise an addition to the Irish flora. Its European distribution is almost as wide as that of the



last-named, and in Britain it ranges from Devon to York. The following is a summary of new district-records :—

## DISTRICT III.

<i>Ranunculus trichophyllus.</i>	<i>Mentha gentilis.</i>
<i>Fumaria muralis.</i>	‡ <i>M. piperata.</i>
<i>Geum intermedium.</i>	<i>Calamintha Acinos.</i>
<i>Pyrus Aria.</i>	<i>Juncus obtusiflorus.</i>
<i>Anthemis nobilis.</i>	<i>Carex filiformis.</i>
<i>Arctium intermedium.</i>	<i>Glyceria plicata.</i>
<i>Erythæa pulchella.</i>	<i>Lastrea spinulosa.</i>

## DISTRICT IV.

<i>Epilobium angustifolium.</i>	<i>Arctium intermedium.</i>
<i>Galium ochroleucum.</i>	

## DISTRICT V.

<i>Lathyrus palustris.</i>	<i>Potamogeton Zizii.</i>
<i>Callitriche obtusangula.</i>	<i>Lastrea spinulosa.</i>
* <i>Epilobium roseum.</i>	<i>Carex aquatilis.</i>
<i>Arctium majus.</i>	<i>Poa palustris.</i>
<i>Centunculus minimus.</i>	

## DISTRICT VI.

* <i>Diplotaxis muralis.</i>	<i>Nitella opaca.</i>
<i>Rubus hirtus.</i>	

## DISTRICT VII.

<i>Fumaria muralis.</i>	<i>Mentha sativa.</i>
<i>Hypericum dubium.</i>	<i>Carex lævigata.</i>
<i>Chærophyllum temulum.</i>	<i>Equisetum hyemale.</i>
* <i>Valerianella rimosa.</i>	<i>Nitella opaca.</i>

## DISTRICT X.

‡ <i>Mentha gracilis.</i>	<i>Polygonum mite.</i>
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## DISTRICT XII.

<i>Glyceria plicata.</i>
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The present paper is the first-fruits of a systematic survey, which I hope to carry out, of the flora of the less-known Irish counties, with a view to the eventual publication of a Topo-

graphical Botany of Ireland, of which we stand in much need. The new edition of *Cybele Hibernica*, the publication of which is so anxiously looked forward to, will go far to supply the information relative to plant-distribution in Ireland which is at present difficult to obtain. Supplemented by a county-census, on the lines which I have indicated in these pages (vol. v., pp. 29-37, 1895), the botany of Ireland may at length take its due place in works purporting to deal with the flora of the British Isles, and no longer be conspicuous only by its absence, as in the census-numbers in the *London Catalogue*.

The only group of Irish plants whose county-distribution has so far been published are the *Characeae*. For these I give stations only where these constitute new county-records.

*Ranunculus circinatus*, Sibth.

III. QUEEN'S—canal at Portarlington.

V. MEATH—canal at Enfield; Lough Crew near Oldcastle.

*R. trichophyllus*, Chaix.

III. QUEEN'S—Maryborough.

*Aquilegia vulgaris*, Linn.

III. QUEEN'S—banks west of Portarlington.

VII. KING'S—abundant in meadows and on banks about Clonad Wood, and on limestone cliffs N.W. of Philipstown.

Commonly found in suspicious situations, but appears truly wild in these stations.

\**Papaver somniferum*, Linn.

V. MEATH and LOUTH—appears quite established on the extensive sandhills that stretch for some miles north and south of the mouth of the Boyne.

*Neckeria claviculata*, N.E. Br.

IV. WICKLOW—rocks at the west side of Luggela lake, 1894. A confirmation of Templeton's record, a century old.

*Glaucium flavum*, Crantz.

V. LOUTH—abundant on shores north of Dunany and below Castlebellingham.

*Fumaria muralis*, Sonder.

III. QUEEN'S—Maryborough esker.

V. MEATH—Oldcastle and Trim. LOUTH—Boyne mouth and Dunany.

VII. KING'S—common about Edenderry.

†*Sisymbrium Sophia*, Linn.

V. KILDARE—Kilcock. LOUTH—Anagassan and Blackrock. On waste ground in the neighbourhood of houses, but apparently established.

†*Brassica Sinapioides*, Roth.

IV. WICKLOW—hedgebank between Greystones and the railway station, 1894, and still there.



**\*Diplotaxis muralis, DC.**

V. MEATH—Laytown.

VI. N.E. GALWAY—railway outside Galway terminus.

**†Silene noctiflora, Linn.**

V. MEATH—plentiful in a sandy waste field west of Mayden Tower.

**Elatine hexandra, DC.**VIII. W. GALWAY—Craigdhu Lough, Roundstone, with *Najas flexilis*.**Linum angustifolium, Huds.**

V. KILDARE—rough banks near Leixlip railway station.

**Lavatera arborea, Linn.**

IV. WICKLOW—steep rocks at south end of Bray Head, 1894, and still there.

**Hypericum dubium, Leers.**

III. QUEEN'S—banks at Emo and Maryborough.

IV. WICKLOW—below Woodenbridge, near Clara bridge, and by St. Saviour's Priory at Glendalough, 1894.

VII. KING'S—Clonad Wood near Tullamore.

**†Erodium moschatum, L'Hérit.**

VII. KING'S—roadside at Killeagh, an escape.

**\*Mellilotus arvensis, Wallr.**

V. LOUTH—about Termonfeckin and Queensboro'.

**Vicia angustifolia, Linn.**

X. CAVAN—base of Slieve Glah. Very rare inland.

**Trifolium medium, Linn.**

III. QUEEN'S—Emo and Portarlington.

IV. WICKLOW—near Enniskerry.

V. MEATH—Navan.

**T. striatum, Linn.**

IV. WICKLOW—dry pasture behind Greystones railway station, 1894, and still there.

**T. fragiferum, Linn.**

V. MEATH—by the Boyne at Mornington. LOUTH—By the Boyne above Queensborough, and by the shore at Clogher. The last-named appears to be its northern east-coast limit.

**T. filiforme, Linn.**

IV. WICKLOW—dry pasture behind Greystones railway station, 1894, and still there.

**Lathyrus palustris, Linn.**

V. MEATH—plentiful on the shore of Lough Sheelin, near the Westmeath boundary.

**Rubus hirtus, W. and K.**

VI. N.E. GALWAY—Killasolan near Clonbrock. "A remarkable form," W. M. Rogers.

**Geum intermedium, Ehrh.**

III. QUEEN'S—wood south of Maryborough.

**Potentilla procumbens, Sibth.**

X. CAVAN—near Cavan town.

**Pyrus Aria**, Ehrh.

III. QUEEN'S—among native wood (Oak, Ash, Hazel) on Maryborough esker, and among Birch west of Portarlinton; a native here.

VII. KING'S—in Derryadd wood, hedges near Philipstown, and on limestone rocks 4 miles N.W. of Philipstown; appears to be native in this district.

**Myriophyllum verticillatum**, Linn.

III. QUEEN'S—Mountmellick.

V. MEATH—Lough Sheelin and Athboy.

**Callitriche obtusangula**, Le Gall.

V. KILDARE—ditch at Maynooth.

**C. autumnalis**, Linn.

X. TYRONE—Omagh and Strabane, Miss Knowles.

**Epilobium angustifolium**, Linn.

IV. WICKLOW—on high cliffs overlooking the S.W. shore of Lough-nahanagan. A new record for this rare plant in District IV., as the old "Scalp" record has been abandoned.

†**E. roseum**, Schreb.

V. LOUTH—growing with *E. obscurum* on a wet wall near Queensboro'. Of another specimen from the same station, Rev. E. S. Marshall writes, "I believe *E. obscurum* x *roseum*, upon the whole nearer to *roseum*."

**Cicuta virosa**, Linn.

V. MEATH—Lough Crew near Oldcastle.

**Charophyllum temulum**, Linn.

V. KILDARE—Thomastown. MEATH—Laytown, Drogheda, Kilmessan, Bective, Navan. LOUTH—Louth and Togher.

VII. KING'S—Edenderry.

X. CAVAN—Mount Nugent.

In all cases in shady hedge-banks, often in considerable quantity. I see no reason to doubt its being indigenous.

†**Anthriscus vulgaris**, Bernh.

V. MEATH—Peter and Paul Abbey near Trim. LOUTH—on Louth Abbey.

VII. KING'S—about Philipstown.

In its few inland stations, it haunts old buildings and dry roadsides, and its rank is doubtful.

**Cornus sanguinea**, Linn.

VII. KING'S—in hedges four miles west of and also one mile north of Philipstown, probably the remnants of native stock.

**Valeriana Mikanii**, Syme.

V. MEATH—Lough Crew demesne. Out of perhaps a hundred Valerians examined in 1896, this plant alone was good *Mikanii*, though many plants approaching this form were found. *V. sambucifolia* is the common Irish plant.

\***Valerianella rimosa**, Bast.

VII. KING'S—in a potato field at Edenderry. A weed of cultivation.

**Rubia peregrina**, Linn.

IV. WICKLOW—steep rocks, south end of Bray Head.

**Gallum Mollugo x verum** (= *ochroleucum*, Syme).

IV. WICKLOW—dry pasture behind Greystones, 1893.

**Dipsacus sylvestris**, Huda.

V. MEATH—dry banks at Bective and Laytown. LOUTH—rough banks by the Boyne about the Obelisk, and near Queensboro'. Existing records for District V. appear to be confined to Co. Dublin.

**Filago minima**, Fr.

V. MEATH—damp sandy ground behind the light-houses at Boyne-mouth, with *Centunculus*.

**Anthemis nobilis**, Linn.

III. QUEEN'S—abundant on the Great Heath of Maryborough, and no doubt indigenous.

\***A. arvensis**, Linn.

IV. WICKLOW—in a meadow near Greystones—introduced with grass seed.

‡**Matricaria Chamomilla**, Linn.

V. KILDARE—near Edenderry. MEATH—Kilmessan. Hanging suspiciously about roadsides and farm-houses; apparently not yet established in this part of Ireland.

**Senecio Jacobsea**, Linn. var. *b. flocculosus* (Jord.)

V. LOUTH—Immensely abundant from the Boyne to Clogher, covering hundreds of acres of sandhills and pasture; the normal form completely absent. Threlkeld recorded it from this locality a hundred and seventy years ago.

**S. erucifolius**, Linn.

V. KILDARE—north of Leixlip railway station. MEATH—at Laytown, and a mile south of it.

The range of this interesting plant is thus extended into Kildare and Meath, but it only crosses the county boundary by a few miles, and is to all intents confined to Co. Dublin. The verification of Dr. Moore's record "between Drogheda and Dundalk" is very desirable.

**Carduus pycnocephalus**, Linn.

III. QUEEN'S—Maryborough esker.

V. KILDARE—Carbury. MEATH—Enfield, Bective.

VII. KING'S—Edenderry, Philipstown.

Though rare inland, this thistle turned up in a number of places, chiefly esker-ridges and gravelly places, often with *C. crispus*. It appeared to grow where suitable ground existed, and was not confined to the neighbourhood of houses.

**Arctium majus**, Bernh.

V. DUBLIN—roadside near St. Doulough's. MEATH—near Oldcastle. LOUTH—waste place at Blackrock.

X. CAVAN—roadside near south-east end of Lough Ramor.

The claims of this species as an Irish plant hitherto rested

on a specimen I collected in Armagh (*J. N.*, 1893, p. 133). It is satisfactory therefore to have the above additional records which are verified by Mr. A. Bennett.

**A. minus** Bernh. var. **paniculatus**, Lange.

III. QUEEN'S—Maryborough.

V. LOUTH—Baltray, Castlebellingham.

**A. intermedium**, Lange.

III. QUEEN'S—Maryborough.

IV. WICKLOW—wood near Enniskerry.

V. MEATH—Laytown and Mornington. LOUTH—Togher and Clogher.

**Carduus crispus**, Linn. var. **b. polyanthemus** (Koch.)

III. QUEEN'S—Maryborough.

†**Cichorium Intybus**, Linn.

V. LOUTH—very common in fields and waste ground by the sea about Termonfeckin and below Togher; the only place I have seen it in Ireland where it looked naturalised.

**Picris echioides**, Linn.

V. MEATH—gravelly banks at Laytown. Previous District V. records confined to Dublin.

\***Crepis taraxicifolia**, Thuill.

III. QUEEN'S—roadside at Maryborough.

V. KILDARE—Leixlip.

Spreading westward.

**Leontodon hispidus**, Linn.

III. QUEEN'S—Portarlington and Emo.

V. KILDARE—Maynooth and Carbury. MEATH—Athboy and Lough Sheelin.

VII. KING'S—Geashill.

We do not yet know the distribution of this and *L. hirtus* in Ireland.

**Centunculus minimus**, Linn.

V. MEATH—damp sandy ground behind the lighthouses at Boyne-mouth. Apparently not known previously from any station between Co. Cork and Co. Down.

**Fraxinus excelsior**, Linn.

The curious sport *F. monophylla* Desf. = *F. heterophylla* Willd., with large undivided ovate leaves, was gathered in a rough hedge near Portarlington, Queen's Co., and in a similar situation near Togher, Louth, apparently wild.

**Erythraea pulchella**, Fr.

III. QUEEN'S Co.—Dry pasture at Emo. Apparently the only inland station in Ireland.

**Mycotis collina**, Hoffm.

V. MEATH—wall by roadside near Boyne monument.

**Cuscuta Trifolii**, Bab

V. LOUTH—on sandhills near Baltray, at the mouth of the Boyne; and on sandy shore below Lurgan Green, growing on *Lotus*, &c. Threlkeld's old record for "*Cuscuta major*," "Mayden Tower," I

have vainly tried to confirm; no Dodder appears to grow there now. The first station mentioned above, however, is just on the opposite side of the river, not a mile from **Mayden Tower**, so it appears probable that this was the plant **Threlkeld** found.

**VI. CLARE**—abundant on fields east of **Killeany** and at **Portmurry**, **Great Island of Aran**, 1895. This is the plant recorded as *C. Epithymum* in report of **Galway Field Club Conference** (*J.N.* iv, 251), and is, I believe, the plant recorded under the same name by **Messrs Nowers and Wells** in *Journ. Bot.*, June, 1892, as it grows exactly in the stations described by them. Since publishing the **Botany of the Galway Excursion**, I grew suspicious of this **Dodder**, and **Mr. Arthur Bennett** has confirmed my belief that it is *C. Trifolii*, not *C. Epithymum*.

**Linaria vulgaris**, Mill.

**IV. WICKLOW**—on ditches and in fields about **Rathnew**. I believe indigenous here.

**L. viscida**, Moench.

**III. QUEEN'S**—in potato fields at **Emo**.

**V. MEATH**—cultivated land near **Carbury**.

Common along the **Great Western Railway** and its branches, but seldom found elsewhere. Both the above stations were far from the railway.

**Euphrasia officinalis**, Linn.

The following segregate forms have been kindly named by **M. F. Townsend** :—

**E. Rostkoviana**, Hayne.

**III. QUEEN'S**—**Emo**.

**V. MEATH**—**Oldcastle**.

**E. borealis**, Townsend.

**V. MEATH**—**Laytown**.

**E. gracilis**, Fr.

**V. MEATH**—**Oldcastle**.

**E. brevipila**, Burnat and Gremli (**Wetts**).

**V. KILDARE**—**Leixlip**. **MEATH**—**Laytown**. **LOUTH**—**Togher** and **Lurgan Green**.

**VI. N.E. GALWAY**—**Clonbrock**.

**VII. KING'S**—**Edenderry**.

**IX. SLIGO**—**Inismurray**.

**X. TYRONE**—**Mullaghcarn**, **Miss Knowles**. **CAVAN**—**Mount Nugent**

‡**Mentha piperata**, Linn.

**III. QUEEN'S**—By the stream below **Maryborough**, probably an escape

**M. sativa**, Linn.

**VII. KING'S**—**Edenderry**.

‡**M. gracilis**, Sm. var. **b. cardiaca**, Baker.

**X. CAVAN**—on the wild stony shore of **Virginia Water**, far from any house, but it is not admitted as a native of Ireland.

**M. gentilis**, Linn. var. *c. Paullana* (F. Schultz).

III. QUEEN'S—by the Mountmellick canal a mile above Portarlinton. Quite wild here, and *looked* indigenous; when Irish Mints are worked out, this species may prove to be a native; it is not uncommon throughout England, and does not appear to be cultivated in this country.

**Salvia Verbenaca**, Linn.

V. LOUTH—A large colony on the edge of the Boyne above Queensboro'.

**Calamintha arvensis** Lam. (= *C. Acinos*, Clairv.)

III. QUEEN'S—three stations near Maryborough:—sparingly by the roadside a mile towards Stradbally; on the esker south of the railway; and abundant on the esker north of the railway. If not indigenous in this district, it is certainly very well established.

**Stachys palustris x sylvatica**.

IV. WICKLOW.—Glen of the Downs.

V. KILDARE.—Hedges near Leixlip railway station. MEATH.—Roadside near Oldcastle. LOUTH.—Roadside near Togher. Hybrids in all cases nearer *S. palustris*.

**Chenopodium rubrum**, Linn.

V. MEATH.—Abundant in marshy meadows below the railway bridge at Drogheda; more sparingly near Maiden Tower. LOUTH.—Alleys in Drogheda on the south side of the river; plentiful about Baltray.

**Atriplex laciniata**, Linn. (= *A. arenaria*, Woods.)

V. LOUTH.—Sands at the mouth of the Boyne.

**A. portulacoides**, Linn.

V. LOUTH.—Steep rocks at Clogher Head.

**Polygonum minus**, Huds.

III. QUEEN'S.—Wet hollows on the Great Heath of Maryborough.

X. CAVAN.—Plentiful on the shore of Virginia Water.

**P. mite**, Schrank.

X. CAVAN.—On the stony shore of Lough Ramor, growing with *P. minus*, among which it could be distinguished by its larger size, broader leaves, and thicker spikes.

**P. convolvulus**, Linn. var. *subalatum*, V. Hall.

V. LOUTH.—Mouth of the Boyne.

**Taxus baccata**, Linn.

VII. KING'S.—A few old bushes in Clonad Wood near Tullamore, possibly the remnants of native stock.

**Orchis Morio**, Linn.

V. LOUTH.—In one meadow at Killencoole: the most northerly station to which I have so far traced this Orchid in Ireland.

VIII. W. GALWAY.—Frequent in the Roundstone district.

**Neottia Nidus-avis**, Rich.

IV. WEXFORD.—Glen half-a-mile inland from Courtown Harbour.

**Listera cordata**, R. Br.

V. MEATH.—Bog on the shore of Lough Sheelin, near the Westmeath boundary, 230 feet above Ordnance Survey datum.

**Malaxis paludosa**, Sw.

V. KILDARE.—A good colony on a wet bog two miles south of Thomastown.

**Allium vineale**, Linn.

V. LOUTH.—Banks by the Boyne above Queensborough.

**Juncus obtusiflorus**, Ehrh.

III. QUEEN'S.—Near Emo, and near Portarlington.

V. LOUTH.—Salt marsh at Soldier's Point.

**Lemna gibba**, Linn.

V. MEATH.—Drains by the Boyne below Drogheda. LOUTH.—In immense abundance in an artificial lake at Beaulieu House, near Queensborough.

**Potamogeton angustifolius**, Presl. (= *P. Zisii*, Roth.)

V. MEATH.—In the Boyne at Bective, plentiful.

**P. densus**, Linn.

VII. KING'S.—In the Kilbeggan canal.

**P. interruptus**, Kit. (= *P. flabellatus*, Bab.)

VII. KING'S.—In the Grand Canal near the boundary of Co. Kildare, a mile south of Edenderry.

**Zostera nana**, Roth.

V. MEATH.—Estuary of the Nanny River, above the bridge at Laytown.

**Eleocharis acicularis**, R. Br.

V. MEATH.—Canal at Enfield. LOUTH.—Pool near Clogher.

VII. KING'S.—Canal near Philipstown and Edenderry.

X. CAVAN.—In Lough Oughter.

**E. uniglumis**, Reichb.

V. LOUTH.—Salt-marsh at Soldier's Point.

**Cladium jamaicense**, Crantz.

V. MEATH.—Shore of Lough Sheelin, near the Westmeath boundary.

**Carex curta**, Good.

V. MEATH.—Bog near Navan. Apparently no other recent record from District V.

**C. acuta**, Linn.

V. MEATH.—In the Boyne at Beauparc and Navan.

X. CAVAN.—Killykeen on Lough Oughter.

**C. aquatilis**, Wahlenb.

V. MEATH.—In the River Blackwater, near the Cavan boundary.

X. CAVAN.—Abundant in the River Blackwater, between Lough Ramor and the Meath boundary.

The Blackwater plant comes nearest var. *virescens*, Anders.—A. Bennett).

**C. ilmosa**, Linn.

V. KILDARE.—Bog two miles south of Thomastown. MEATH.—In bogs near Carbury, and between Athboy and Navan.

These appear to be the only recent records for this sedge in District V.

**C. lasvigata**, Sm.

VII. KING'S.—Clonad Wood near Tullamore.

**C. filiformis**, Linn.

III. QUEEN'S.—Marsh near Maryborough.

**C. pseudo-cyperus**, Linn.

III. QUEEN'S.—By the canal at Mountmellick.

V. MEATH.—Bog-drains by canal three miles E.N.E. of Enfield, close to the Kildare boundary.

No recent record from either of these Districts.

**Festuca uniglumis**, Soland.

V. LOUTH.—Sandhills at Baltray—the most northern station in Ireland.

**Glyceria plicata**, Fr.

III. QUEEN'S.—Maryborough.

V. KILDARE.—Carbury and Leixlip. MEATH.—Oldcastle, Bective, and Boyne-mouth. LOUTH.—South of Soldiers' Point.

X. CAVAN.—Edge of Lough Ramor.

XII. LONDONDERRY.—Ditch near Formoyle Hill.

Will probably be found throughout Ireland.

**Poa palustris**, Linn.

V. MEATH.—on the reedy northern edge of the Boyne at Beauparc, among *Carex acuta*, *Thalictrum flavum*, &c.

†**Bromus secalinus**, Linn.

V. LOUTH.—About Queensborough.

**B. racemosus**, Linn.

V. LOUTH.—At Soldiers' Point, in old pasture.

**B. commutatus**, Schrad.

III. QUEEN'S.—Native near Maryborough.

X. CAVAN.—Shores of Lough Ramor.

**Lastrea Oreopteris**, Presl.

VII. KING'S.—Sparingly in Clonad Wood near Tullamore, at 250 feet elevation.

**L. spinulosa**, Presl.

III. QUEEN'S.—Woods south of Maryborough.

V. KILDARE.—Bog south of Thomastown. MEATH.—Bog between Athboy and Navan; near Oldcastle, and on edge of Lough Sheelin.

X. CAVAN.—Bog near Lough Sheelin.

**Osmunda regalis**, Linn.

V. KILDARE.—Very sparingly on bog south of Thomastown. MEATH.—One plant in bog three miles E.N.E. of Enfield.

VII. KING'S.—By the river at Clonad Wood near Tullamore.



**Equisetum variegatum**, Schleich, var. *majus*, Syme.

III. QUEEN'S—In marshy ground in several spots near Maryborough.

VII. KING'S—Bank by the Tullamore River near the bridge at Ballinagar, and abundant by the Kilbeggan branch of the Grand Canal.

The head-quarters of this plant appear to be in the Central Plain. Thence it has spread all along the Royal Canal, right to the boundary of the city of Dublin.

**E. hyemale**, Linn.

VII. KING'S—On the edge of the stream below the bridge at Clonad Wood near Tullamore.

**Chara fragilis**, Desv.

III. QUEEN'S—Maryborough (var. *delicatula*)

V. KILDARE—canal at Leixlip and Kilcock. MEATH—canal at Enfield; in Lough Crew near Oldcastle. LOUTH—Soldier's Point (var. *capillacea*), Killenchoole.

X. TYRONE—Favour Royal, Mrs. Leebody (var. *delicatula*).

**C. aspera**, Willd.

V. MEATH—Oldcastle.

VII. KING'S—Edenderry, and in the Kilbeggan branch of the Grand Canal.

**C. polyacantha**, Braun.

V. MEATH.—in Lough Crew near Oldcastle.

**C. contraria**, Kuetz.

V. MEATH—near Oldcastle.

VII. KING'S—Edenderry, in the canal.

[IX. ROSCOMMON—in the River Suck at Bellagill bridge.

X. CAVAN—in Lough Sheelin;

**C. hispida**, Linn.

III. QUEEN'S—canal at Portarlinton (var. *rudis*).

V. KILDARE—canal at Maynooth and Kilcock (var. *rudis*). MEATH—Lough Crew near Oldcastle (type and var. *rudis*), canal at Enfield (var. *rudis*).

VII. KING'S—canal at Edenderry (var. *rudis*).

X. CAVAN—Lough Sheelin (var. *rudis*).

**C. vulgaris**, Linn.

V. KILDARE—near Carbury (var. *longibracteata*). MEATH—near Oldcastle (var. *longibracteata*).

VII. KING'S—near Clonad Wood, and in the Kilbeggan branch of the Grand Canal.

X. CAVAN—near Cavan town.

**Nitella opaca**, Ag.

V. MEATH—Oldcastle.

VI. N.E. GALWAY—old well at Clonbrock.

VII. KING'S—Tullamore River below Geashill.

X. CAVAN—near Cavan town.

## FIELD DAYS IN ULSTER.

BY THE REV. HILDERIC FRIEND.

## II.—ANTRIM AND COLERAINE.

ON Wednesday, May 27th, I was up betimes. I could not understand how it was that everybody was so much behind time. Hurrying to the station I missed my way, and came at last to the right spot only to find that instead of missing my train I still had a quarter of an hour to wait. At last it occurred to me that I had been gaining time by crossing the Irish Channel, and had not put my watch right with Dublin. I did so, then proceeded to Antrim for Lough Neagh. It was a delightful day, and I greatly enjoyed the run. Arriving at my first halting-place I left all my travelling baggage at the station, and at once set to work. On the way down to the quiet little town I found a heap of manure in front of the Hall used by Orangemen. This yielded me a couple of white worms (Enchytræids), such as are usually associated with such material.

I soon discovered that my movements were regarded with some suspicion. Pushing my way towards the Lodge connected with the residence of Viscount Massereene, I found on the left a short dirty lane running down to the river. Here I fancied I should find a heap of treasures. It was apparently the exact locality. I turned over the humid soil, pulled up the weeds, examined their roots, and pryed into every spot which could be the conceivable home of an annelid, but without avail. Not a solitary specimen could I find, save the ubiquitous green-worm (*Allolobophora chlorotica*), and a horse-leech. I made my hands as decent as possible after my dirty exploit and returned to the main street to fall into the hands of a policeman, who politely informed me that there was to be a ball-firing display or contest by the shores of the Lough, and if I would like to get photographs the opportunity would be a good one.

I now hastened to the Lough—not to photograph flying bullets, but to seek for trophies. I believe much good work might be done here by any one living on the spot, and I trust some reader of the *Irish Naturalist* who resides near Lough Neagh will favour me with specimens of the fresh-water

worms to be found there. On pulling up some tufts of grass by the shores of the lake I discovered what appeared, even to my practised eye, to be a pretty annelid. I was surprised to find that the specimens ranged in colour from pure white to pink and salmon colour, a phenomenon I had not before observed in worms of one species. I collected a goodly number, and was amused a few days after when I opened my collection to find that they had all assumed wings! My annelids were the larvæ of a pretty minute fly (Diptera), but I was unable at the time to recapture them for identification. These flies may therefore be regarded as having been evolved from worm-like ancestors of aquatic predilections. Under the stones I found a few black leeches of minute dimensions, and a small white *Nephelis*. A little further research brought to light a beautiful worm belonging to the family of *Tubificidæ*. It was eventually found to belong to the genus *Psammoryctes*, and will probably prove to be new to science. It is scarce in the locality which I examined, but may be more abundant elsewhere. About an inch long, red, slender, it lives in the roots of partly submerged grass and water plants, and can only be seen by patiently examining the plants with a lens. I believe that if ooze from the lake could be collected from a boat or dredge other species would be obtained, while the feeders of the lough would be sure to supply others.

Having spent as much time here as I could afford I returned to the station. On inquiring for the Round Tower I found that it was locally known as the steeple. The gate posts all round this locality are all miniature "steeples," showing how the mimetic art attaches even to man. Riding from Antrim to Ballymena I observed that the Cotton-grass was abundant in the peaty bottom. Alighting at Coleraine I proceeded at once to the backwater, a few hundred yards from the station, where I was rewarded by the immediate discovery in the ooze of a large number of worms belonging to the Tubificids. The dam here is an excellent hunting ground for fresh-water worms, but I unfortunately had no introduction to any lady or gentleman interested in natural history in Coleraine, and could not therefore initiate any one into the mysteries of the art of collecting. I believe I obtained two or three species of aquatic worms here, but as my specimens had to be killed and

preserved owing to my inability to work up all my gleanings in a living state I have not yet determined all the species. I shall be glad to hear of some one who will help me to obtain fresh material from this part of the country.

As the special facilities for tourists are not provided till June 1st, I was a few days too early for these conveniences. This was in most instances an advantage, as it saved me from being the gazing-stock of an idle crowd, always on the look-out for the ludicrous; it had, however, in this instance, its drawbacks, for the conveniences for visiting Portrush and the Causeway were inadequate, and I was consequently unable to do any work at those places worthy of placing on record. I saw various localities which struck me as specially suitable for aquatic annelids, and in the event of another visit shall know where to turn my attention.

My next destination was Derry. The run thence from Coleraine was full of interest, and the locality, under the genial and enthusiastic guidance of my kind host, proved an admirable hunting-ground. A report of my finds here must, however, be reserved for my next paper. Meanwhile I shall be very grateful if the reader will seek for specimens of aquatic worms under stones, waterweeds, algæ, mud, and elsewhere, and forward the same to me at Ocker Hill, Tipton, Staffs.

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## OBITUARY.

HENRY NEWELL MARTIN.

We should have noticed earlier the premature death of this famous Irish biologist, who was born at Newry in 1848. After brilliant university courses at London and Cambridge, acting at the latter as demonstrator to Prof. Michael Foster, he became assistant to Huxley, in collaboration with whom he produced the well-known "Practical Biology." In 1876 he accepted the professorship of biology in Johns Hopkins University, Baltimore, U.S.A., where he carried out many valuable physiological researches, wrote several text books, and trained a number of talented pupils. In 1893 his health failed; he resigned his chair and returned to England, where it was hoped he might have regained strength. But he gradually became weaker and passed away at Burley-in-Wharfedale, Yorkshire, on October 27th of last year.

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## LEUCANIA UNIPUNCTA, HAW. IN CO. CORK.

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

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*Leucania unipuncta*, Haw. (*extranea*, Gn.) has been taken a second time in Ireland. The first record is that of the Hon. R. E. Dillon, who captured one specimen at Clonbrock, Co. Galway, at sugar in September some years ago, in whose cabinet it is preserved. Lately I received an example of the same insect from Mr. R. J. F. Donovan, a younger brother of Dr. C. Donovan, now abroad, whose collections at Glandore, Co. Cork, and that neighbourhood, proved of great service in extending our knowledge of the distribution of interesting species and varieties of Lepidoptera on the little-known south coast of Ireland. Mr. R. J. F. Donovan is now taking up the study of this section of our Irish fauna in a locality somewhat removed from the former; namely, Timoleague and Courtmacsherry Bay. He has commenced well by taking this interesting moth at sugar on the 13th September last. The specimen is a small one, but well marked, and it now forms a part of my collection by his kindness. But few have ever occurred in Great Britain, all I believe on the south coast of England. The larva is the "army worm" of the Americans, and commits great devastations on the crops. A notice of this moth having appeared in swarms last summer on the coast of New Hampshire (Mass.) is quoted in last month's *Entomologist* from an American Entomological periodical. It appears to have an immense range of distribution—all America, Japan, China, India, Melanesia, Australia, New Zealand, Madeira, etc., but it is unknown in Continental Europe according to Staudinger. It now seems probable that it may be indigenous in Ireland, as our southern shores are to a large extent unknown and unworked by collectors, and its occurrence in Galway quite harmonises with what we know of the similarity of the entomological fauna of the South and West.

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## EUPHRASIA SALISBURGENSIS, FUNK., IN IRELAND.

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

IN the *Journal of Botany* for November last attention was drawn to the Irish forms of *Euphrasia* by the publication of an instructive paper from the pen of Mr. F. Townsend, an acknowledged authority on this difficult genus. In this paper *E. Salisburgensis*, Funk., an alpine or sub-alpine species of wide range on the European continent, is recorded as an addition to the Irish flora on the faith of specimens gathered by the Rev. E. S. Marshall on the shores of Lough Mask, Co. Mayo, in July, 1895. The Lough Mask plant, as figured by Mr. Townsend in the plate which adds so much to the value of his paper, is obviously far from typical, but from a note in last month's issue of the *Journal of Botany* it appears that Messrs. H. and J. Groves have discovered amongst material collected in 1892 near Menlough in Co. Galway, specimens which Mr. Townsend considers much closer to the Continental plant. An elegant, slender-stemmed *Euphrasia*, gathered by myself in August, 1895, near Ballyvaughan, Co. Clare, where it grows in abundance on limestone crags, has since been kindly examined by Mr. Townsend, who unhesitatingly refers it to *E. Salisburgensis*, and informs me that it is similar to the Menlough plant.

This interesting *Euphrasia* is thus shown to range over a considerable area on the low-lying limestone tracts of West Ireland; but it cannot justly be regarded as a recent addition to our flora. The plant, in fact, was gathered in Ireland so long ago as 1852, and was recorded as Irish, under another name, in the *Cybele Hibernica* in 1866. We find it first referred to in the following passage from a paper by Daniel Oliver published in the *Phytologist* for 1854, and describing a botanical tour made in Ireland two years earlier:—

"*Euphrasia*—? On Aran I collected a curious little form some three inches in height much branched from the base, stem with a minute, adpressed pubescence, lanceolate or lanceolate-oblong leaves with one, two, or three strong teeth on each side. I did not know to what species or form to refer it, but examples being sent to C. C. Babington, he kindly informs me that he thinks it a form of the *E. gracilis* of Fries., although it strikingly resembles and possibly may be *E. Salisburgensis*." <sup>1</sup>

<sup>1</sup>Botanical Notes of a Week in Ireland (August, 1852), Vol. IV., p. 679.

Two years later, in the *Scottish Gardener* for 1856, the same plant, this time under the name *E. gracilis*, Fries, was recorded by the late Mr. A. G. More from the limestone district of Castle Taylor and Garryland, Co. Galway. The finder, however, appears to have been dissatisfied with the naming of his plant, for four years later in his paper:— "Localities for some Plants observed in Ireland" <sup>1</sup>, we find this further reference to it:—

"*Euphrasia gracilis* seems to belong rather to *E. Salisburgensis*; in either case it is the *E. nemorosa* of Grenier and Godron. But the Garryland (and Aran) *Euphrasia* differs much from what I have gathered as *E. gracilis* on the heaths and downs of Kent. This latter is apparently the *E. ericetorum* of Jordan; but I do not suppose that either is specifically distinct."

It appears clearly from More's correspondence about this time with his friends, the Rev. W. W. Newbould and Professor Babington, that he was strongly inclined to refer his Castle Taylor plant to *E. Salisburgensis*, and that he refrained from adopting that name only in deference to the opinion of the distinguished author of the *Manual of British Botany*. Through the kindness of Miss More I am enabled to make the following interesting extracts from her brother's correspondence in illustration of this point. The MS. draft of the paper just quoted from had been submitted by More to Newbould with the name *E. Salisburgensis* set down for the Garryland *Euphrasia*, whereupon Newbould thus writes, under date April 9, 1860:—

"*Euphrasia Salisburgensis*.—I would not use this name unless you were quite sure the plant was the Continental one. If I rightly remember, you showed me the plant, and it was identical with one I gathered on the border of Loch Neagh. This plant, I thought, was not *E. Salisburgensis*, but *E. officinalis* of Koch, approaching as nearly as possible to *E. Salisburgensis*, and on mentioning this to Babington, I found that he had independently come to precisely the same conclusion."

Shortly before this, March 19, 1860, Babington, in reply to inquiries from More, had written:—

"I do not find that I have any *Euphrasia Salisburgensis* or any other from Garryland. I have what I believe to be it from the great Isle of Aran.<sup>2</sup> I have given up *gracilis* and think that if we are to split here we must take the French view of them and leave *officinalis* and *nemorosa* to correspond with Boreau's groups, *Calyce glanduleux* and *Calyce non-glanduleux*."

<sup>1</sup> *Nat. Hist. Review*, vii., p. 434.

<sup>2</sup> Probably some of Oliver's 1852 specimina.

And, finally, after examination of More's specimens, Babington writes, April 17, 1860 :—

"I certainly think that your *Euphrasia* is the same as mine from Aran. It comes very near to *Salisburgensis*, although the true Continental plant has even more deeply jagged leaves than this. I am not inclined to separate the plant [*E. officinalis*] into segregate species."

Still dissatisfied with the uncertainty as to his Galway *Euphrasia*, More, in the following year, 1861, sent a sheet of specimens through his friend, J. G. Baker, to M. Boreau, author of the *Flore du Centre de la France*, by whom they were identified as *E. cuprea*, Jord. Under that name both the Castle Taylor and the Aran Island plants were recorded in *Cybele Hibernica* (1866), as a form of the aggregate *E. officinalis* which Babington thought it inadvisable to "split."

The precise value to be given to Jordan's specific distinctions must depend on the greater or less development of the analytic faculty in the individual student. To many otherwise gifted botanists the true analytic vision is denied; they lack that instinct of discrimination which has enabled M. Jordan in his *Espèces végétales affines* to evolve 200 species from the *Draba verna* of Linnaeus, and for such as these *E. cuprea* will remain a mere phase of *E. Salisburgensis*. Others may with Nyman rank it as a sub-species, others again with Gunther Beck as a variety, and so on through all the dwindling gradations from species down to "state." As for myself, having compared the Castle Taylor specimens named *E. cuprea* by Boreau<sup>1</sup> with those from Ballyvaughan, I can find no distinction of any importance. Some of the Castle Taylor specimens in their narrower leaves and more truly filiform stems and branches appear to approach closer to typical *E. Salisburgensis* than the plant from Ballyvaughan, while in the latter the more aristate tothing of the bracts comes closer to the type.

In short, the late Mr. More's Castle Taylor plant of 1854 has as good a title to a place under *E. Salisburgensis*, Funk, as those from Menlough and Ballyvaughan, and has certainly a better title to that position than the plant from Lough Mask. It was simply in deference to Babington's objection to split

<sup>1</sup> To one of these specimens is appended the following note in the handwriting of the late A. G. More: "Seen by Bab. same as Aran Isles" [specimen?]



*E. officinalis* that the Castle Taylor plant was not recorded with the dignity of a new Irish species or sub-species some 36 years ago; and that the plant was finally published in *Cybele Hibernica* as *E. cuprea* rather than as *E. Salisburgensis* was due to M. Boreau's refinement on Mr. More's diagnosis. He who records the segregate necessarily records the aggregate, and the relation between *E. cuprea* and *E. Salisburgensis* is that of segregate and aggregate.

The Irish distribution of *E. Salisburgensis* appears to be exclusively low-level. The stations Inishmore (Aran), Castle Taylor, Lough Mask, Lough Corrib (Menlough) and Ballyvaughan, all lie within 100 feet of sea-level, and if further observation should show that it occurs, as Newbould suspected it did, on the shores of Lough Neagh, then its descent to a level of 50 feet would be established.

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## BIRD MIGRATION.

**The Migration of Birds: a Consideration of Herr Gätke's views.** By F. B. WHITLOCK, London; R. H. Porter, 1897. Pp. 140. Price 3s. 6d. nett.

This is a remarkably incisive criticism of some of the theories put forward in Herr Gätke's celebrated work "Die Vogelwarte Helgoland," on the ever-fascinating subject of Bird Migration. Particularly, our author dissents from Herr Gätke's views as to the direction, altitude, and velocity of the migration-flight; and on each of these three subjects he certainly scores some telling points against the distinguished Helgolander. By far the most interesting part of Mr. Whitlock's book is that dealing with the "Direction of the migration flight;" and though a distinction must be drawn between the question with which, at the outset, he proposes to deal, and that to which, in effect, almost the whole of his reasoning is devoted, the chapter bearing this heading is beyond doubt a masterly examination of Herr Gätke's leading idea—the idea of a "broad migration column," advancing along an "undeviating" route, which is conceived to lie either *due* north and south, or (in many cases) *due* east and west, between limits corresponding in the former case to the longitudinal, and in the latter to the latitudinal, extent of the breeding area. Our author takes in detail five species—the Hooded Crow (pp. 13-21), Honey Buzzard (pp. 21-24), Shore Lark (pp. 24-29), Yellow-browed Warbler (pp. 29-32), and Richard's Pipit (pp. 32-34), all supposed by Herr Gätke to pursue the undeviating east-and-west route—and successfully shows that in every one of these instances the theory of the "broad front" lands its propounder in some absurdity.

Nor do the direct north-and-south migrants fare better. The Red-spotted Bluethroat, for instance, to which Herr Gätke assigns this route, is shown by Mr. Whitlock to be on such a hypothesis strangely out of place in its annual visits to Heligoland, having no ascertained winter home west of Egypt; while with reference to the Red-throated Pipit (*Anthus cervinus*), Herr Gätke's statement that it "adheres to a most rigid southerly course" is pertinently contrasted with a passage in Collett's "Bird Life in Arctic Norway," stating as distinctly that in spring it follows "the eastern route across Russia and the Baltic provinces." At the same time it must be pointed out that our author is no friend to "eastward migration" on any extensive scale, and, at the commencement of the chapter under review, seems to regard the east-and-west trend of the bird-flights as Herr Gätke's principal heresy, to the refutation of which the shattering of the "broad front" is merely subsidiary. It is, however, against the "broad front" and the "undeviating line" that all his heavy array of facts is really marshalled, and the case for at least a considerable east-and-west migration is left, after all, practically unshaken. Mr. Whitlock objects, too (p. 54), to the doctrine that birds follow a more direct course in spring than in autumn, as "quite unsupported by any positive evidence." It certainly seems at variance with Herr Gätke's rigid east-and-west theory. But that some curious differences between spring and autumn routes exist can be proved by one instance—that of the Nightingale—a bird which we in Ireland have special reason to know seldom straggles *accidentally* from its course, and which at Heligoland is a well-known visitor in spring, yet has never been taken in autumn. The converse case, therefore, of a bird of passage common in autumn but scarce in spring, does not need (although it may fall in with) Mr. Whitlock's supposition of wholesale loss of life in the interval.

In his chapter on "Velocity of the Migration Flight" Mr. Whitlock quotes (p. 94) a comical result of one of Herr Gätke's high estimates. The speed of the Hooded Crow, on migration, is set down as 108 miles an hour. Few of us would have fancied it of our familiar "Scald-crow"; but what follows? Scald-crows, as we know, are little incommoded by weather; but it seems the migrating bird, moving 108 miles an hour, objects to have its feathers ruffled by wind "blowing through its plumage obliquely *from behind*." So—says Herr Gätke—when flying westward before a strong south-east wind, it turns its face southward, and in this attitude maintains its westward flight with the same velocity as under normal conditions. Herr Gätke does not, of course, mean his readers to imagine a wind blowing at the terrific pace of 108 miles an hour (*i.e.*, 158 feet a second!); but, as Mr. Whitlock points out, no slower breeze than this would ruffle the rear-feathers of a bird flying at that particular rate; indeed, in flying sideways, the Crow would to some extent be creating the very inconvenience he is represented as seeking to avoid. It is certainly to be regretted that the pretty little Bluethroat, whose speed is set down as 180 miles an hour, travels only by night, and can never be seen in the performance of its wonderful exploit.

C. B. M.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include a cockatoo from Mr. B. Thompson, two Indian Pythons and a Diamond Snake from Mr. W. Cross, some Trout and water-plants from Mr. F. Godden, two Bramblings, a Chaffinch, and a Bunting from Mr. J. L. T. Dobbin, and an Indian Mynah from Mrs. Denny. A pair of Wolves, a Malayan Bear, twenty-two monkeys, and a number of freshwater-fish have been acquired by purchase.

On March 11th, the Lord Lieutenant opened the newly arranged house for reptiles, and diving-birds, and fish, described in the last number of the *Irish Naturalist*.

One puppy of the last litter born of the Cape Hunting Dog is alive and thriving. This highly interesting specimen—the first of the species ever reared in captivity—is to be given to the collection of the Zoological Society of London.

4,778 persons visited the gardens in February.

### DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 15.—The Club met at the house of Mr. A. ANDREWS.

Mr. GREENWOOD PIM showed a slide of dust collected in Melbourne, on 27th December, 1896, after a (so-called) rain of blood. The particles were very minute and mostly rounded; organic remains extremely scarce. Prof. Cole, to whom the material was submitted, was of opinion that it was desert sand, similar to that resulting from "red rains," which have occurred in Greece and Italy, and which were derived from the Sahara; the rounded grains and reddish tint confirming this view.

Mr. Pim also showed a specimen of *Nectria coccinea* in situ on bark, the brilliant red conceptacles nestling among the bright green *Protococcus* forming an exceedingly pretty object for a low power and condensed illumination.

Mr. F. W. MOORE exhibited a brightly-coloured species of fungus which had attacked the pseudo-bulbs of *Odontoglossum pulchellum*. The species has been determined by Mr. G. Masee as *Calomectria lutesca*, Sacc.

Mr. M'ARDLE exhibited specimens of *Lachnella echinulata*, Awd., a rare discomycetous fungus, which has minute waxy white cups, globose in the young state, afterwards the disk becomes flattened and shortly stipitate, externally villous. Each hair at the apex bears a globose echinulate head, forming a radiating margin, and is a beautiful microscopic object. The specimens were found in Glenealy Wood, Co. Wicklow, growing on the decayed leaves of the oak, in August last year, by Dr. McWeeney and Mr. M'Ardle, when collecting for the Flora and Fauna Committee of the Royal Irish Academy.

## BELFAST NATURALISTS' FIELD CLUB.

MARCH 17.—The President (Mr. LAVENS M. EWART) opened the proceedings by calling upon the geological secretary's report of the season's work. The report was read by MISS THOMPSON, and stated that the Club's work had been interfered with by wet and inclement weather, which prevented the excursion to Pomeroy from taking place, and rendered abortive another to Lough Neagh. Miss Thompson then referred to the help given by members to Dr. Hume during his visit to the North of Ireland to investigate the Chalk, and also expressed the hope that if Professor Tate should revisit Belfast, some opportunity would be given for members to meet the Club's founder. One of the interesting finds of the year was a junction of chalk and basalt, discovered by Mr. R. Bell on Squire's Hill. Sections of it show that, in many cases, the tiny shells of the Foramanifera found in it are still unaltered. It has now proved a most desirable arrangement to have the Club's work done systematically by organised sections, and it is worth mentioning again that any member can join any section by sending his name in to the secretary of the section, thereby securing notices of all sectional meetings and excursions which cannot be generally noticed. Allusion was then made to Mr. Robert Bell's find of plant-remains below the boulder clay, and to the continued work on the erratic blocks. "Ailsa" rock has now been found by Mr. Welch at Portrush. The work done hitherto has been on the lines now worked by the International Boulder Committee of the British Association. An excursion was held to Dro-more during the Christmas holidays to investigate an apparent distinction into upper and lower clays. This, however, must remain doubtful.

The next paper was read by the Vice-President (the Rev. C. H. Waddell, B.D.) on the "Geological History of Plants." A short discussion followed this paper.

Mr. RICHARD HANNA then read a paper on "Alien Plants," or plants which have been artificially introduced, which will appear in these pages.

Some lantern slides by Messrs. Welch, Fennell, Gray, Phillips, and other members were next displayed by Messrs. Lizars. They included slides of a series of dykes, glacial beds, glaciers, rock-specimens, and features of local geology.

A number of exhibits of geological and botanical subjects were arranged in the lower room. There was also on view the new slicing machine for cutting rock-sections, recently presented to the Club by Messrs. Combe, Barbour, and Combe, and made to the design of Mr. H. J. Seymour by them. Mr. Seymour explained its action to a large number of members. The following is a list of some of the more important exhibits:—Series of fossils from Chalk, Greensand, and Lias of Ireland and parts of England, by Mr. R. Bell; plant remains from Ballypallady, and from museum; varieties of silica, by Mr. H. J. Seymour; living Cycads and igneous rocks, by Mr. A. G. Wilson; fossils from Carboniferous and Lias, by Mr. Wm. Gray; erratics from Club collection; mycelium of fungus in wood and *Rubus Drejeri* var. *hibernicus*, by the Rev. C. H. Waddell; fossil wood from West Indies and Lough Neagh. There were a number of other exhibits. Two new members were elected, and the meeting concluded.

**BOTANICAL SECTION. 27TH FEBRUARY.**—The whole time was taken up with the study of the extensive order Leguminosae. Rev. C. H. Waddell drew attention among other features to the tubers formed on the roots by which some of these plants obtain supplies of nitrogen, and showed some on the roots of the bean.

**BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.**

**MARCH 2.**—The following papers were read:—"Ireland: Its ancient Civilisation and Social Customs," by Mr. SEATON F. MILLIGAN, M.R.I.A., and "Boulder Clay—a marine deposit, with special reference to the 'Till' of Scotland," by Mr. JOSEPH WRIGHT, F.G.S. Professor Everett occupied the chair.

Mr. Wright, after describing the chief characteristics of boulder clay, said that geologists all agreed that this clay, which formed the greater part of the subsoil of the British Isles, was the result of ice action, and that it was deposited at a time when an Arctic climate prevailed somewhat similar to that at present existing in Spitzbergen. But geologists were not so unanimous in their theories explaining its formation, some holding that it was the result of the action of land ice, and others that it was of marine origin. Special attention had been given to this subject by geologists in the North of Ireland. Major-General Portlock's opinion was that these clays were of marine origin, and in his report on the geology of Londonderry, published in 1843, he gave a list of fossil shells found by Messrs. Bryce and Hyndman in boulder clay which was cut through when the reservoir for the Belfast Waterworks was being excavated. Mr. S. A. Stewart, the curator of the Museum, published in 1880 a list of mollusca from Irish boulder clay, in which he recorded sixty-nine species of shells. Examples of *Leda pernula* and *Leda pygmaea* were obtained both at Woodburn and the Knock with their valves in juxtaposition, which proved that they must have lived on the spot where found. Mr. Wright then proceeded to describe his examination of boulder clay from the vicinity of Glasgow, and expressed his indebtedness to Mr. James Neilson, vice-president of the Glasgow Geological Society, or his kindness in supplying him with samples of typical Scottish boulder clay. Material from eleven different localities had been examined, and in all of these Foraminifera were found. These specimens were all of the same species as those found at present in shallow water off the Irish coast, and, with the exception of *Discorbina parisiensis*, had all been found in Irish boulder clay. *Rotalia Beccarii*, *Nonionina depressula*, and *Polystomella striatopunctata* were the most abundant in the clay, and the same species were the most common amongst our shallow-water forms. Mr. Wright concluded by saying that the result of his examination of both the Scotch and Irish boulder clays, and the finding in them of many shallow-water organisms, forced him to the conclusion that the boulder clay both in Scotland and Ireland was of marine origin.

**MARCH 17.**—A Special Meeting was held, when the following Paper was read by JOHN FINNEGAN, B.A., B.Sc., "The History and Properties of Röntgen Rays," fully illustrated with special experiments and lantern photo-slides.

## DUBLIN NATURALISTS' FIELD CLUB.

The fourth business meeting of the Club for the session 1896-7 was held on Tuesday evening, February 9th, 1897, in the Royal Irish Academy House, the President, PROFESSOR COLE, F.G.S., in the chair. There were 115 members and visitors present. The minutes of the last meeting were read and signed. Mr. R. LL. PRAEGER, B.A., B.E., Vice-President, then read a paper entitled "Bog-bursts, with special reference to the Kerry Disaster," which will shortly appear in our pages.

The Secretary (Dr. T. JOHNSON) showed lantern and microscopic preparations illustrating the relation of the structure of the bog moss (*Sphagnum*) to its water-absorbing powers, and pointed out how little was known economically of Irish bogs. Mr. M'ARDLE demonstrated the cryptogams and Mr. Praeger the flowering plants collected. Mr. M'Arde also gave an account of the various Irish species of *Sphagnum* and their habitats. Mr. A. V. JENNINGS suggested, by comparison with the causes of avalanches of Switzerland, the weed and rock slides of New Zealand, that special agencies, such as faults and underground springs, were not necessary to account for bog-bursts generally. Mr. RAMAGE, F.I.C., spoke on the chemistry of bogs, explaining the cause of their antiseptic properties. Prof. COLE spoke highly, as an eye-witness, of the work of Mr. Praeger and the other members of the Royal Dublin Society Committee, and suggested the Field Club itself might try to do something in the investigation of Irish bogs, failing the more appropriate action of the Government.

The Secretary next exhibited specimens of a drift seed (*Mucuna wrens*) picked up on the shore at Kilkee (Co. Clare), and sent to him for identification; also specimens of so-called Jumping-Beans recently presented to the Science and Art Museum. Mr. J. G. Robertson exhibited specimens of fossil fish from the Kilkenny coalfields. The following nominations for membership were read:—Mrs. W. Deaker, Dr. J. Trumbull, W. H. MacMahon Phelan, and Misses Bernard, Cragg, Longford, and Wann.

It was agreed that the Club should become a member of the Mycological Society.

## CORK NATURALISTS' FIELD CLUB.

FEBRUARY 24.—Mr. R. LLOYD PRAEGER lectured on "Bogs and Bog-bursts, with special reference to the recent disaster in Kerry." The President, Mr. W. H. Shaw, occupied the chair.

## LIMERICK AND CLARE FIELD CLUB.

FEBRUARY 23.—Mr. R. LLOYD PRAEGER lectured on "Bogs and Bog-bursts, with special reference to the recent disaster in Kerry." Dr. Fogarty occupied the chair, and a discussion followed the lecture.

1 MARCH 16.—Mr. E. TAYLOR lectured on "Celtic Ecclesiastical Art."

## FIELD CLUB NEWS.

The Belfast Club have again arranged with Prof. Cole for a course of instruction in practical geology. A course of six three-hour lessons in the examination of rocks will be accompanied by three excursions, and preceded by a public lecture entitled "The Building of Ireland: the Landscape and the Ground beneath it."

On March 2nd and 9th Mr. R. A. Phillips delivered two lectures under the auspices of the Cork Club, the first "On Collecting, Preserving, and Identifying Plants," the second on "Rare and Characteristic Plants of County Cork." Practical lectures of this kind are much to be commended.

The recent addition of archæology to the field of work of the Limerick Club has resulted in a surprising influx of new members. In three months the membership has doubled itself, and now stands at close on 200. At the commencement of last year it stood at 60. The title of the Society has been slightly altered to suit its wider field: it is now styled "The Limerick and Clare Field Club."

The following excursions of the Dublin Club are announced:—April, Sugarloaf Mountain; May, Powerscourt and Douce Mountain; June, Edenderry; July, Ballycastle, Co. Antrim (three day excursion in conjunction with Belfast Club); August, Kerry bog-slide; September, Avondale, Vale of Ovoca. The exact dates will be announced later.

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 N O T E S .
 

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**The Introduction of Alien Species.**

Allow me to enter a strong protest against some of the editorial remarks on "Ignorance and Introduction" in last month's number of the *Irish Naturalist* (p. 82). I sincerely hope that no one will be thereby deterred from the attempt to naturalise beautiful or useful plants or animals in Ireland. The Editors do not, I suppose, disapprove of the introduction of foreign timber into our forests, or the fixing of shifting sands by planting grasses which may not be indigenous to the locality. Do they object to beautifying our bogs and marshes by planting foreign heaths which may scatter their seeds and multiply? Is it a whit more objectionable to increase our very limited stock of a lovely butterfly like *Gonepteryx rhamni*, or *Vanessa io*? If their strictures go so far I may be permitted to express the hope that the love of beauty and utility will prevail over the making of catalogues.

GEORGE V. HART.

We thank Dr. Hart for his courteous note and the opportunity which it affords us of stating our position on the subject more definitely. Our remarks were particularly directed against the introduction of common British species, absent from Ireland or whose range here is restricted to

certain localities. Geographical and geological problems of the greatest interest lie behind work on the distribution of plants and animals, and every student of the subject knows that the Irish flora and fauna furnish specially suggestive facts for the solution of these problems. We hold, therefore, that deliberate falsification of the geographical record is a grave scientific offence, since it tends to make the facts on which we have to build insecure.

There are, of course, some introductions which cannot mislead anyone; we have nothing to say against these. No one would suppose that Lord Powerscourt's Japanese Deer are indigenous Irish mammals; while in many cases botanists can determine with certainty that a tree or shrub has been planted. But so many species, unknown in Great Britain, have been and are being found in Ireland, that the greatest possible care should be taken not to introduce anything at all likely to deceive naturalists. Dr. Hart mentions foreign heaths. When we consider the intense interest of the Mediterranean heaths which are so striking a feature in the flora of western Ireland, we would specially beg that our plants of this family may not be tampered with for the sake of "beauty and utility." Let foreign heaths be grown in greenhouses and gardens, and our moors and marshes left to the undisturbed possession of the native plants. A few months ago we recorded the occurrence of a North American plant, *Sisyrinchium californicum*, in Co. Wexford. Though it grows over several acres, botanists cannot be certain that we should be justified in adding it to our list of four or five undoubtedly indigenous North American plants. In view of the special affinities of a section of the Irish flora and fauna, the introduction of North American or Mediterranean species is particularly reprehensible.

The discussion about the Frog in Ireland which is still going on in our pages, illustrates the difficulties raised for the student of distribution by the introduction of a species. The paucity of Irish reptiles and amphibians has been noted from time immemorial, and is a striking evidence that Ireland is an older island than Great Britain. Yet, because of the recorded introduction of the Frog two centuries ago, we shall always be in some doubt whether our most abundant representative of these two classes is native or not. And when the details of the subject come to be worked out, doubt on such a point vastly increases the difficulty—already great enough—in coming to right conclusions.

Dr. Hart hopes "that the love of beauty and utility will prevail over the making of catalogues." The making of catalogues is necessary, but it is not the end of the study of distribution. The catalogue is required as a starting point—a record of facts from which further studies can be undertaken: studies into the [past history of the living creation around us and of the land which it adorns. The artificial pursuit of "beauty and utility" by the landscape-gardener and the breeder is, we believe, possible without hindrance to the pursuit of truth by the naturalist

THE EDITORS.



BOTANY.

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PHANEROGAMS.

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**Broom (*Sarothamnus scoparius*) flowering in Winter.**

At the end of December and beginning of January I saw two shrubs of Broom in flower, at Ballyhyland, Co. Wexford. The flowers, to be sure, were few, but they were fresh. The Broom occasionally—though not, I think, often—bears a few sprays of autumnal blossom in October. I noticed this in 1882, and again in 1886. But I have never before observed it flowering at the close of the year.

C. B. MOFFAT.

ZOOLOGY.

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AMPHIBIANS.

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**The Frog in Ireland.**

I am glad to see Mr. Barrington's note on the vocal powers of the Frog, which Dr. Scharff so slightly estimates. I would add, that one need not always wait for "sunny mornings of March" to have ample proof of the Frog's ability to make himself heard, for this year it was on the 11th of January that my ears were first greeted by the "music of the marsh," proclaiming that *Rana temporaria* considered it spring-time. Last year, the corresponding date in the same locality (in Co. Wexford) was January 17th. On warm evenings the frogs around Dublin sometimes make the air resonant quite late into the dusk. On March 17th, 1892, I have a note of their loud and incessant croaking in ditches along the Royal Canal at 9 p.m. (This may have been a special Patrick's Day Demonstration in mockery of the arch-exterminator, whom Dr. Guithers, F.T.C.D., has reduced to his proper level: for I have not heard anything quite equalling it since.) Had Saint Donatus been present he would certainly have seen reason to revise his poetry.

C. B. MOFFAT.

In response to my friend Mr. Barrington's invitation to hear the frogs croak, I went out to Fassaroe on the 7th March. They had, however, already become silent, after their very short courtship which lasted for about a week. Although I had not the pleasure of hearing them, I have no hesitation in accepting Mr. Barrington's statement that Irish frogs croak rather louder than I believed, especially when there are a large number together. But even then the noise, from the description given to me, cannot be compared with that made by the Edible Frog, which moreover croaks almost throughout the whole spring and summer.

R. F. SCHARFF.

## THE ICTERINE WARBLER.

HYPOLAIS ICTERINA. GARTEN LAUBVOGEL. SPOTT VOGEL.

BY THE REV. CHARLES W. BENSON, LL.D.

ON 26th July, 1882, I had the pleasure of hearing this remarkable songster in the Bosch, as the Park at the Hague is called. Strolling in with my boy in the hope of finding some birds new to us, we were gratified in a few moments by hearing from a tree near a marshy piece of ground a song we had never heard before.

The singer began somewhat like a Thrush, and I thought that perhaps he might be a Redwing; then there were a few jarring notes, and then he broke out into one of the most delightful and varied songs imaginable. We listened with all our ears, until we were obliged to leave for the train to Rotterdam.

On my return to Dublin, still unacquainted with the performer's name, I found in the Library of Trinity College, in Dresser's great work, the following description of the Icterine Warbler's song quoted from Professor Collett's "Bird-life":—"Its song not a little resembles that of the Nightingale, but one may find again the ditty of the Song Thrush; it is the very best of our songsters." On reading these words I felt certain that our unknown friend was the Icterine Warbler.

I did not hear this remarkable bird again until July, 1891, when English chaplain at Kissingen in Bavaria. Then we found him near the little river Saale in a tree close to the Iron Bridge, from which day after day he uttered wonderfully loud and melodious notes, interspersed with harsh cries and discords, some of these were so loud and strange, that I was surprised that Germans passing over to take their "moorbad" did not pause in wonder. One note was especially like that of a Parrot.

Shortly after, my wife found the nest in the fork of a low tree just behind the Kurhans, and we frequently visited it, whilst the female never stirred or seemed alarmed as we looked

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down upon her. Once again at Karlsbad, in 1893, we heard, but very rarely, the same curious and very striking notes, but neither at Kissingen nor at Karlsbad did we hear anything like the lovely song that gladdened our ears at the Hague.

Now it is very remarkable that Mr. O. V. Aplin, in his interesting paper on the song of this bird in Africa,<sup>1</sup> states that he never heard there this sweet and wonderful song; he re-echoes Mr. Seebohm's description, "it screamed, it warbled and chuckled voluminously," and this well represents what I heard at Kissingen and Karlsbad, but falls very far short of my experience in Holland.

On the other hand, my friend, the late Mr. J. G. Rathborne, who shot the only specimen of this bird obtained in Ireland, assured me that he was attracted by its splendid song, which was quite new to him, and that he watched it in his grounds at Dunsinea, near the Observatory at Dunsink, as it rose up from the willow trees, after the manner of fly-catchers, and returned singing to the branch again.

On 29th May, 1886, as mentioned in the *Zoologist* for that year, Mr. (now the Rev.) Allan Ellison, an excellent observer, believed that he saw and heard this bird in the famous woods of Coollattin, Shillelagh, Co. Wicklow. He says:—

"Its song began with a few rather harsh strains, but in general it was quite delightful, far surpassing in charm and melody any song I have ever heard. But for its song I could have hardly distinguished it from our Willow Warbler, but it was of a more decided yellow colour, and had a longer tail. After watching the bird for about half an hour I passed on, but on returning to the same spot an hour afterwards I could see or hear nothing of it, nor have I ever met it since."

On hearing from Mr. Ellison, I hurried down to Shillelagh, but found that, alas! the bird had flown.

In the same month of May, Mr. Murray A. Matthew, Stone Hall, Pembrokeshire, heard this bird apparently, in South Wales. He writes to the *Zoologist* as follows:—

"Early in May I heard the notes of a bird that were quite new to me in our shrubberies; since then he has taken up his station in an ash tree just outside our grounds, and sings a most delicious song all day to the delight of passers-by, who return again and again to listen to his melody. The notes are very sweet and liquid, imitating some of the trills of the Song Thrush. Seen high up through the foliage he looks like a Chiff-Chaff, but when he descends he seems darker about the wings, his breast

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<sup>1</sup> *Zoologist*, May, 1896.

seems of a pale yellow. The other side of his hedge is a swampy cover of furze, willow, rushes, and young spruces, where I have searched unsuccessfully for the nest, which no doubt is there. In my opinion our little warbler is no other than the Icterine Warbler."

It will thus be seen that some observers think that Mr. Seeborn, doubtless a host in himself, has rather underrated and that Mr. Aplin has not heard this remarkable bird at its best. It is to be hoped that he may have opportunities of hearing it again this year, and I shall look out with much interest for any remarks from him. In a letter I received last month from Mr. H. N. Pashley, Naturalist, of Cley-next-the-Sea, Norfolk, he says that an Icterine Warbler was taken there on 8th September, 1896, by Mr. R. Gurney, of Sproston Hall. Another had been taken in 1894 near Cley by a London gentleman. May we not hope for further tidings of this remarkable bird in 1897?

An interesting account, and an excellent coloured plate of the Icterine Warbler may be found in "A Chapter on Birds, Rare British Visitors," by Dr. Bowdler Sharpe, of the Zoological Department, British Museum. I cannot help feeling sorry, however, that he has called the bird the "Common Tree Warbler," instead of perpetuating its good old name of the Icterine Warbler derived from the Latin and Greek "Icterus," meaning: (1) "The Yellow Jaundice," (2) "A Yellow Bird, which if one see, being sick of the yellow jaundice, the person recovers, but the bird dieth." Can there be a stronger testimony to its vocal powers, and their disinterested exercise than this?

I trust that some of my readers may be successful in hearing this sweet songster in Ireland this year, for to me it will always be the sweetest of birds, and should they do so, will at once apprise me of the fact, that I may hasten gladly to the favoured spot.

## A DAY'S DREDGING OFF BALLYCASTLE, CO. ANTRIM.

BY GEORGE W. CHASTER.

HAVING been strongly urged by Mr. R. Welch, of Belfast, to study the molluscan fauna of the North Antrim coast, last September, Messrs. J. R. Hardy and R. Standen, of Manchester, and myself arranged to "prospect" that region, which is to English conchologists almost a *terra incognita*.

Crossing from Liverpool by one of the Belfast S.S. Co.'s well-appointed boats, we reached Belfast in good time in the morning, and were soon *en route* for our destination—Ballycastle. Here we were met by Mr. Welch, who had made all arrangements for our convenience by securing rooms at the comfortable "Antrim Arms" Hotel, and by providing a roughly-outlined programme to guide our operations. To his hearty assistance may be assigned a large measure of the success attending our trip to a region which we were afterwards unanimous in declaring so full of charm and interest as to demand revisiting and investigating further.

The results of our collecting among the land and fresh-water mollusca have already appeared in these pages (*J.N.*, vol. vi., pp. 1-9, Jan., 1897).

One day was spent in dredging, and the object of this paper is to record the results of the day's work. I may here parenthetically remark that the study of marine conchology at Ballycastle presents some difficulty. The small tidal rise and fall renders shore-work unproductive of any save the very commonest forms; the swift and powerful tidal currents keep up a constant to-and-fro wash along the sea-bed in the lines of their action, and this constantly-washed bottom is, of course, inimical to molluscan life. However, we carefully discussed the matter beforehand, aided by a small-scale chart and the advice of an experienced local boatman—Coyles—and at last decided upon certain likely spots. Starting out, we ran across to Rathlin Island, and tried two hauls to the east of the island. The first brought up only a few Echinodermata and Hydrozoa evidently scraped off bare rock. Further out we brought up from 45 fathoms a heavy dredgeful of gravel and shells, so

very "dead" that a change of scene was decided upon for our next attempt. Rounding Rue Point of the island we had two hauls from good "live" ground in 15 and 17 fathoms of water. Wishing to try the sandy bottom of Church Bay we went thither and brought up from 8 and 11 fathoms a quantity so large that, after passing it through our sieves, all the finer portion except two bags-full was reluctantly thrown back. Our boatman now warned us that we must quickly return to the mainland if we were to avoid the dreaded tide-race. On reaching Ballycastle Bay we tried the bottom in 26½ fathoms, but, finding it to consist of clean-washed, fine gravel and dead shells, a sample only was retained. After another unsuccessful haul we landed, agreeing that we had by that time acquired a sufficiency of shells and dredged material to search through at home, as well as of dampness, weariness, and hunger.

The dredgings were, perhaps, not such as would attract the attention of the uninitiated. An array of bags filled with fine material, two or three small boxes containing dead shells and a few, mostly inconspicuous, living forms were all we had to show. As, however, amongst the latter were *Propilidium ancyloides*, Forbes, and, as the ground was evidently good, confident hopes were held as to the ultimate results. The marine mollusca being given into my charge, I brought home the half hundredweight of finer material and examined it with a constantly increasing interest as its richness became manifest. Our single day's dredging has resulted in the addition to the British fauna of three species, *Leda pusilla*, Jeff., *Homalogyra polyzona*, Brus., and *Adeorbis unisulcatus*, Chaster, the last being new to science. Of course all are of minute size, our shallow waters having been too carefully searched for us to expect novelties except of diminutive dimensions. I would here urge the importance of the study of the marine mollusca. Conchologists sometimes confine their attentions to the land and freshwater species, and neglect the forms inhabiting the sea, though the latter offer an incomparably richer field for investigation, whether from a malacological or conchological point of view. The relative importance of the one to the other may be roughly inferred from the fact, that Woodward in the systematic part of his "Manual" devotes about ten times as

much space to the marine as to the terrestrial and fluviatile groups. In the subjoined list most of the species are merely mentioned by name, a few remarks being appended on those which are of special interest. Species of which we obtained living specimens are indicated by the italicised and bracketed letter l (*l*). Such as are not included in Mr. R. L. Praeger's list of North Irish mollusca (Appendix to Ann. Rep. and Proc. Belfast Nat. Field Club, 1887-88) have a prefixed asterisk. I may here say parenthetically that on the shore of Whitepark Bay we obtained a large piece of drift-wood, completely riddled by *Teredo megotara*, Hanley, another addition to Mr. Praeger's list. The arrangement and nomenclature of Jeffrey's "British Conchology" are employed for convenience sake, not because I agree with them.

For other remarks on the *rariora* I would refer the reader to the notes at the end of my paper.

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| Anomia ehippium, L.                      | M. bidentata, Mont.                              |
| A. patelliformis, L. ( <i>l</i> )        | M. ferruginosa, Mont.                            |
| Ostrea edulis, L.                        | *M. donacina, Jeff.                              |
| Pecten pusio, L.                         | Lasæa rubra, Mont.                               |
| P. varius, L. ( <i>l</i> )               | Kellia suborbicularis, Mont.                     |
| P. opercularis, L. ( <i>l</i> )          | Lucina borealis, L.                              |
| P. tigrinus, Müll. ( <i>l</i> )          | Axinus flexuosus, Mont.                          |
| P. Testæ, Biv. ( <i>l</i> )              | Cyamium minutum, Fabr.                           |
| P. maximus, L. ( <i>l</i> )              | Cardium echinatum, L.                            |
| Lima elliptica, Jeff.                    | C. fasciatum, Mont. ( <i>l</i> )                 |
| L. Loscombii, G. B. Sow.                 | C. minimum, Phil.                                |
| Mytilus modiolus, L. ( <i>l</i> )        | Cyprina islandica, L. ( <i>l</i> )               |
| M. phaseolinus, Ph. ( <i>l</i> )         | Astarte sulcata, Da Cos. ( <i>l</i> )            |
| Modiolaria marmorata, Forb. ( <i>l</i> ) | A. triangularis, Mont.                           |
| M. discors, L. ( <i>l</i> )              | Circe minima, Mont. ( <i>l</i> )                 |
| Crenella decussata, Mont.                | Venus exoleta, L.                                |
| Nucula nucleus, L. ( <i>l</i> )          | V. lincta, Pult.                                 |
| N. nitida, G. B. Sow.                    | V. casina, L.                                    |
| N. tenuis, Mont.                         | V. ovata, Penn.                                  |
| Leda pygmæa, Münst.                      | V. gallina, L. ( <i>l</i> )                      |
| L. minuta, Müll. ( <i>l</i> )            | Tapes virgineus, L.                              |
| *L. pusilla, Jeff.                       | Lucinopsis undata, Penn ( <i>l</i> )             |
| Pectunculus glycymeris, L.               | Tellina squalida, Pult.                          |
| Arca tetragona, Poli ( <i>l</i> )        | T. pusilla, Phil.                                |
| *Galeomma Turtoni (Eds. Z. J.)           | T. fabula, Gron.                                 |
| Lepton nitidum, Turt.                    | T. crassa, Penn.                                 |
| L. Clarkiæ, Cl.                          | Psammobia ferröensis, Chem. ( <i>l</i> )         |
| Montacuta substriata, Mont.              | Mactra solida, L. v. elliptica, Br. ( <i>l</i> ) |

- M. subtruncata*, Da Cos. (*l.*)  
*Scrobicularia prismatica*, Mont. (*l.*)  
*S. nitida*, Müll. (*l.*)  
*S. alba*, Wood (*l.*)  
*Solen ensis*, L. (*l.*)  
*Pandora inæquivalvis*, L.  
*Thracia papyracea*, Poli.  
*T. prætenuis*, Pult.  
*Corbula gibba*, Ol. (*l.*)  
*Mya Binghami*, Turt. (*l.*)  
*Saxicava rugosa*, L. (*l.*)  
*Dentalium entalis*, L. (*l.*)  
*Chiton fascicularis*, L.  
*C. cinereus*, L. (*l.*)  
*C. ruber*, Lowe (*l.*)  
*Helcion pellucidum*, L.  
*Tectura testudinalis*, Müll.  
*T. virginea*, Müll. (*l.*)  
*T. fulva*, Müll.  
*Proplidium ancyloides*, Forb. (*l.*)  
*Puncturella noachina*, L.  
*Emarginula fissura*, L. (*l.*)  
*Fissurella græca*, L.  
*Scissurella crispata*, Flem.  
*Capulus hungaricus*, L.  
*Cyclostrema nitens*, Phil. (*l.*)  
*C. serpuloides*, Mont. (*l.*)  
*Trochus helicinus*, Fabr.  
*T. tumidus*, Mont. (*l.*)  
*T. cinerarius*, L. (*l.*)  
*T. Montacuti*, W. Wood.  
*T. millegranus*, Ph. (*l.*)  
*T. zizyphinus*, L. (*l.*)  
*Phasianella pullus*, L. (*l.*)  
*Lacuna crassior*, Mont. (*l.*)  
*L. divaricata*, Fabr. (*l.*)  
     var. *quadrifasciata*, Mont.  
*L. puteolus*, Turt.  
*L. pallidula*, Da Cos.  
*Rissoa cancellata*, Da Cos.  
*R. reticulata*, Mont.  
*R. calathus*, F. & H.  
*R. cimicoides*, Forbes.  
*R. punctura*, Mont. (*l.*)  
*R. zetlandica*, Mont.  
*R. costata*, Ad.  
*R. parva*, Da Cos. (*l.*)  
     var. *interrupta*, Ad. (*l.*)
- R. inconspicua*, Ald. (*l.*)  
*R. proxima*, Ald.  
*R. striata*, Ad. (*l.*)  
*R. soluta*, Ph. (*l.*)  
*R. semistriata*, Mont.  
*Skenea planorbis*, Fabr.  
*Homalogyra atomus*, Ph. (*l.*)  
*\*H. polyzona* (Brus. mss.), B. D. & D. (*l.*)  
*H. rota*, F. & H. (*l.*)  
*Cæcum glabrum*, Mont. (*l.*)  
*Turritella terebra*, L.  
*Scalaria communis*, Lmk.  
*S. trevelyana*, Leach.  
*S. clathratula*, Ad.  
*Aclis unica*, Mont.  
*A. ascaris*, Turt.  
*A. supranitida*, S. Wood.  
*A. Gulsonæ*, Cl. (*l.*)  
*\*Odostomia minima*, Jeff.  
*O. nivosa*, Mont.  
*O. truncatula*, Jeff.  
*\*O. clavula*, Lov.  
*O. rissoides*, Han.  
*O. pallida*, Mont.  
*\*O. conoidea*, Broc. (*l.*)  
*O. acuta*, Jeff.  
*O. turrita*, Han. (*l.*)  
*O. unidentata*, Mont. (*l.*)  
*O. insculpta*, Mont. (*l.*)  
*O. Warreni*, Thomp.  
*O. interstincta*, Mont.  
*O. indistincta*, Mont.  
*O. spiralis*, Mont.  
*O. scalaris*, Ph.  
*O. rufa*, Ph. (*l.*)  
*O. Scillæ*, Sc.  
*O. acicula*, Ph.  
*O. nitidissima*, Mont.  
*O. lactea*, L.  
*\*Eulima intermedia*, Cant. (*l.*)  
*E. distorta*, Desh. (*l.*)  
*E. bilineata*, Ald.  
*Natica Alderi*, Forbes (*l.*)  
*N. Montacuti*, Forbes.  
*\*Adeorbis imperspicuus*, Monts.  
*\*A. unisulcatus*, Chaster.  
*Lamellaria perspicua*, Mont. (*l.*)



Velutina lævigata, Penn. (l.)	D. purpurea, Mont.
Aporrhais pes-pellicani, L.	Pleurotoma costata, Don.
Trichotropis borealis, B. & S.	P. nebula, Mont.
Cerithium reticulatum, Da Cos.	P. rufa, Mont. (l.)
C. perversum, L.	P. turricula, Mont. (l.)
Cerithiopsis tubercularis, Mont.	Marginella lævis, Don.
Buccinum undatum, L. (l.)	Cypræa europæa, L. (l.)
Trophon truncatus, Str. (l.)	Cylichna cylindracea, Penn. (l.)
* var. alba, Jeff. (l.)	*C. nitidula, Lov.
T. barvicensis, Johnst. (l.)	Utriculus mammillatus, Ph.
T. muricatus, Mont. (l.)	U. truncatulus, Brug. (l.)
Fusus antiquus, L.	Bulla utriculus, Broc.
F. gracilis, Da Cos.	Philine angulata, Jeff.
Nassa incrassata, Str. (l.)	P. scabra, Müll. (l.)
Defrancia Leufroyi, Mich.	*P. nitida, Jeff. (l.)
D. linearis, Mont. (l.)	Spirialis retroversus, Flem.

**Lima elliptica**, Jeff.—I do not mark this as an addition to Mr. Præger's list, because the older writers did not separate it from *L. subauriculata*, Mont.

**Leda pusilla**, Jeff. (*Proc. Zool. Soc.*, 1879, p. 580, pl. xlvi, fig. 6).—A perfect though dead specimen and two valves, all of small size. The finding of this species in shallow water is of great interest, for though it occurred in the "Porcupine" Expedition dredgings of 1870, S. and S.W. of Ireland, the stations are all in deep water (257 to 690 fathoms) and are outside the southern limit assigned by the Rev. Canon Norman to the British area. It is therefore an addition to our fauna.

**Galeomma Turtoni**, Eds. (*Zool. Journ.*)—A broken valve was all that was found to represent this species.

This occurrence of this characteristically southern form so far north is remarkable, but it remains to be proved whether it still lives in the district, or is extinct. Professor G. O. Sars in the table appended to his "Bidrag til Kundskaben om Norges Arktiske Fauna" (*Mollusca regionis arcticæ Norvegiæ*) has included this species amongst those whose record in Norwegian waters rests upon good authority, though its rarity there is attested by the asterisk prefixed to the name, indicating that he has not himself met with it. A not unlikely explanation of its occurrence in these northern localities is that valves have been washed from some of the raised beaches. My late friend, Mr. David Robertson, notes an equally characteristically southern species—*Trochus lineatus*—as moderately common in the raised beach at Cumbrae (*Trans. Geol. Soc. of Glasgow*, 1875, pp. 195, 198). I have no opportunity of ascertaining whether *Galeomma* is known to occur in the raised beach at Portrush, or in others.

**Montacuta donacina**, Jeff.—Two valves from Church Bay. An excessively rare species. It was obtained by the "Porcupine" Expedition of 1869 in Lough Swilly, 3—13 fathoms.

**Homalogyra polyzona** (Brus. Mss.), Bucq., Dautz., & Dollf. (Moll. Mar. du Rousillon, p. 325, pl. 37, fig. 32). I have hesitatingly admitted this to rank as specifically distinct from *H. atomus*, Ph. Whether a variety or species it is an addition to our British fauna.

**Odostomia truncatula**, Jeff. One of our specimens, when carefully examined, is seen to contain the operculum and remains of the animal, thereby affording conclusive proof that the species still lives in the district. Like *Galeomma Turtoni*, it is known in the living state from southern localities only, and but for the observation just recorded it might be considered an equally doubtful denizen of the Antrim sea.

**Adeorbis imperspicuus**, Monterosato.

**Adeorbis unisulcatus**, Chaster. These two species have been generally overlooked owing to their microscopic size. The latter I have described and figured in the current number of the *Journal of Conchology*.

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## A PROPOSED GEOLOGICAL PHOTOGRAPHIC SURVEY OF THE COUNTIES OF DUBLIN AND WICKLOW.

BY PROF. GRENVILLE A. J. COLE, F.G.S.

Now that the excursion-season of the Dublin Naturalists' Field Club is about to open, it seems desirable to organise a photographic survey of the counties that lie nearest to our homes. Very little has been done in the way of recording the features of our wilder landscapes, or indeed of any district remote from Kingstown Pier, or the Esplanade at Bray. Mr. W. W. Watts, as Secretary of the Committee of the British Association in charge of Geological Photographs, has brought the matter home to us in a recent number of the *Geological Magazine*, where he points out the excellent work done in the north of Ireland, and remarks "that such districts as the Wicklow Mountains, the beautiful tract of Limerick, the areas of ancient rocks in Galway and Mayo, and the Carboniferous and Old Red Sandstone rocks of Kerry, are all, literally, awaiting development."

Mr. Welch is steadily setting matters right as regards Galway ; but there is much to be done nearer home. It will be all the better done if we can systematise and divide the work. The robust possessors of whole-plate cameras may select the nobler landscapes and the broad aspects of our mountain-contours ; while more lightly equipped artists may deal with this or that boulder, or with the details of important rock exposures.

A permanent series of prints, enlarged to a uniform size, and printed in platinum, may ultimately be formed ; and it is possible that the Dublin Field Club may be willing to give financial aid towards their production. Lantern-slides may also be prepared, and will form a valuable series for exhibition at the winter meetings. At present, Mr. Dowling has recorded the junction of granite and Ordovician rocks at Killiney ; Mr. Welch, the submerged forest-bed at Bray ; Mr. Preston, of Grantham, has a fine series of the promontory of Portrane ; and others doubtless exist, merely awaiting collection. For my own part, I have taken, in lantern-plate size only, fairly complete series of the Balrothery esker, and of the folded strata at Loughshinny. The latter still deserve the attention of any camera that can get at them.

I now write, through the *Irish Naturalist*, to ask for the help of any persons who would be willing to join in the projected survey. If such will be so good as to communicate with me at the Royal College of Science, Dublin, *before Friday, May 7th*, I can then call a meeting in Dublin for *Monday, May 10th*, at 5 p.m., at which we can form our plans and discuss the division of work for the coming outdoor season.

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## IRISH ANIMALS IN THE DUBLIN MUSEUM.

BY GEORGE H. CARPENTER, B.SC.

VISITORS to the Natural History Galleries in the Museum of Science and Art, Dublin, must have noticed, during the last few months, that extensive re-arrangements of the collections were in progress. Some may have wondered why such radical alterations were undertaken, considering, perhaps, that the old system was good enough. Others may have thought that the changes had no reason—unless to furnish innocent occupation for the museum staff. Now that the main features of the new scheme have been carried out, a short statement of the plan and object of the changes—especially as regards the collections of native animals—may be of interest to readers of the *Irish Naturalist*.

The Natural History building, situated to the south of Leinster Lawn, consists of a low-pitched, ground-floor storey, and a lofty upper hall surrounded by two galleries. In the former arrangement of the collections, which had lasted for several years, the south side of the ground-floor room was devoted to a collection illustrating the geographical distribution of animals, while the north side was occupied by collections both Irish and general, of fishes, amphibians, and reptiles. Upstairs, the centre of the floor of the hall was used for the general collection of mammals, while along either side were ranged table cases containing the general collection of invertebrates alternating occasionally with life-history groups of Irish birds; in cases against the north wall was the collection of Irish invertebrates (excepting insects), on the landing outside a collection of British mammals. Ascending to the lower of the two galleries the visitor found it entirely devoted to birds—an Irish and a general series. In the top gallery were displayed a set of British birds' eggs and nests and Irish, general, and economic collections of insects.

The incongruity of some of these arrangements was evident enough to the staff of the museum, but objection to the general upset involved in a radical change of plan, necessarily accompanied by the cessation of systematic work on specimens,

served to maintain a conservative policy for several years. The "noble discontent" which led to the present re-arrangement was due to Dr. P. L. Sclater who, after a visit to the Museum about two years ago, gave the officers the benefit of his free criticism and advice. He urged that the various groups of Irish animals, scattered about the building, should be gathered into the lower room, leaving the upper hall for the general zoological series. And he pointed out the objection to the juxtaposition on the floor of the upper hall of mammals and invertebrates.

The main outlines of the new scheme being settled, the details had to be thought out. The top gallery of the upper room has been allocated to the general invertebrates, and specimens are already in the cases, though the arrangement at present is incomplete. The lower gallery is to be devoted to the tunicates, lancelets, lampreys, fishes, amphibians, reptiles, and birds; the cases from which the Irish birds have been removed will shortly be filled with representatives of the lower vertebrate classes, while the general bird collection will be re-arranged, the series running in ascending instead of descending order. The floor of the upper room is given over entirely to the general collection of mammals, and the arrangement is now nearly complete. The large cases which formerly ran down the centre of the hall have been turned at right angles so as to stand transversely. Extra space and a more satisfactory series have thus been obtained; and the large skeletons and stuffed beasts, which formerly stood in the lower room and were worked into the geographical collection because there was no room for them upstairs, have now been brought up and placed in their proper zoological positions. It is hoped ultimately to show in wall-cases a set of mammalian skulls<sup>1</sup>. The cases on the landing, whence the British mammals have been removed, have to be used for storage purposes at present. It is intended to transfer to them the "History of Animals" collection (illustrating the factors of evolution) which for the present remains in the lower room, and also to form an

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<sup>1</sup> At present the Irish invertebrates have not all been removed from the wall-cases; it is necessary to keep them temporarily stored there until their new quarters downstairs are ready for their reception.

“index collection” to the whole animal kingdom. It will be seen that the general zoological series in the upper hall, under the new arrangement, runs regularly from the protozoa in the first case of the top gallery to the mammals on the floor.

The lower room has to be divided between the geographical distribution series and the new Irish collection. After much consideration it was decided to partition the room into three equal sections by placing transversely across it two pairs of tall cases, each pair set back to back. The eastern third of the room is for the geographical collection, the middle third for the Irish invertebrates, and the western end for the Irish vertebrates. The collections of Irish invertebrates are yet in process of formation, but the general scheme may be indicated. We will suppose a visitor has entered the Museum from Merrion-square; after passing through the geographical collection he enters the Irish invertebrate section by the eastern end. Here the southern wall-cases and window-cases will be devoted to the protozoa, sponges, hydroids, sea-anemones, corals, &c.; the worms, polyzoa, and brachiopods are already roughly arranged in the cross-case at the western end of the section. In the wall-cases and window-cases at the northern side will be shown the crustacea and in the eastern cross-case the arachnids, millipedes, and centipedes. Having thus walked around the Irish invertebrate section our visitor turns his attention to the floor-space, which is occupied by fifteen table-cases placed in five transverse rows; beginning at the east end, the first three rows are for the insects, the next row and a half for the molluscs, and the last half row for the echinoderms. The molluscs and echinoderms are already roughly arranged, and a few boxes of insects have been exhibited. It will be long before this section of the Museum really approaches completion, for so little is known of certain orders of Irish invertebrates. Some of the animals, such as the protozoa and the rotifers, on account of their small size, will have to be represented by coloured drawings, or glass models, as also the sea-anemones and nudibranch molluscs, spirit-specimens of which give but a poor idea of the living animals. It is hoped, however, that each year may be marked by additions and improvements to this collection, as more naturalists are found to turn their attention to imperfectly-known groups, and

collectors at the better-worked orders contribute specimens to fill gaps in the Museum series.

Passing from the western end of the invertebrate section, we enter the section devoted to the Irish vertebrates. The arrangement of these is already in a forward state. The series begins with the eastern window-case on the south side, where the lowest vertebrates—the tunicates and lancelet—are shown. At the end of the adjoining wall-case are the lampreys, and in the succeeding window wall-cases on the south, west, and north sides the fishes are exhibited. Most of the species are represented by coloured plaster-casts, which usually give a much more life-like result in the case of fish than either spirit—or stuffed specimens. Where spirit-specimens have to be shown, however, it is intended to substitute flat-faced cells for cylindrical jars, which always distort the object within. A fair number of fish, mounted in the flat cells and coloured by a new method in imitation of the natural hues of the living creature, are now exhibited, and form interesting and beautiful objects.

The birds are shown in tall table-cases ranged on the floor-space, the attractive life-history groups being inserted in their proper places. At present these table-cases stand lengthwise along the room, but it has been decided that a better light on the specimens would be obtained by turning them transversely, and this change will shortly be made. Maps showing the summer and winter range of each species are in preparation, and should prove instructive. In the wall-cases at the east end of the room the mammals are exhibited. It is necessary to be content with drawings of the different kinds of whales, on account of the great size of the specimens; but the visitor is told by labels that skeletons of certain Irish species are included in the general mammalian collection upstairs. One small side-case is given to the rodents, another to the insectivores and bats, while the large central case is occupied by the ungulates and carnivores.

In the lobby outside the lower room the large life-history group of Herring-gulls has long been a familiar object. Nests and eggs of Irish birds have now been placed in table-cases around this lobby, while photographs of nests in their natural surroundings have been hung on the walls. As this lobby

opens from the western end of the room, the collection of nests and eggs now closely adjoins the stuffed specimens of the birds.

The changes thus briefly described are meant to bring together in compact arrangement a series illustrating the present fauna of Ireland. And it is to be hoped that these collections of our native animals will serve a two-fold purpose—giving the casual visitor, whether native or stranger, some idea of the number and variety of living creatures which inhabit our country, and at the same time helping students of the various groups of Irish animals. It need not be pointed out how these students can re-act on the collections, and by their co-operation render them more worthy of our metropolitan museum.

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## CONTRIBUTIONS TO IRISH NATURAL HISTORY.

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**Proceedings of the Royal Irish Academy, 3rd series, vol. iv.,  
No. 1 (December, 1896).**

In this somewhat bulky number, there are several papers dealing especially with the Natural History of Ireland. Mr. R. Lloyd Praeger issues his "Report upon the Raised Beaches of the North-East of Ireland, with special reference to their Fauna" (pp. 30-54, and Plate I.) He thus completes his examination of the beds that fringe the coast, having given us, five years ago, a memorable series of observations on the "Estuarine Clays" of the same area. It is interesting to note that Mr. Praeger supports, on the whole, Prof. Hull's statement as to the increase of elevation above the sea in the raised beaches as we go northward. The beaches rest upon the marine clay, which probably runs down all the eastern coast; and the spots specially examined are Greenore, Carlingford, Greencastle (opposite Greenore), Killough, Sandeel Bay, Ballyholme Bay, Carnalea, The Kinnegar (Holywood), West Bank (Belfast Lough), Kilroot, and Larne. Records of the fauna, so far as known, are quoted, in most cases from personal observation. Indeed, it is only at Kilroot and Larne that the author has been able to glean much in this matter from previously published memoirs. Some of the deposits commonly known as "raised beaches" are, it is pointed out, in reality raised sea-banks, such as the Kinnegar and the Curran of Larne.



On pp. 45 and 46, there is a valuable table for the comparison of the faunas from successive horizons, viz.: the Glacial beds, the Estuarine Clays, the Raised Beaches, and the present sea. From this it is shown that the Ballyrudder gravels and the boulder-clays, forming the base of the series under consideration, have a northern character, the Ballyrudder deposit being practically Arctic. The fauna of the Estuarine Clay and of the Raised Beaches is, on the other hand, "distinctly southern"; while the existing sea contains a mixture in which northern forms slightly preponderate. As an example of the care with which this portion of the subject is followed out, we may quote the statement that the recent change of fauna has been brought about "by the extinction of southern forms rather than by the immigration of northern ones. . . . Some of the shells . . . which have now forsaken the north-eastern shores, or show a striking diminution in numbers, still flourish in the milder climate of Donegal, which is actually further to the northward; while, on the other side, their line of retreat has been down the east coast towards Dublin."

Among these emigrants at the close of the Estuarine Clay epoch, we may note *Scrobicularia piperata* and *Tapes decussatus*, which are common generally round Ireland, but absent from Lough Swilly to Carlingford Lough; *Gastrana fragilis*, mainly a southern and western form; and *Rissoa albella*, which is very abundant in the estuarine clays, but is now found in Ireland only at Bantry Bay. The Raised Beaches similarly contain shells that are now confined to the south and west.

This important paper concludes with a summary of the local climatic changes of Post-Pliocene times, and with a bibliography of the papers utilised.

On p. 61 of this number of the Proceedings, Mr. Henry H. Dixon writes "On the Osmotic Pressure in the cells of leaves," in continuation of his well-known work on the mode of elevation of the sap; but this paper belongs to general botany, and we can only call attention to it here.

On pp. 74—III., Dr. C. R. Browne describes "The Ethnography of Ballycroy, County Mayo," a district selected for the field-work of the Anthropological Laboratory of Trinity College during 1896. This district is peopled by tribes which left Tirconnell more than two centuries ago, and O'Donovan has recorded that the inhabitants were in his time still spoken of by their neighbours as "the Ulstermen." Dr. Browne refers the immigration to 1640 A.D., and shows that the physical differences separating the folk of Ballycroy from those of the rest of Erris are mainly "noticeable in the casts of features and darker nigrescence than in their physical proportions." He finds no justification whatever for the statement, often repeated, that the immigrants from Ulster, dispossessed by the English, have become reduced in stature and altogether physically degraded by their struggle with the "bad lands" of Mayo (p. 80). The present study will gain in value when a number of similar patient observations have been published, and when Prof. Haddon and

Dr. Browne are prepared to base generalizations upon the long series of enquiries that they have set before themselves. It affords yet another example of their systematic methods of research, by which the Irish peasant is approached, in his past environment, in his present needs, and in his beliefs and aspirations, from a position devoid of prejudice, bias, or misguiding sentiment. May we hope that, in the course of time, ethnographic considerations may be allowed due weight in apportioning public praise or blame, and in reading the bitter book of history? At the present time, however, it must be granted that such papers have an essential vein of humour, due to the novelty of regarding our neighbours as objects of Irish Natural history.

On p. 112, Mr. D. M'Ardle describes "Additions to the Hepaticæ of the Hill of Howth, with a table showing the geographical distribution of all the species known to grow there." The author discovered *Jungermania attenuata* at Howth in 1893, the first record of the plant in Ireland; and he has now added nineteen species to his list previously published. Fourteen of these are new records also for the county. *Cephalosia Francisci* is a second liverwort not yet recorded from any other part of Ireland.

The geographical table is suggestive, to an outsider, of the wide distribution of almost all species of liverworts. As the author points out, Howth compares most closely with Yorkshire; but we may suspect that the gaps in the series from the Pyrenees, Scandinavia, France, and Germany, are due to the fact that Mr. M'Ardle, unlike the historic bird, cannot be in all these places at once, and that Ireland is likely for some time to afford him a field of continual discovery and delight.

GRENVILLE A. J. COLE.

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## NOTES.

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Our warm congratulations to Prof. Sollas on his appointment to the Chair of Geology at Oxford. But he will be much missed by his many Irish friends, and Irish Geology will be a heavy loser by his departure. Another appointment which arouses similar feelings is that of Dr. A. Francis Dixon, Senior Demonstrator of Anatomy in Trinity College, to the Professorship of Anatomy at the University College, Cardiff.

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### BOTANY.

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#### *PHANEROGAMS.*

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##### **Dryas octopetala in Co. Antrim.**

At the March meeting of the Belfast Field Club, Rev. H. W. Lett exhibited specimens of *Dryas octopetala* gathered last November at Sallagh Braes, remarking that his search for it was undertaken in consequence of the comment which we made on his note on this plant published in the

"Journal of Botany" for August last. We are much pleased that our remarks have had the effect which we desired, of settling the question of the occurrence of the Mountain Avens in Co. Antrim; and we heartily congratulate Mr. Lett on adding this interesting Alpine to the local flora.

#### **The Record of *Callitriche truncata* in Co. Cork.**

One of the localities given for this species in Babington's Manual, ed. VII. and VIII. is Glansiskin, Co. Cork, but we do not know of any other record of its occurrence in Ireland. Mr. Scully recently sent us a *Callitriche* from the late Mr. A. G. More's herbarium, collected at Glansiskin, which was supposed to be the plant, but upon examination we found it to be *C. hamulata*. By the kindness of Professor Marshall Ward we have since had the opportunity of examining the specimen in the Cambridge Herbarium, collected by Mr. J. Carroll at Glansiskin, and labelled *C. truncata* by Professor Babington, and this also proved to be *C. hamulata*. There does not therefore appear to be any evidence that *C. truncata* is an Irish plant. It is, however, quite likely that it may yet be found on the South or West, inasmuch as it occurs in the South of England, Guernsey, and the West of France.

H. & J. GROVES.

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#### ZOOLOGY.

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#### INSECTS.

#### **Supposed Occurrence of American Beetles in Ireland.**

I have sent a note to the *Entomologists' Monthly Magazine* to record the fact that in an Ash-tree which was being cut up in the yard of Messrs. Bass and Co., Burton-on-Trent, were numerous larvæ and a few perfect specimens of two North American longicorns, viz., *Neoclytus caprea*, Say., and *N. erythrocephalus*, Fab. As this tree was stated to have been felled at Carrick-on-Suir, it might be worth the while of any one collecting in that district to search for other specimens.

PHILIP B. MASON.

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#### AMPHIBIANS.

#### **The Frog in Ireland.**

As an argument for the comparatively recent introduction of the Frog, I can state that the natives of Cape Clear say it is unknown there, and in four or five excursions to that island in various years I have failed to find a trace of it in any stage, though there are very suitable localities for it to breed in. I wonder if it is absent from our other islands, all of which have, I suppose, been detached from Ireland more recently than Ireland from Great Britain.

JOHN J. WOLFE.

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 BIRDS.
 

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**Spring Migrants in Co. Cork.**

Sand Martins were flying about on April 2nd—this is just one day earlier than I have ever seen them before. I have not yet seen Swallows, but a friend, on whose correctness I rely, told me he saw two flying about his garden every day from March 22nd to 26th inclusive, he has not seen them since. I have never seen them in March, and it seems strange that this remarkably wild wet March should bring them and the Martins earlier than usual.

JOHN J. WOLFE.

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**Iceland Gull (*Larus leucopterus*) at Londonderry.**

On 24th February I saw an immature specimen of this species flying about with other gulls at Derry Quay. In the distance it looked like a very light coloured young Herring Gull, but when it came within twenty yards or so, the entire dull, creamy, white plumage and the white tail without bar at end, showed to what species it belonged.

D. C. CAMPBELL.

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 MAMMALS.
 

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**Irish Bats.**

Mr. Kane's interesting communication (p. 88) has led me to refer to my manuscript notes, and I find that, by some accident, not only did I omit his capture of *V. Nattereri* in Co. Galway, but also a record of the same species from Castlefreke, Co. Cork (see J. Ffolliott-Darling, *Zoologist*, 1883, p. 294), although both were entered in my original notes. The reference at bottom of p. 37 in my paper, to *Zoologist*, 1893, p. 294, should be *Zoologist*, 1883, p. 294. I regret that these mistakes escaped my notice when correcting proofs.

H. LYSTER JAMESON.

As Westmeath is excluded from Mr. Jameson's list of counties in which the Hairy-armed Bat (*Vesperugo Leisleri*) occurs, it may be of interest to state that the late Mr. A. G. More identified a bat of this species captured in a bedroom at Cromlyn, Westmeath, on the 16th of November, 1894. A memorandum of the fact is among Mr. More's papers, now in the possession of his sister, with whose consent I forward this note. The specimen was probably one of the last submitted for identification to the distinguished naturalist who had been for so many years the chief authority on the Fauna and Flora of Ireland.

C. B. MOFFAT.

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## PROCEEDINGS OF IRISH SOCIETIES.

## ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of white Guinea-fowl from Mr. J. Da'y, and two Diana Monkeys from Captain R. Irvine.

8,761 persons visited the Gardens in March.

## DUBLIN MICROSCOPICAL CLUB.

MARCH 18.—The Club met at the house of Prof. G. A. J. COLE, who showed a section of volcanic ash from Montrose, Jamaica, containing a fragment of granite, doubtless exploded upward from some fundamental series through which the andesitic lavas broke. The specimen was furnished by the Institute of Jamaica.

Mr. F. W. MOORE showed *Nectria lagena*, Masee, a new species of *Nectria*, exhibited for the first time. It was found growing on a pseudo-bulb of *Odontoglossum Oerstedtii*, a native of Costa-Rica, cultivated in the cool Orchid house at Glasnevin. The plant had been in cultivation for several years, and hitherto this *Nectria* had not been found on it; in fact all the imported pseudo-bulbs had decayed away, and *Nectria lagena* was found growing on one which had been formed by the plant in its present quarters. It is a pretty and distinct species, of a bright orange red colour.

Mr. GREENWOOD PIM showed *Hysteroglyphium Fraxini*, an interesting fungus growing usually on dead ash twigs. The spores were olive yellow, with numerous septa, both longitudinal and transverse, producing the structure called "muricate," from its similarity to masonry.

Mr. M'ARDLE exhibited the cell structure and plants of *Adelanthus decepiens*, Hook., which he found on the shores of Lough Guitane, a new Kerry station, when collecting for the Flora and Fauna Committee of the Royal Irish Academy in November, 1893. The plant is one of the remarkable instances of a Hepatic common to Ireland, the West Indies, and the Andes of South America.

Dr. C. HERBERT HURST exhibited Edinger's Projection Apparatus made by Leitz. The light from a paraffin lamp after passing through a large condenser is reflected vertically downwards through a second condenser upon the microscopical slide, the second condenser being adjustable so as to concentrate the light upon just so much of the object as it is desired to "project." A second stage supports the projecting lens under the object, and the image is received on a white card below.

The utility of the apparatus for purposes of demonstration is very great, and with more powerful illumination it could be used even with very high magnification, as ordinary microscopical objectives may be used with advantage in place of the projecting lenses supplied with the apparatus. In its present form, however, the apparatus has some serious defects. It lacks rigidity, and the image is consequently displaced on

the card every time the projecting-lens is focussed—thus robbing the apparatus of its utility as a substitute for the camera lucida. The focussing pinion, moreover, moves the lens instead of the object, and every movement of it thus alters the magnification. No provision is made for holding an ordinary microscopical objective, and the lenses supplied, however good they may be for other purposes, are not projection-lenses and will only produce a sharp image of a small part of a flat object at a time—the result being that one hand has to be kept on the focussing-head during the whole time of demonstration unless the object be a very small one.

All these defects could easily be remedied without any great increase of the remarkably low price of the apparatus. The needs are:—Heavier and more rigid supports for stage and substage; rack and pinion adjustment to the stage instead of to the substage; an “adapter” to hold ordinary objectives; a better device for focussing the second condenser; a “tent” of black velvet or other opaque material to make the apparatus available in daylight.

Professor T. JOHNSON exhibited a preparation of *Ectocarpus pusillus*, Griff., a brown alga from Helvick Point (Dungarvan Bay) collected last October. The preparation showed plurilocular sporangia containing large non-motile spores, as discovered by Dr. Bornet whose illustrations were shown. The species is an addition to the Irish marine flora, made by Miss Knowles and the exhibitor.

Mr. W. N. ALLEN showed micrographs of several corallinaceæ.

Mr. G. H. CARPENTER showed *Aepophilus Bonnairei*, Sign., an interesting little marine wingless bug found beneath a stone between tide marks by Mr. A. R. Nichols, when collecting mollusca on the shore at Dungarvan, Co. Waterford, in September last. Recorded from the coast of Devon, Cornwall, the Channel Islands, and north-western France, its occurrence on the southern Irish shore might have been expected.

Mr. H. H. DIXON showed sections illustrating the second mitosis in the embryo-sac of *Lilium longiflorum*. The nuclear plate of the lower nucleus is formed of short straight chromosomes and in this respect resembles a heterotype division. The longitudinal fission of the chromosomes, however, conforms to the normal type and is simple. The V-shaped daughter chromosomes are not formed.

Mr. Dixon also exhibited sections of *Codium tomentosum* showing the numerous small nuclei of the cœnocyte and a peculiar central column of some cellulose-like substance lying in the axes of the branches of the cœnocyte.

Mr. J. N. HALBERT exhibited the female of a minute Hemipteron *Microphysa elegantula*, Bær., taken on old lichen-covered Blackthorns (*Prunus communis*) at Clonbrock, Co. Galway. The genus is remarkable for the striking dissimilarity of the sexes. *M. elegantula* being chiefly characterised by the extreme rudimentary condition of the elytra, which in the female, do not project beyond the base of the abdomen. The species seems to be very local this being the second record of its occurrence in Ireland.

## BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 6.—A lecture was delivered by Mr. Ernest W. MacBride, M.A., of Cambridge, on "Starfish and Sea Urchins: their Haunts, Habits, and History."

## BELFAST NATURALISTS' FIELD CLUB.

MARCH 16.—MR. WILLIAM GRAY, M.R.I.A., in the chair. The secretary was called on to read a short paper by Rev. H. W. Lett, A.M., on the "Re-discovery of the plant *Dryas octopetala* in County Antrim." Mr. Lett said that he brought the communication before the Club, as his discovery of the plant had been doubted. He had come across it in 1886, but owing to his being hard at work on mosses at the time it had escaped his memory until he turned it up in his herbarium. On publishing the circumstance the editors of the *Irish Naturalist* remarked that the record was not sufficiently authenticated. Mr. Lett, therefore, took the earliest opportunity of visiting the place on Sallagh Braes last November, where he found the plant still flourishing. The original specimen and also the 1896 one were placed on the table for inspection. Remarking on Mr. Lett's paper, Mr. S. A. Stewart said that if the editors of the *Irish Naturalist* had been somewhat sceptical about the discovery, it was only in order to ensure the most absolute accuracy, and their remarks had had the effect of placing the record beyond question by anyone. He heartily congratulated Mr. Lett on adding this interesting plant to our local flora. Mr. Gray then called on Mr. M'Cleery to read his paper on "An Evening with the Microscope." The paper, which was fully illustrated by a large number of lantern-slides, began by describing the action of the instrument itself and its parts, several photographs of typical microscopes being shown. The process of photo-micrography was also explained by means of lantern-slides. Mr. M'Cleery then proceeded to show a long series of beautiful slides made by Messrs. Donaldson, Firth, Stelfox, Welch, Gray, and by himself of various insects and their parts, such as flies, gnats, parasites of animals, eggs of butterflies, bees, wasps; also diatoms, foraminifera, and other objects, describing each slide and the reason it was shown. It was intended only to give the uninitiated some idea of the vast and beautiful field of work that lay before them, how varied it was, and with what ease it might be studied, and his object would be attained if he could induce someone to take up this fascinating study.

GEOLOGICAL SECTION, FEBRUARY 24.—The geological section met to see Mr. H. J. Seymour's demonstration of the admirable capabilities of the rock-slicing machine just presented to the Club by Messrs. Combe, Barbour & Combe. Thin slices of granites and other igneous rocks were successfully cut, and a thorough explanation of the methods of grinding and mounting rock-sections was given by Mr. Seymour. Arrangements for the forthcoming courses of petrology and field geology, and for a

large public lecture on "The Building of Ireland" by Prof. Cole, were also completed. A report on the raised beaches of the North-east of Ireland (*R. I. A. Proc.*), by Mr. R. L. Praeger, and specimens of granites from Shap and the Ross of Mull, from Mr. J. O. Campbell, were presented.

MARCH 6.—The beautiful weather favoured the geological members of the Club in an excursion over Squire's Hill. Winding round by the Horseshoe Road the "Black Quarry" was first visited; many specimens of basalt with stilbite, natrolite, apophyllite, chabasite, and other zeolites were obtained. Another quarry yielded biotite-pyroxene dolerite, and in a third much interest was aroused by some curious green masses believed to be the so-called "hullite" in a condition of decomposition differing from the well-known Carnmoney specimens. The party descended by the picturesque old Crumlin-road, enjoying the view of Lough Neagh sleeping in the evening light. Afternoon tea with Mr. and Mrs. Woodward at St. Mark's Vicarage terminated a successful excursion.

BOTANICAL SECTION. APRIL 10.—The Rev. H. W. Lett gave a lecture on Grasses and Sedges introductory to the study of this interesting but difficult class of plants. It was well illustrated by an extensive set of specimens from his own herbarium.

#### DUBLIN NATURALISTS' FIELD CLUB.

MARCH 9TH.—The President (Prof. COLE, F.G.S.) in the chair. Mr. GREENWOOD PIM, F.L.S., read a paper entitled "Strange animals, old and new," illustrated by lantern slides he had made from plates in a 17th century natural history book (Johnson's "Historia Naturalis") and from the recently published Royal Natural History of Lydekker. The paper illustrated the advisability of keeping an open mind as to the kind of animal that could or not exist and the necessity of careful observation of the actual specimens for accurate illustration.

The Secretary (Prof. T. JOHNSON, D.Sc.), read a paper by Miss M. C. KNOWLES and himself on Seaweeds from the S.E. of Ireland. Early in October Mr. Nichols and the Secretary went for a week to Dungarvan and district to collect marine shells and algæ on behalf of the Royal Irish Academy Flora and Fauna Committee. Their work was much facilitated by the arrangements made by R. J. Ussher, J.P., of Cappagh, and Mr. Symmonds of Dungarvan. The week, that in which the Daunt's Rock Lightship went down, was one of gales and rainstorms, and dredging was carried on under difficulties. The paper was devoted to the results of the investigation by Miss Knowles and the Secretary of the sea-weeds collected. In addition to a number of common species 90 species have been so far identified of which the more interesting are *Dermocarpa prasina*, *Spirulina subsalsa*, *Hyella caspitosa*, *Mastigocoleus testarum*, *Chlorochytrium inclusum*, *Bolbocoleon piliferum*, *Epicladia Flustræ*, *Entoderma viride*, *Halicystis ovalis*, *Gomontia polyrhiza*, *Streblonema velutinum*, *S. solitarium*,



*S. luteolum*, *S. minimum*, *S. reptans*, and two other species one of which is, and the other may be, according to Sauvageau, new to science; ten species of *Ectocarpus*, *Aglaosonia reptans*, *Gomiotrichum elegans*, *Chorescolax Polysiphonia*, *Gigartina acicularis*, *Nitophyllum reptans*, *Rhodochorton membranaceum*, and several species of *Melobesia*. The paper was illustrated by lantern and by microscopic slides and specimens. The Secretary expressed his high appreciation of the devoted way in which Miss M. Knowles had carried on the examination of the seaweeds from Dungarvan Bay.

The following were elected members:—Miss Barnard, Miss Cragg, Mrs. Deaker, Miss Longford, W. H. MacM. Phelan, J. Trumbell, Miss Wann.

Miss Devenish sent for exhibition fruits of *Trapa bicornis*.

APRIL 13.—The President (PROF. COLE, F.G.S.) in the chair. Dr. C. J. PATTEN gave an interesting paper on the Ornithological fauna of Dublin Bay, with numerous lantern illustrations. Dr. Patten gave a list of fifty-six kinds of birds observed, accompanied by natural history notes. The paper dealt more especially with the wading birds, their gregarious swift-flying, migratory habits, and associated structural adaptations being noted. Prof. Cole and Messrs. Dowling, Palmer, Knox, and E. Williams, spoke on the paper.

Mr. A. R. NICHOLS, B.A., read a paper on the Recent Mollusca of Ireland. The paper was fully illustrated by specimens and lantern slides. The structure and general classification of the Mollusca were considered, special attention being called to the Irish representatives of the different groups. The distribution of the Irish Marine Molluscs was also described, the sea-shore at Portmarnock and Malahide being noted as rich localities.

Dr. A. H. FOORD, F.G.S., whose illness prevented his attendance, sent for exhibition a specimen of a unique spine-bearing fossil nautilus, collected by himself in the Clane quarries, Co. Kildare. Mr. NEALE sent for exhibition a lantern slide of a Porbeagle shark taken in a fishing net, off Slea Head, Co. Kerry. Mr. J. G. ROBERTSON exhibited a fossil fish from the Kilkenny coalfields. Prof. Cole invited photographic members of the Club to join in an attempt to make a photographic survey of Co. Wicklow (see page 125), on the lines adopted by a British Association Committee for the United Kingdom in general. The attention of the meeting was called to the collection of beautiful illustrations of Irish Crosses, made by Miss Margaret Stokes. Five members were elected, as follows:—H. Powell, Miss Campbell, Brigade-Surgeon J. Kelly, Miss McCarthy, W. H. Lee (transferred). Three candidates were nominated for election.

## BOG-BURSTS, WITH SPECIAL REFERENCE TO THE RECENT DISASTER IN CO. KERRY.

BY R. LLOYD PRÆGER, B.E.

[Read before the Dublin Naturalists' Field Club, 9th February, 1897.]

IN the early hours of the morning of 28th December, 1896, the Knocknageeha bog, situated at the head of the Ownacree valley, seven miles N.N.E. of Headford, near Killarney, burst, and discharged a fluid mass, which, pouring down the valley of the Ownacree, devastated the surrounding country in its course.

Without loss of time the Royal Dublin Society appointed a committee, consisting of Professor W. J. Sollas, Dr. A. F. Dixon, Mr. A. D. Delap, and myself, to investigate and to report on the phenomenon. The Committee left Dublin on the afternoon of Friday, January 2nd, and devoted the following three days to the work.

Our report was presented to the Society on 20th January. This evening I can best bring the subject under your notice by reading extracts from that report, and exhibiting on the screen maps and sections of the place, and photographs taken by Dr. Dixon, adding such comments as may be necessary for their elucidation.

A dry summer had been followed by a wet autumn, and, about nightfall on December 27th, a heavy downpour of rain set in, accompanied by a south-easterly gale. Somewhere between two and three o'clock the following morning, the edge of the bog, which overlooks the Ownacree valley, gave way, and liberated a vast flood of peat and water. There was no immediate warning of the catastrophe, and no one witnessed the actual rupture.

Although the outburst was clearly not instantaneous, it evidently proceeded with great rapidity, as is witnessed by the circumstances of a lamentable loss of life. The bog gave way along the line of a turf-cutting from 4 to 10 feet deep, parallel

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<sup>3</sup>The Report of the Committee will be found in *Scientific Proceedings, R.D.S.*, vol. viii. (n.s.), part v., No. 57. The illustrations which accompany the present paper are taken from this Report, by kind permission of the Royal Dublin Society.

to which, and about 300 yards below it, runs the Kingwilliams-town road. A small stream, coming from the bog, passes under this road. Close by this stream, on the lower side of the road, was situated the house of Cornelius Donnelly, Lord Kenmare's quarry steward; it was of the ordinary type, of one storey, with walls of rubble masonry and a thatched roof; it stood about 12 feet below the level of the road, and at a short distance from it, the intervening space being occupied by a garden. The house was entirely swept away; Cornelius Donnelly, his wife, and family of six children all perished; the bodies of some of them, and those of their live-stock, together with articles of furniture, were carried down the valley, and were found at various points along the course of the flood, a portion of one of the beds being picked up, a few days later, in the Lake of Killarney—fourteen miles away. From the fact that the whole family perished, and that those bodies which were recovered were without clothing, it would appear that the rapidity with which the flood rose was so great as to afford them no chance of escape.

After bursting from the face of the turf-cutting already mentioned, the first obstacle the flood encountered was the road leading to Kingwilliamstown; it overwhelmed this for a width of a quarter of a mile, and continued its course to the road to Killarney, a short distance below, pouring, as it passed, a small cataract of mud into the old quarry at the cross-roads. The Carraundalkeen, a small streamlet, tributary to the Ownacree, passes under the Killarney road, through a culvert about 8 feet by 5 feet; this was speedily blocked with masses of turf, and the rising flood poured across the road, carrying away the tall hedges on both sides that stood in its course on its eastern side. On both this and the Kingwilliams-town road huge masses of the more coherent upper crust of the bog were left stranded. A short distance further down, on the northern side of the Carraundulkeen valley, is situated a valuable limestone quarry, which the flood filled to a depth of 15 or 20 feet; as it impinged on the lower corner of the entrance, it surged up in a great wave 3 or 4 feet above the highest level within the quarry, which is marked as a horizontal line along the quarry walls. Beyond the quarry it continued down the valley for a straight run of three-quarters of a mile, to enter, almost at right angles, the valley of the

Ownacree or Quagmire river. Checked, as it encountered the opposing side of this valley, the flood rose along its middle line, where its velocity was greatest, 8 feet above its sides. A small cottage stands near by, and its floor is 5 feet below the maximum height of the flood. It owes its escape to the fact that it is situated about 100 yards on one side of the middle line of the flow. After entering the main valley, the flood continued its career for a mile and a half to Annagh Bridge, where the Ownacree meanders through flat bog and meadows. These, and the road which crosses the bridge, were inundated, and the muddy fluid broadened out into a black lake, half a mile in length by 600 yards in breadth. A breach was made in the road close beside the bridge. On the margin of the submerged flat stands the cottage of Jeremiah Lyne; he and his family had a narrow escape. The flood, in its downward course, encountered the back of the cottage, and rose against it 5 feet, sweeping two haycocks, which stood behind the house, round to the gable. The family were awakened by water pouring in. They were unable to unbar the door owing to the pressure of 3 feet of fluid, and escaped by climbing through the window and wading to higher ground.

Below Annagh Bridge, the force of the flood was less felt. At Barraduff Bridge, "Six-mile Bridge" of the Ordnance map, where the Ownacree joins the Beheenagh river, the Ownacree is 20 feet wide, and the flood rose 8 feet; below the junction the stream is 30 to 50 feet wide, and the flood rose 6 feet; at Six-mile Bridge it rose to the top of the arches, 10 feet above its normal level; at the bridge two miles below Headford, the level of the flood was about 4 feet above the stream, and finally at Flesk Bridge, near the Lake of Killarney, one foot.

The flood attained its maximum height during its first great outburst in the dark hours of Monday morning. At daybreak, the roaring flood of black fluid, bearing on its surface huge masses of the lighter crust of the bog, had already become confined to the central portions of the valley, but still ran across the road and over the site of Donnelly's house. The flow, which continued with constantly diminishing violence for the whole of Monday, was not regular, but intermittent,

swelling and diminishing as fresh portions of the bog gave way, and slid downwards into the torrent. Every fresh outburst was accompanied by loud noises, likened by bystanders to the booming of big guns or the rumbling of thunder. Over the sides of the valley the settlement of the peaty part of the fluid had already taken place, and, as drainage continued, it increased somewhat in consistency. The disruption of masses of bog continued at intervals down to Friday, January 1st. When we visited the scene on Saturday, January 2nd, the flow had lost its torrential character, but a turbid stream, many times increased beyond its usual volume, occupied the river bed. Mr. James Barbour, who visited the place on Saturday, January 8th, reports that one could then have stepped across the stream, so that by this time it must have shrunk to nearly its usual size.

The district in which the bog is situated forms the southern portion of a high and undulating area of Coal-measures, generally bog-covered, and attaining a height of over 1200 feet, some miles to the north-west. That part of the bog in which the outburst took place is about 750 feet above the sea; it forms the watershed, and drains eastwards into the river Blackwater, and west into the Ownacree. To the north-east the bog descends in a gentle slope towards the Tooreencahill stream, a branch of the Blackwater; to the north-west towards the main branch of the Ownacree, and westward towards the Carraundulkeen streamlet, into which it burst. Judging from the size of the valley in which this branch flows, it would appear that the greater part of the bog drained into the last-mentioned stream. At the inquest evidence was given that a "wet vein" existed in the bog continuing the direction of this stream. It is of interest to observe that the bog rests partly on Coal-measures, and partly on Carboniferous limestone, which is brought up by an anticlinal, and separated from the Coal-measures by a fault, which runs for some miles east and west, through the very middle of that part of the bog, which lies adjacent to the outburst.

The bog, like most others, possessed a convex surface; it extended in three arms, which sloped downwards in the three directions of drainage already specified. In all other directions it is bounded by gently rising cultivated land. It was not

drained by any superficial streams, nor was any large amount of water discharged at any point from beneath. The "wet vein" already mentioned was evidently a line of drainage.

The peasantry state that the surface of the bog was exceptionally soft; they admit, however, they could walk across it in the middle of winter. The flora of the bog shows that it was no wetter than bogs usually are. The plants which form its surface are members of the normal bog-flora. The vegetation consists of a tangle of *Calluna Erica* (Ling), *Erica Tetralix* (Cross-leaved Heath), *Narthecium Ossifragum* (Bog Asphodel), *Scirpus cespitosus* (Club-rush), and *Molinia varia* (Purple Melic grass), with the usual abundant undergrowth of bog-mosses, of which *Sphagnum rubellum* is the prevailing species, while *S. cuspidatum*, var. *plumosum*, fills the numerous shallow pools, which, as usual, were scattered over the surface. Tufts of the moss *Racomitrium lanuginosum* were frequent, and the lichen *Cladonia rangiferina* (Reindeer moss) was abundant, mixed with the hepatic *Pleurozia cochleariformis*. The above list furnishes satisfactory evidence that the surface of the bog was not unusually wet; indeed, the plants characteristic of wet bogs, such as *Andromeda polifolia* and *Schollera Oxycoccus* (Cranberry), though searched for, were not to be found.

The bog had been cut for turf in two places—on the north-eastern slope, which faces towards the Blackwater, where the cuttings were of no great extent; and along the western edge, where, as already stated, they formed an irregular line, running parallel to the Kingwilliamstown road. It was from the latter cuttings that much of the local fuel was obtained.

This cutting does not appear to have been judiciously planned, except at the southern end, where it extended in wedge-shaped gashes into the bog; but for the rest of the distance it was cut in an irregular line, transverse to the line of drainage.

An evidently faithful description of the bog, as it existed in 1811, is given by Mr. Nimmo<sup>1</sup> in his account of the bogs of Kerry and Cork.

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<sup>1</sup> Appendix to Fourth Report of the Commissioners appointed to inquire into the nature and extent of the several bogs in Ireland, and the practicability of draining and cultivating them: ordered by the House of Commons to be printed 28th April, 1814, p. 84.

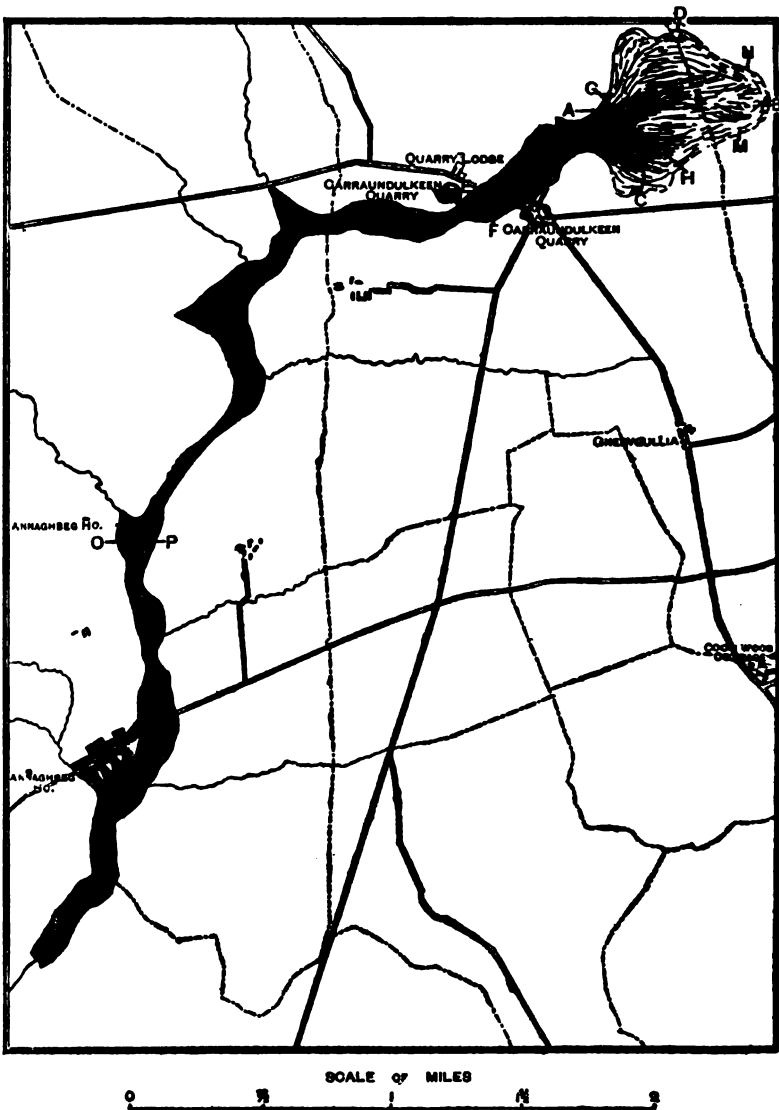


FIG. 1.

Map showing the subsided portion of the bog, and the area over which peat has been deposited in the valley of the Ownacree. The letters A to P indicate the directions in which the sections shown in figs. 2 and 3 were taken.

Under the estimate of the cost of a scheme for draining the bog, we find the following interesting item:—"Two cuts into a swamp on the summit, 304 perches at 3s. 6d., £53 4s."

Mr. Leonard, Lord Kenmare's agent, states that on visiting the bog at mid-day on Monday, about eight hours after the outburst, its surface for about a mile above the site of the turf-cutting was no longer convex but level. As the escape of fluid material continued, the surface correspondingly sank, till a shallow saucer-shaped depression was formed, opening by a narrow trough into the Carraundulkeen stream. At each side of the mouth of this trough there could still be seen the undisturbed ends of the turf-cutting; the central portion, for the width of a furlong, had disappeared. Looking eastwards from this point, a wide, broad valley appeared to extend upwards into the bog. On January 2nd, when we saw it, this depression was 7 furlongs in length by 5 furlongs wide, with a maximum depth of 28 feet. From careful inquiries it would appear that the former elevation of the centre of the bog above the undisturbed edge of the depression was about 7 feet, so that the total subsidence amounted to no less than 35 feet. The margin of this collapsed portion of the bog was clearly marked, so that we had no difficulty in tracing it on the 6-inch map. The slope near the side was comparatively steep, lessening towards the middle; the steep margin was marked by concentric fissures, which, when of sufficient width, were occupied by great masses of "sludge" which had risen from below. Near the margin, the area of these crevasses, as compared with that of the still remaining upper surface, was about 1 : 3; the proportion increased to about 2 : 1 near the centre, where also the fissures were no longer concentric, owing to the fact that a definite flow of the whole mass of the bog had taken place down the valley. Over the two areas marked on the map by close parallel lines, the surface had entirely disappeared. Walking round the margin of the depressed area, it was observed that, in addition to those portions which originally sloped towards the Ownacree, other adjoining areas, which previously had sloped towards the east and north, had shared in the general subsidence, and now formed a part of the newly-formed valley which we have described as opening to the westward through the former turf-cutting.



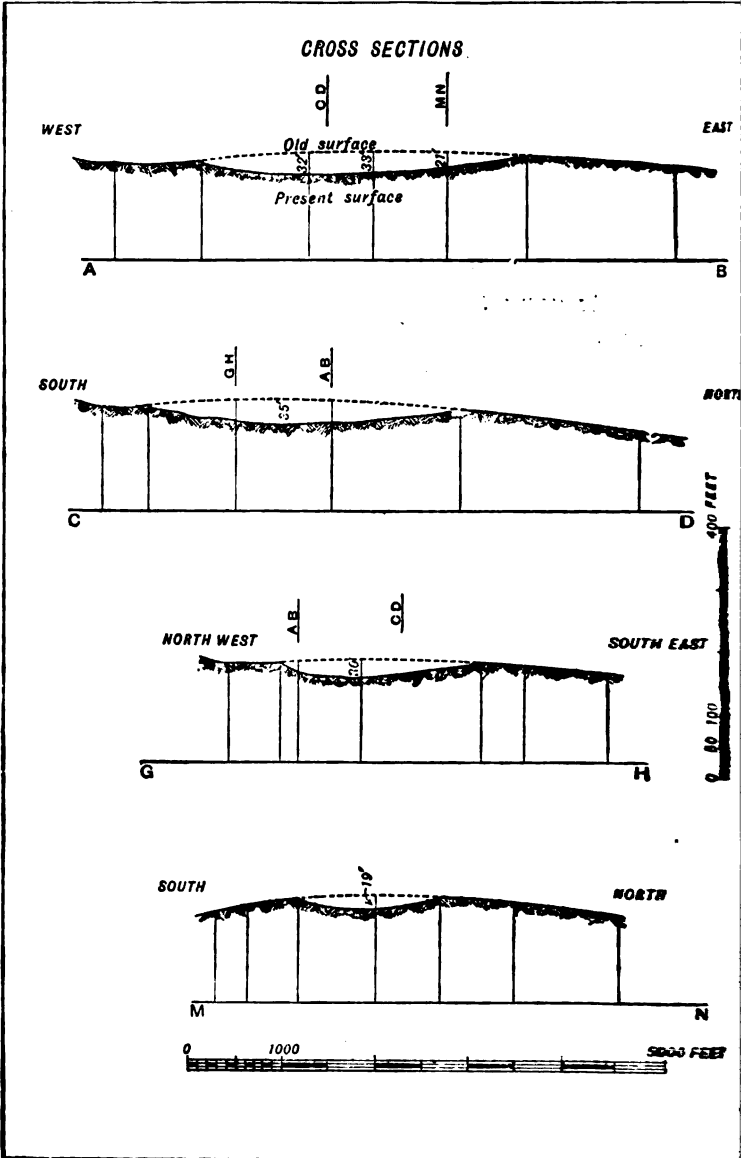


FIG. 2.

Sections through the bog of Knocknageeha. Vertical scale, 6 to the horizontal.

This curious feature will be clearly seen from the sections of the bog given in figs. 2 and 3. A striking indication of this reversal of slope was furnished by several shallow surface drains which had been cut in order to dry the surface of the bog for turf-cutting at its eastern extremity. These, when made, had a slope of one in forty towards the Blackwater valley; they were now broken across, so that what had been the upper half sloped with an equal gradient towards the Ownacree. It was along the southern edge of the basin that the greatest amount of marginal disturbance had taken place, the proportion of crevasses to crust here being quite 2 : 1. This appears to have been the shallowest portion of the bog; several ridges of the underlying gravel had somewhat disturbed the general subsidence of the peat. The portion overlying the crests of the ridges had remained *in situ*, while that on their slopes had broken away on both sides, and flowed down through the depression between them. Soundings with a pole in these depressions showed hard bottom at from 5 to 8 feet. This was the only place where an 8-foot pole gave an indication of bottom. Owing to the increase in the number and width of the crevasses, on entering the depression from its margin, it was quite impossible to make any observations from more than 20 or 30 yards inwards from the edge. But there appears to be no doubt that along the line of greatest depression, the thick covering of bog had been entirely removed; in some places the hard bottom could be seen.

Immediately above the Kingwilliamstown road we pass from the area of subsidence to the region of flow. The flood has left behind it, in the upper portion of the valley, a deposit of peat averaging 3 feet in thickness, here as everywhere contrasted by its black colour with the grass land or other surface on which it rests. Its compact convex margin, like that of outpoured oatmeal porridge, often 2 feet in height, serves equally well to define it; so that it was an easy task to determine and map the high-water level of the flood. The surface of the deposit was everywhere broken by great roots and trunks of Scotch Firs, which, in their enormous numbers, bore convincing testimony to the evisceration which the bog had undergone. The appearance of this extensive sea of black peat, with its protruding stumps of blackened trees, overlying fertile fields, was a sight melancholy in the extreme.

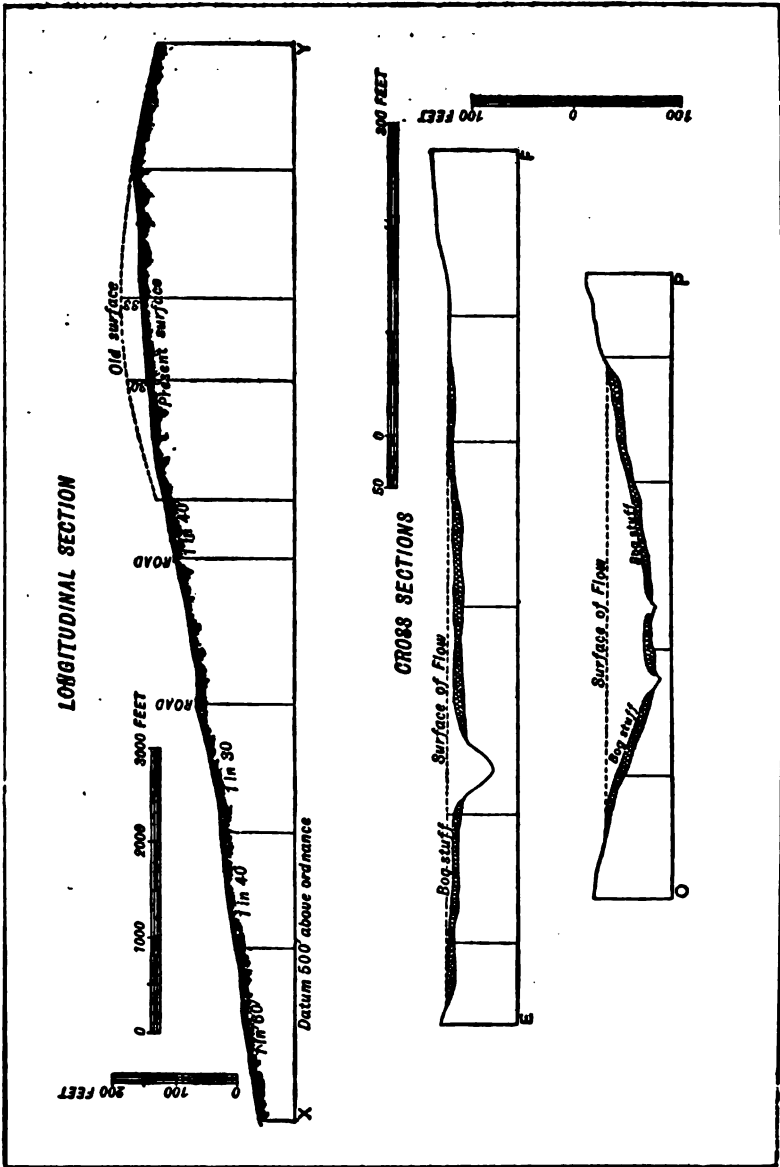


FIG. 3.

Longitudinal section through the subsided area and the course of the flood. Cross-sections across the valley of the Ownacree, to show the height attained by the flood and the deposit of peat.

The presence of so much floating timber in the waters of the flood must have greatly enhanced its destructive power. One of the largest of these trees, a huge stump with roots 12 feet across, was seen lying some distance up the course of a tributary stream, and on the top of its overhanging bank, at a distance of two and a half miles from the scene of the outbreak.

The erosive effects on the bed of the Owenacree are well marked. We observed places where it had been lowered 6 feet; *e.g.* at a spot about half a mile from Annagh Bridge; a lane which had extended across this as a shallow ford, had been cut through by a trench, 20 feet in width and 6 feet in depth. In other places the stream has cut for itself a new course.

The lamentable fate which overtook the Donnelly family has been already alluded to. Many farmers have suffered serious loss by the tearing up and washing away of their potato-pits, which were situated near the banks of the stream. The filling up of the limestone quarry is a serious inconvenience; for, although the work of clearing it out has been already commenced, and it will ultimately be worked as before, it must remain useless for some time. No other quarry exists in the neighbourhood, and lime is the only manure in universal demand. The roads can be cleared without much difficulty: the breaches made in them are not serious. The farmers will feel most seriously the loss of their land. On most of the holdings the best land was situated along the river banks, and, in the upper portions of the valley, this is now covered to a depth of 3 feet with a solid deposit of peat. At Annagh Bridge the average depth has decreased to 2 feet; here the deposit is of a finer grain and more liquid. According to the inquiries made by the police, in the four townlands which occupy the east bank of the river between the scene of the outburst and a point a little below Annagh Bridge, close on 300 acres of land have been thus buried.<sup>1</sup> The tenants being all small holders, the loss of their best grazing has ruined them.

Strange and contradictory rumours are prevalent among the peasantry as to whether any symptoms of the approach-

<sup>1</sup> *Freeman's Journal*, January 2nd.

ing catastrophe were noticed. Sergeant King, R.I.C., states positively that he and other officers on patrol heard rumbling noises some days before the occurrence. Further, it is certain that some of the peasantry were so alarmed by sounds, which they attributed to the banshee, that the parish priest was sent for to pray with several families.

The evidence as to whether the actual bursting of the bog was accompanied by sounds is conflicting. Some state that they were awakened by a loud roar; others, including Mr. MacSweeney, of Quarry Lodge, slept as usual. But this negative evidence is of little or no value; for, in one instance, the flood passed within fifty yards of a cottage, breaking down and sweeping away the trees of the adjacent haggard, without arousing the occupants.

It is obvious that, before the outbreak, the condition of the bog was that of a viscous fluid enclosed within a resistant wall. The pressure of the fluid and the tension of the envelope were then in equilibrium. Owing to an increase in pressure or a decrease in the tensile strength of the retaining wall, this equilibrium was destroyed, the envelope was ruptured at its weakest part, and the viscous fluid, under a head of pressure, rushed down the inclined surface provided by the natural drainage of the country.

Before entering further into the discussion of the causes which led to the outburst, it will be convenient to present here information we have collected concerning similar occurrences which have taken place in the past. We give first a list of those which have affected the bogs of this country; they are arranged in chronological order.

**A.D. 1697, June 7.** *Kapanikans Bog, Co. Limerick, near Charleville.*—This occurrence is so quaintly described in a letter, dated June 7, 1697, that it is worth quoting *verbatim et literatim* :—

“On the 7th Day of June, 1697, near Charleville, in the County of Limerick, in Ireland, a great Rumbling, or faint Noise was heard in the Earth, much like unto a Sound of Thunder near spent; for a little Space the Air was somewhat troubled with little Whisking Winds, seeming to meet contrary Ways: And soon after that, to the greater Terror and Afrightment of a great Number of Spectators, a more wonderful thing happened; for in a Bog stretching North and South, the Earth began to move, viz. Meadow and Pasture Land that lay on the side of the Bog, and separated by an extraordinary large Ditch, and other Land on the further side adjoining to it; and a Rising, or little Hill in the middle of the Bog hereupon sunk flat.

"This Motion began about Seven of the Clock in the Evening, fluctuating in its Motion like Waves, the Pasture-Land rising very high, so that it over-ran the Ground beneath it, and moved upon its Surface, rowling on with great pushing Violence, till it covered the Meadow, and is held to remain upon it 16 Feet.

"In the Motion of this Earth, it drew after it the Body of the Bog, part of it lying on the Place where the Pasture-Land that moved out of its Place it had before stood; leaving great Breaches behind it, and spewings of Water that cast up noisom Vapours: And so it continues at present, to the great Wonderment of those that pass by, or come many Miles to be Eye-witnesses of so strange a thing."

This communication was accompanied by a map and detailed description by John Honohane.<sup>1</sup>

**A.D. 1708.** *Castlegarde Bog, County Limerick.*—The Castlegarde bog, or as it was then called Poulevard, moved along a valley and buried three houses containing about twenty-one persons. It was a mile long, a quarter mile broad, and about 20 feet deep in some parts. It ran for several miles, crossed the high road at Doon, broke through several bridges, and flowed into the Lough of Coolpish.<sup>2</sup>

**A.D. 1745, March 28.**—*Bog of Addergoole, Dunmore, County Galway*—About mid-day, after a heavy thunder-shower, about 10 acres of bog, the front of which was being cut for turf, moved forward and down the course of a stream, and subsided upon a low pasture of 30 acres by the river-side, where it spread and settled, covering the whole. The stream, thus dammed back, rose till it formed a lake of 300 acres, which, by the cutting of a channel, was subsequently reduced to 50 or 60 acres. This area, together with the 30 acres of meadow over which the bog spread, has been destroyed for purposes of husbandry.<sup>3</sup>

**A.D. 1788, March 27.**—*Bog near Dundrum, County Tipperary.*—"A large bog of 1500 acres, lying between Dundrum and Cashel, in the county of Tipperary, began to be agitated in an extraordinary manner, and to the astonishment and terror of neighbouring inhabitants. The rumbling noise from the bog gave the alarm, and on the 30th it burst, and a kind of lava issued from it, which took its direction towards Ballygriffen and Golden, overspreading and laying waste a vast tract of fine fertile land belonging to John Hide, Esq. Everything that opposed its course was buried in ruins. Four houses were totally destroyed, and the trees that stood near them torn up by the roots. The discharge has been incessant since the 30th, and how far it will extend cannot at present be determined."<sup>4</sup>

<sup>1</sup> Philosophical Transactions, vol. xix., pp. 714-716, October, 1697; and Boate, Molyneux, and others, a Natural History of Ireland, p. 113, 1755.

<sup>2</sup> *Dublin Evening Telegraph*, 2nd January, 1897.

Ouseley, *Trans. R.I.A.*, vol. ii., Science, pp. 3-5, plate I, 8187.

<sup>4</sup> *Gentleman's Magazine*, vol. lviii., p. 355, 1788.

**A.D. 1809, December 6.**—*Bog of Rine, Camlin River, County Longford.*—"In the night, during a thunderstorm, about 20 acres of the bog burst asunder in numerous places, leaving chasms of many perches in length, and of various breadths, from 10 feet to 3 inches. The rifts were in general parallel to the river, but in some places the smaller rifts were at right angles to it; not only the bog, but the bed of the river was forced upward; the boggy bottom filling up the channel of the river, and rising 3 or 4 feet above its former banks. In a few hours 170 acres of land were by these means overflowed, and they continued in that state for many months, till the bed of the river was cleared by much labour and at considerable expense." The bog had been an unusually wet one. It did not sink in any particular place. "Several earthquakes were felt in distant countries about 16th December, . . . and it is not absolutely impossible that a communication may exist between them" [the earthquake and the bog-slide.]<sup>1</sup>

**A.D. 1819, January.**—*Owenmore Valley, Erris, Co. Mayo.*—"A mountain tarn burst its banks, and heaving the bog that confined it, came like a liquid wall a-down, forcing everything along, boulders, bog timber, and sludge, until, as it were in an instant, it broke upon the houses [of a small village], carrying all before it, stones, timbers, and bodies, and it was only some days after, that at the estuary of the river in Tullohan Bay, the bodies of the poor people were found."<sup>2</sup>

**A.D. 1821, June 26.**—*Bog of Kilmaleady, near Clara, King's Co.*—The excellent report on the outbreak of this bog, communicated to the Royal Dublin Society by Sir Richard Griffith, may with advantage be consulted by those who are interested in the subject. It will be found in the *Journal* of the Royal Dublin Society, vol. I., pp. 141-144 and map, 1858.

Sir William Wilde gives the following additional particulars taken from the daily press of the time :—

"At 7 p.m., of the evening of the 26th June, the south front of the bog of Ballykillion, or Kilnalady, gave way to a depth of 25 feet, and with a tremendous noise, commenced to move down the valley at the rate of about 2 yards an hour, with a front 200 yards wide, and about 8 feet deep. . . . It continued to move for more than a month.

"About the same time the Ferret bog, about 16 miles north-east of Kilnalady, was strongly agitated, boiling up to a great height."<sup>3</sup>

**A.D. 1821, September.**—*Joyce Country, County Galway.*—"Upwards of a hundred acres of land, on which crops were growing and several families resided, were heard to emit a sound resembling thunder; the earth then became convulsed, and eventually this large tract moved down towards the sea, leaving the whole route over which it passed a complete waste."<sup>4</sup>

<sup>1</sup> Edgeworth, App. 8 to 2nd Report of Bog Commission, p. 176, 1811.

<sup>2</sup> Otway, "Sketches in Erris and Tirawley," p. 14, 1841.

<sup>3</sup> Census of Ireland for the year 1851, part v., vol. I., 1856, pp. 189, 190.

<sup>4</sup> *Ibid.*, p. 90.

**A.D. 1824, December 22.**—*Bog of Ballywindelland, Coleraine.*—A portion of this bog containing 80 or 100 acres gave way and passed into an adjoining valley: it gradually advanced on the firm land, during the day, at the rate of 2 feet per minute.<sup>1</sup>

**A.D. 1831, January.**—*Bog near Geevagh, Co. Sligo.*—"After a sudden thaw of snow, the bog between Bloomfield and Geevagh gave way; and a black deluge, carrying with it the contents of 100 acres of bog, took the direction of a small stream, and rolled on with the violence of a torrent, sweeping along heath, timber, mud, and stones, and overwhelming many meadows and arable land. On passing through some boggy land, the flood swept out a wide and deep ravine, and a part of the road leading from Bloomfield to St. James's Well was completely carried away from below the foundation for the breadth of 200 yards."<sup>2</sup>

**A.D. 1835, September 17.**—*Fairlock Moss, Randalstown, Co. Antrim.* (A very large bog overlooking a valley.)—All day a portion of it swelled up till the convexity was 30 feet in height; at 5 p.m., with a sound like a loud, rushing wind, it sank several feet, and a collection of tufts, mud, and water moved N.E., not rapidly, and soon stopped. It swelled up again, and about midday on the 19th, it again burst with a similar noise and the flow crept on till the 21st, when it ceased till the 23rd, being interrupted by ditches; on the 23rd, at 3 p.m., it suddenly rushed forward. Continuing, it surrounded a cottage 10 feet deep, rose over the Belfast-Londonderry coach road, crossed it with a width of 300 yards, and poured over the far bank in a cascade, and continued down the valley till it reached the River Maine, which it dammed temporarily, and killed all the fish. The flow into the Maine did not cease till Sept. 28. The deposited area of bog was three-quarters of a mile long, and 200 to 300 yards wide, with a maximum depth of 30 feet. The place where the bog had swelled up to 30 feet, afterwards sunk 20 feet below its original level, and a small pool occupied the hollow.<sup>3</sup>

**A.D. 1840, January.**—*Bog of Farrendeyle, Kanturk, Co. Cork.*—The bog was 10 feet in thickness, resting on a substratum of yellow clay; the pent-up water undermined a prodigious mass of bog, and bore it buoyantly on its surface; twenty acres of valuable meadow were covered, and a cottage was propelled and engulfed; a quarter of a mile of the road from Kanturk to Williamstown was covered 12 to 30 feet deep.<sup>4</sup>

**A.D. 1870, December 14, 9 a.m.**—*Bog near Castlereagh, Co. Roscommon.*—The bog is situated 5 miles north-east of Castlereagh, on the watershed of the River Suck and the Owen-na-foreshea, a tributary of Lough Gara; it overlies cavernous limestone. The eruption took place from the face of a turf-cutting, which was from 12 to 15 feet in height. A

<sup>1</sup> *Ibid.*, p. 198.

<sup>2</sup> Lyell, "Principles of Geology," 10th ed., vol. ii., p. 504.

<sup>3</sup> Hunter, *Magazine of Nat. Hist.*, vol. ix., May, 1836, pp. 251-261.

<sup>4</sup> *Freeman's Journal*, January 3, 1840 (copied from the *Cork Standard*).



very rapid flood of peat and water poured forth, bearing on its surface large masses of the crust of the bog; it rose 10 feet over Baslick Bridge, and left a deposit of peat, which covered 165 acres of low ground and extended for some 6 or 7 miles down the valley of the Suck. A valley was formed in the peat bog half a mile in length and 20 feet deep.<sup>1</sup>

**A.D. 1873, October 1.**—*Bog 3 miles east of Dunmore, Co. Galway.*—The bog was connected with the Dunmore river by the Carrabel, a small stream. It was considerably elevated above the surrounding country, its edges presenting the appearance of high turf banks. "A farmer digging potatoes suddenly observed a brown mass slowly approaching. Leaving his spade in the ground, he went for the neighbours, and on his return the mass of moving bog had half covered his potato field, and completely hidden his corn field from sight, except a few stacks which remained on a knoll, an island in the midst of a scene of desolation." The bog slowly flowed down the valley of the Dunmore, burying three farm-houses, and covering about 300 acres of pasture and arable land, 6 feet deep. The peat was cut along a perpendicular face, 25 to 30 feet in height, which extended down to the underlying gravel. It was from this cutting that the outburst took place. The flood of peat and water moved rapidly at first, but afterwards slowly, and continued in movement for 11 days. It carried away roads and bridges. The subsided portion of the bog extended eastwards from the face of the cutting for a distance of a quarter of a mile; its greatest breadth measured also a quarter of a mile; down the middle, a valley from 20 to 25 feet deep was formed, and about the sides the crust was torn asunder. The numerous crevasses so formed were filled to the top with black peaty fluid.<sup>2</sup>

**A.D. 1883, January 25.**—*Bog near Castlereagh, Co. Roscommon.*—"The bog was situated between the villages of Moor and Baslick; in about two hours it moved a mile in a south-westerly direction towards the River Suck; after a short interval the movement continued, some 4,000 acres of land were covered, three houses had to be deserted, several roads were blocked; the Ballinagare-road being covered 15 feet deep. Eleven or twelve years ago the Tulla bog, situated about a quarter of a mile from the scene of the present outbreak, burst and discharged itself into the river Suck."<sup>3</sup>

**A.D. 1883, January 30.**—*Bog near Newtownforbes, Co. Longford.*—"A bog near Newtownforbes has commenced to migrate, covering turf and potatoes."<sup>4</sup>

<sup>1</sup> Report to the Board of Public Works, by Mr. Forsyth, 26th and 28th January, 1871.

<sup>2</sup> Savage, "Picturesque Ireland," pp. 234-235, illustr. (*n. d.*)

<sup>3</sup> Report to the Board of Public Works, by Mr. Forsyth, 31st October, 1873.

<sup>4</sup> *Freeman's Journal*, January 27, 30, and 31, 1883.

<sup>5</sup> *Ibid.*, January 31, 1883.

**A.D. 1890, January 27.**—*Bog at Loughatorick North, Co. Galway.*—The bog is situated in the townland of Loughatorick North, on the Slieve Aughty Mountains, nearly on the watershed, and 300 feet above Ballinlough Lake, which lies N.E., and into which the bog drains by a small river. The bog consists of two portions, separated by a narrow neck, where exposed rock was seen after the outburst. The upper and larger part is 70 acres in extent, the lower only 15 acres. The latter began to move 3 days before the upper portion; in its centre was a small lake to which an underground stream could be traced; after the outburst, this lake became dry. After a fall of snow, a sudden thaw set in on the 24th January; three days later a movement of the bog commenced, and continued till 1st February. Great masses of peat were carried away by the black flood into Ballinlough Lake, which was nearly filled with peat and the outwashed trunks of trees. The lowlands were covered with peat over an area of 100 acres, and for a depth of 12 inches. Traces of the flood were visible to a height of 6 or 7 feet on the trunks of trees which stood in its course. The upper part of the bog subsided from 10 to 15 feet; its margins were much rent with fissures.<sup>1</sup>

**A.D. 1895, August 9.**—*Bog near Dungiven, Co. Derry.*—The site was in the townland of Briskey, at the east slope of Benbradagh; an extensive mountain bog 10 to 30 feet in depth, sloping at a gradient of about 1 in 12. Where the burst occurred a small stream runs underground for about a quarter mile, the ground above it being firm, so that cattle grazed on it. On the evening of August 9th there was a thunderstorm, but not accompanied by any excessive rainfall. The weather during the summer had been normal. In the night, probably before midnight, between 2 and 3 acres of bog gave way. For some 40 yards length at its lower end, the bog burst out entirely. Over the rest a tapering area 300 feet wide by 600 long, the ground subsided about 10 feet, leaving great blocks of the solid crust, broken up in a fantastic way. A very considerable flood of water and peat poured down the stream, which eventually joins the River Roe. No damage was done, as the gradients are steep, and the land not under cultivation, but a cottage situated beside the stream 1 mile below the scene of the outburst narrowly escaped being washed away. A deposit of peat was left on the banks of the stream for a considerable distance. There is evidence of several similar slides having taken place in the district.<sup>2</sup>

Outside Ireland the bursting of bogs appears to be a phenomenon of great rarity. Klinge, in a valuable Paper on bog eruptions, states that, after a diligent search through European literature, he has been able to discover only two examples that

<sup>1</sup> Report to the Board of Public Works, by Mr. A. T. Pentland, 24th November, 1890.

<sup>2</sup> Information supplied by Mr. H. C. Moore, C.E., Dungiven.

did not occur in this country. To these we are not able to add more than two others. The occurrences are as follows:—

**A.D. 1763, Autumn.** Stuckhauser bogs, Treuenfeld, Duchy of Oldenburg.<sup>1</sup>

**A.D. 1772, December 16.** Solway Moss, Cumberland, England.<sup>2</sup>

**A.D. 1871, November 29.** Stanley, Falkland Isles, off Cape Horn.<sup>3</sup>

**A.D. 1886, June 2.** Stanley, Falkland Isles.<sup>4</sup>

The recorded outflows in Ireland and elsewhere differ partly in magnitude, but chiefly in the rapidity of flow of the escaping material. The rate of flow is evidently a function of the slope of the ground and the viscosity of the fluid, and the latter depends on the ratio between the amount of water and of solid contents present in the moving material. A difference also exists in the proportion of solid crust to liquid contents. The largest proportion of solid material is met with in the flow of 1745. In this case the bog shifted bodily, and the movement might, with more justice than in most instances, be compared to that of a landslide. The late eruption of Knocknageeha was one of the largest on record, and is also characterised by the unusually large proportion of water present in the liberated material. Hence its rapid flow.

Klinge,<sup>5</sup> the latest investigator of these phenomena, expresses views on the constitution of peat bogs differing in some respects from those usually accepted. He labours to prove that the absorption of sub-aerial water, or the development of large quantities of gas, are insufficient to account for the bursting of bogs. He regards mountain bogs as of two different kinds, those which have grown in the uniform climate of the western coast of Europe, characterised by a continual increase in the degree of decomposition from their surface downwards, and those which have arisen under the

<sup>1</sup> Lesquereux, Untersuchungen über Torfmoor: German edition by Lengerke, with remarks by Sprengel and Lasius, 1847, p. 165, Anmerk.

<sup>2</sup> Lyell: Principles of Geology.

<sup>3</sup> Extracts from a letter by Acting Governor Bailey to Governor Callaghan. *Quarterly Journal of the Geological Society*, vol. xxxv., Proceedings, pp. 96, 97, 1879.

<sup>4</sup> Extracted from a letter by Lieut. Governor of the Falkland Islands, Arthur Barkly, to the Rt. Hon. Earl Granville. *Quarterly Journal of the Geological Society*, vol. xliii., Proceedings, p. 2, 1887.

<sup>5</sup> Ueber Moorausbrüche, *Botanische Jahrbücher*, Bd. xiv., 1892, p. 426.

influence of severe changes of climate; the latter consist of alternating layers more or less highly decomposed. The different layers have different saturation-limits for water, and these limits once attained never alter. There is no vertical movement of water through a bog. This view, the author asserts, stands in complete opposition to statements made by older writers as to the absorption by bogs of from 50 to 90 per cent. of their bulk of water. In support of his contention that peat bogs are impermeable, he appeals to pools on their surface, often 5 to 10 feet in depth, separated by peat-walls only 3 to 5 feet thick, and yet with water-levels differing from each other by several feet. The dome-like form of mountain bogs he regards as inexplicable, unless a high capacity for water in conjunction with imperviousness be admitted for the peat. Excessive rainfall accumulates in pools on bogs, which are drained by surface channels. Pools only occur on bogs near the wet western coast of Europe. The author makes an interesting observation on the dessicating effects of sphagnum on the air over mountain bogs. This is so great that on the leeward of these bogs, at least in Norway and Nova Zembla, an aero-xerophytic (dry air) flora occurs.

The immediate cause of an eruption of a bog is, according to Klinge, the violent irruption of water into the bog from below.

In discussing Klinge's views we may first point out that the mountain bogs of this country belong to his first class—those in which the decomposition of the vegetable matter increases from the surface downwards. The decomposed peat is heavier than water, and tends to accumulate at the bottom: the crust on which the growing plants are found is lighter than water, and floats on the top of the bog. It is between the crust and the lower layers that we should expect the most fluid portion of the bog to occur.

We cannot agree that the crust is impermeable; the fact that bogs can be drained is opposed to such a view; nor do the pools which Klinge instances afford conclusive proof in its favour; they may be explained by a difference in permeability of the surrounding peat, and that they are being drained of water, or have been supplied with it, it is possible, at different rates.

We see no reason to doubt the correctness of the accepted view, which regards a peat bog as consisting of a fluid interior, more or less viscous, and an outer felted crust. The closing up of drains and canals, cut into bogs, is a familiar phenomenon which supports this view.

Although the felted envelope of a bog is close enough at its margins to afford support to the fluid interior, it is often broken by holes in the middle; into these the soft, black fluid of the interior oozes up, as everyone who has traversed a wet bog is well aware. Through such openings rain-water may make its way, and join the liquid accumulation below the crust.

All mountain bogs present very similar features; and the fact which appears most wonderful is not that they burst, but that they do not do so more frequently.

Evidently the crust, in its natural state, is, as a rule, equal to the task which the contained water puts upon it, and it is only when weakened by unusually deep cuttings that it gives away.

If this cause be considered sufficient, it might be thought unnecessary to discuss the question further, yet we think that the eruption of the water from below, as Klinge suggests, though not as he postulates sudden and violent, may sometimes, perhaps frequently, have played a chief part; that, indeed, not a decrease in the support afforded by the crust, but an increase in the pressure of the contained fluid may have been the last in a train of causes which brought about the catastrophe. In the present instance the whole structure of the country (fig. 4) would lead the geologist to suspect the existence of springs: the southward dip of the beds forming the rising land to the northward of the bog, would convey subterranean water towards it from a large catchment basin; the fault underlying the bog would serve as a conduit, through which this water would rise beneath it. The water draining away from such a spring would give rise to the wet line in the bog. The existence of such a spring would also afford an explanation of the origin of the bog; about the waters escaping from it, bog plants would naturally spring up, and would thence spread outwards and upwards; but since their growth would commence near the spring, it is there that

we should expect to find the bog attaining its greatest height, above the level of the surrounding country.

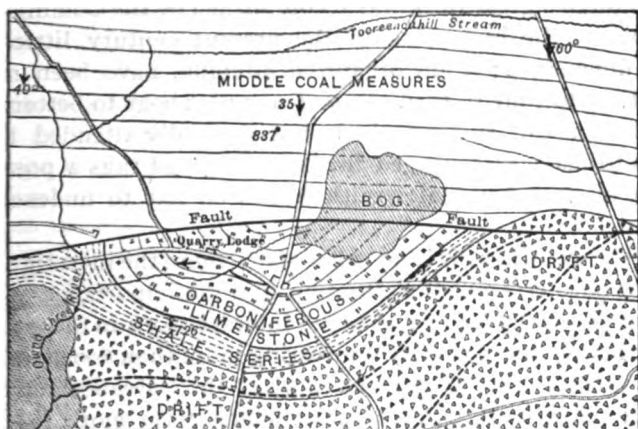


Fig. 4.—Geological Map, founded on that of the Geological Survey, showing the fault which underlies the sunken portion of the bog. Scale 1 inch to a mile.

In view of the probability that much of the water discharged from the bog had its origin in springs, the occurrence of an earthquake about ten days before the disaster should not be overlooked. The earthquake was felt from Kew, in Surrey, to as far west probably as Miltown-Malbay; its epicentre seems to have been situated near Hereford; and we might fairly expect that the disturbance which produced it should have continued along the great structural features trending east-to-west, which extend from Wales through the south of Ireland. Any change in the distribution of material along the fault, that we have several times mentioned as passing beneath the scene of the late eruption, would be likely to affect the subterranean drainage. The two views, one that looks for the cause of the outbreak in heavy rain, and the other which invokes the action of springs, and perhaps of earthquakes, are not mutually exclusive; both causes may have acted together, or sometimes one, and sometimes the other. Some outbursts, however, almost certainly owed their origin to the influx of subterranean water, *e.g.*, that of Randalstown (September 17th, 1835), when the bog swelled up till its

convexity was 30 feet in height, and after sinking, was again raised in the course of a few days.

Although a great work was accomplished by the Commission on Bogs at the beginning of the present century, little has been done since; a few organized attempts have been made from time to time to turn some of our peat bogs to better use, but the want of success which has generally attended them seems to have discouraged further effort, and thus a possible source of vast national wealth has been left to undeserved neglect.

On the Continent it is far otherwise; there the investigation of peat bogs receives the attention that the importance of the subject demands. So great is the interest taken in the subject in Germany, that a society numbering more than 600 members exists there, having for its object the advancement of knowledge of peat culture, under which term more is comprised by German workers than might be supposed. This society publishes "*Mittheilungen*" fortnightly; those for 1896 make a volume of 476 pages in royal octavo. A similar society exists in Sweden: it was founded in 1885, and now numbers over 3300 members. It possesses experimental peat farms, where investigations are made on methods of cultivation; it employs a skilled agricultural engineer, who is occupied, travelling through the country, in giving information and advice to the peat farmers. A botanist is kept at work on the microscopical examination of peat, and a chemist to perform analyses. A "*Tidskrift*" is published bi-monthly; the collected numbers for 1896 include 304 pages of letterpress. By means of this journal, yearly meetings, discussions, lectures, and exhibitions, the Society is earnestly engaged in diffusing information on all subjects connected with peat industry throughout the kingdom.

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## A POPULAR BIRD BOOK.

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**Birds of our Islands.** By F. A. FULCHER. 8vo, pp. 368. London: Andrew Melrose, 1897. Price, 3s. 6d.

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Such books as Mr. Fulcher's have two virtues. They present natural history in an attractive guise to beginners, and they afford refreshing reading to those who already love the objects they relate to. If they are also somewhat unsafe guides, plenty of text-books exist to serve as correctives. Mr. Fulcher is fond of his subject, and his book, which is pleasantly written as well as profusely illustrated, has this claim on Irish readers, that the author has made our own island the field of a considerable proportion of his observations. He is even so good as to proffer (we may not say present) to our Avifauna a new species of Wagtail: but here, for the present, commendation comes to a halt.

Mr. Fulcher's chapter on the Wagtails is a very shaky piece of writing. It is enriched with an illustration (p. 209) said to represent the Grey Wagtail, but in which a female Pied Wagtail, or else no British species, is the bird figured. The author may not be answerable for this; but he strangely states (p. 219) that the three common British Wagtails—Pied, Grey, and Yellow—lay eggs so much alike "that, apart from their surroundings, it is impossible to distinguish between them." One might as well say a Sedge-Warbler's egg cannot be told from a Sparrow's. Then Mr. Fulcher writes (p. 216) of "the yellow and olive of the wings, and olive-green back" of the Grey Wagtail, and says these "give no sense of greyness." To a common eye they give no sense of greenness, the back being slaty grey, and the quill-feathers blackish. And speaking of the Yellow Wagtail, whose upper surface really is olive, he says (p. 217) "its plumage is very like that of the Grey Wagtail, yellow and green." In truth, beyond both being yellow beneath, the plumage of the two has scarcely a common feature. Notice is drawn to these details as showing that either Mr. Fulcher has paid little attention to the Wagtails, or that his sense of colour is peculiar.

We now come to our author's new Irish Wagtail, which "has no scientific name, for strange to say, our leading ornithologists do not seem to know it."

"I saw it on the roof of a house in the extreme north of the wild peninsular (*sic*) of Inneshowen. A little flock of five of those fairy-like birds had alighted, probably to rest after crossing the North Sea. Not green and gold, or grey and gold, or olive and gold, as times without number I am asked, but all gold, pure gold of brightest yellowest hue,



except for a tiny flash of cinnamon under the chin. No canary can compare with the golden hue of my Wagtail—golden head, golden tail, golden back, gold beneath—from breast to tip of tail pure gold" (pp. 218-19.)

Wagtails (*Motacilla Rasi*) with more than their share of yellow have been seen before; but not five together. The unkind suspicion, it is to be feared, will linger, that a group of Grey Wagtails, disporting themselves in the golden sunlight, got so suffused with splendour as for once, in Mr. Fulcher's eyes, to seem 'golden' instead of "green." There is little to be said against the substitution of one imaginary tint for another.

Even after the Golden Wagtail, the full page illustration (p. 241) entitled "Merlin and its Prey," is, at first sight, calculated to startle, the prey being an adult Mallard! But in fact the falcon figured is a Peregrine. The Gannet (p. 141) is called "the whitest member of the family of Geese," and a contrast is instituted (p. 149) between this bird's plain relations and the "handsome family" to which the Cormorant belongs. Our author has evidently no suspicion that Cormorant and Gannet belong to one and the same family. There are several reasons why the Grasshopper-Warbler is hard to see, but it is imaginative writing to include among them such a one as Mr. Fulcher's (p. 71): "In the first place, the sound (of its song) is so like that of its namesake, the Grasshopper's, that it is hard to say which is which." "Once heard," Macgillivray more accurately says of the same performance, it "can never be afterwards mistaken for the sound of a grasshopper or cricket." Many other observations are made by our author with which it is difficult to agree, but with reservations on some such points as those already particularized, his book deserves praise; and the taste with which its publishers have brought it out is also strongly to be commended. Of the full-page illustrations, that of the Great Grey Shrike (p. 223) is perhaps the most life-like. Many of the wood-cuts, e.g. "Young Larks" (p. 15), "Golden Plover in summer" (p. 30), "Curlews" (p. 199), "Snipe" (p. 193), and "Little Stint" (p. 202)—are very pleasing.

C.B.M.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent donations include a tortoise from Mr. J. F. Darling, a Brent Goose from Dr. Hudson, an opossum from Mr. H. J. Chippendale, a monkey from Mr. L. H. Crozier, a Long-eared Owl from Mr. E. Williams, a Hussar Monkey from Capt. J. E. Cochrane, a cockatoo from Capt. Heffernan, a Herring-gull from Mr. J. Reynolds, some newts from Master Swift Johnston, and some sticklebacks from Master Hart.

Two Barbary Wild Sheep and two Tozenburg Goats have been born in the Gardens. Six snakes, twelve Green Frogs, six toads, a female Ibex, with kid, and a Great Wallaroo have been purchased.

16,816 persons visited the Gardens during April.

### DUBLIN MICROSCOPICAL CLUB.

APRIL 8.—The Club met at the house of Prof. T. JOHNSON, who exhibited a preparation of *Ascocyclus orbicularis* (I. Ag.) Magn., a brown alga, in the form of small discs, found on leaves of *Zostera* (the Sea-Grass). The observations of Miss Hensman and the exhibitor tend to show that the species, not hitherto recorded for Ireland, is regularly present on *Zostera marina*, which is itself common on the Irish coasts.

Mr. F. W. MOORE showed some diseased leaves of *Selaginella texta*. This is a rare plant, placed by Baker as a varietal form of *S. involvens*. The points of many of the shoots turned brilliant red in colour, and in some cases further growth was arrested. In other cases the shoots continued to grow, the leaves retaining their normal colour, but the branches showing a marked constriction where the red colour had appeared. Leaves in various conditions were exhibited, from which it was evident that the change in colour was due to a breaking down of the chlorophyll granules which lost their green colour, and assumed a red tint of varied intensity, according to the state in which the granule was.

Prof. G. COLE showed a section of a hauyne-trachyte from Laach, Eifel, lent by Mr. T. Ryley. The hauyne appears in considerable abundance, and is of a delicate blue colour. This comparatively restricted silicate and sulphate, rich in soda, is here characteristically accompanied by a warm brown soda-hornblende, and by some soda-augite.

Mr. M'ARDLE exhibited *Peziza (Humaria) auriflava*, Cooke, a rare fungus, which he found growing on peat and moss in an orchid pot in the cool orchid house at Glasnevin. The specimens shown agreed well with the figure of the plant in Cooke's *Micrographia*, vol. I, part 1, plate 6,

fig. 23. The cylindrical asci containing eight echinulate spores, and the simple or forked golden yellow paraphyses formed a striking object. Dr. Cooke reports it from France. Mr. M'Ardle is not aware that it has been previously found in Ireland.

Rev. CANON RUSSELL showed some curious nodules, which, within the last few weeks, were turned up in a field adjoining a large bog at Geashill, King's Co., of which it formed a part fifty or sixty years ago. It is described in the books of Lord Digby's office as being "moory land" in the year 1856, but since then it has been from time to time under tillage—with exception, perhaps, of that part of it where the nodules were found, which has for forty years past been left to nature. So far as he can make out, the process by which such ground is reclaimed from the bog is as follows:—

The surface moss, heather, and loose spongy turf immediately underneath, is pared off to the depth of four or five feet and thrown into the bog-hole at the foot of the cutting until it is filled up. The water which is thus displaced forms a fresh hole close to the bank which is gradually retreating as the peat is dug out. Round the edge therefore of what is called "the high bog" at a much lower level a fringe of "moory pasture" is being continually formed, made up of the accumulating loose material that had been cleared off from the top. In course of time road stuff and manure are carted over the ground, and it is made ready for the first crop, which is generally one of potatoea.

In all probability, then, these nodules were formed in what were originally bog-holes now filled up by the "clearings" from the surface of the bank. Their peculiar shape may be due, partly to the action of the water many years ago, and partly to the effect of the fungoid growth, with which they are infested. So far as Canon Russell has examined them, they are chiefly made up of the stems and leaves of the rare *Sphagnum Austini* closely felted together and covered by the threads of a white mycelium, which in some cases find their way into the heart of the nodule. This moss, which grows freely in the bogs about, was first discovered in the locality by the Rev. H. W. Lett, and is well represented by the form in which it appears in these tufts. The papillæ, so characteristic of the moss, along the walls of the cells were brought well into view by the mounts which Professor Johnson kindly prepared for exhibition. They are remarkably well developed, and seem longer than Canon Russell has seen them in some specimens of the living plant.

Mr. W. F. SINCLAIR sent for exhibition two specimens of Shagreen with notes in response to Dr. Frazer's request for information on the subject (p. 79). The first was an example of white Asiatic Shagreen, such as is used in some English sword-hilts and many eastern. It was from the skin of *Trygon sephen* or some closely allied species of sting-ray. The principal sources of Asiatic Shagreen are the Trygons or sting-rays, and especially *Trygon sephen*; in which the tuberculated area is

usually large, in proportion to the total surface; and the tubercles called in trade the "pearl") though of various sizes, are arranged so as to present a pretty regular pattern, the lesser filling up the interstices of the greater. Their vertical axis, also, is usually at a right angle to the long axis of the fish; which is important to the sword-cutter; as the hilt covered with such Shagreen gives a good "cut-and-thrust grip." The Japanese, the best artists in Shagreen usually arrange the two or three large spinal tubercles of this fish so as still further to improve the grip. *Urogymnus asperimus* furnishes a skin used for some fancy articles. It is a good-sized ray, of all the warm seas of Asia, having many large tubercles produced into sharp curved spines. It is very good for shields. In the East, the Shagreen of rays is more valued than that of the allied saw-fishes, and of sharks and dog-fish; but there is hardly any cartilaginous fish that does not furnish some here and there. The *Plectognathi*, especially *Triacanthus* and *Balistes*, furnish a little, of small size and poor quality.

All bright coloured Shagreens are dyed, and the white seems to be bleached, in the best Japanese specimens. That of English sword-hilts is blackened when the sword is finished.

Rays, amongst other merits, are much easier to skin than Sharks and Dog-fish; and, on the Indian coast, men who never fail to skin *Trygon sephen* can hardly be persuaded to do so with any other fish, unless it comes handy just when they want some Shagreen.

The exhibitor would be very glad to hear of any analysis of the "pearl" of true Shagreen. He presumes that the artificial Shagreen is not the subject of any special research at present.

The second specimen was identified by Mr. G. A. Boulenger, F.R.S., as from *Centrophorus granulatus*, a deep-sea dog-fish, widely distributed and especially abundant about Madeira. This is used for the hilts of the best English regulation swords. The comparison of this skin with that of our common species of dog-fish would probably be of some interest to amateurs. It is clearly no novelty amongst professional naturalists.

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#### DUBLIN NATURALISTS' FIELD CLUB.

APRIL 24.—The first Excursion of the season was held, the locality visited being the Sugarloaf Mountain and Calary Bog. A large party took car to the foot of the Sugarloaf and there divided into two sections. One section ascended the Sugarloaf under the guidance of Prof. Cole (the President), who supplied each member of the party with a sketch section of the Leinster Chain, and explained that the Bray and Howth Series (of Cambrian or pre-Cambrian age) was composed of shales and sandstones, which were uptilted and hardened, the sandstones being cemented by silica to form quartzites. The Ordovician shales

were laid down in a sea upon this older series, and were in turn upheaved along the line of the Leinster Chain, in Silurian, or more probably, Lower Devonian times. The granite intruded into the great arch of strata thus produced during the progress of the movement. Subsequently, on the worn-down edges of this ridge, the Carboniferous Limestone was laid down, in a still later sea.

The other section went on by car to the Calary Bog for field work. Both sections met later and drove through the Glen of the Downs, where Dr. E. J. M'Weeney found a fine specimen of *Peziza reticulata*. Grev.—a fungus hitherto unrecorded for Ireland—on a mossy bank. The party then returned to Bray.

Dr. C. J. Patten and Messrs. Connellan and Knox were elected members of the Club.

MAY 15.—A large party of members and their friends visited Powerscourt, and through the kindness of Lord Powerscourt, K.P., were enabled to visit various parts of the demesne to examine and to collect different objects of natural history interest. One section had the advantage of ascending Douce Mountain (which proved somewhat barren), under the guidance of Mr. Anton, the keeper of the deer park. All were loud in their praise of the beauty of the waterfall and surrounding parts, not a little of the beauty of the Park being due to the many fine conifers, oak, beech, and other trees.

Mr. Palmer up Douce, Mr. Knox in the demesne, and their parties saw many interesting birds, including Redstarts, Crossbills, Siskins, Stock-Dove, Ring Ousel, and a Sparrow-Hawk's nest. The Redstarts and Crossbills were evidently nesting, but could not be located. It is pleasing to be able to record the steady annual increase of the Stock-Dove and Blackcap warbler, several pair of which breed every year in Powerscourt.

Mr. Greenwood Pim noticed *Vibrissea truncorum*, a curious subaquatic fungus allied to *Peziza*, which has occurred for several years on dead branches in a stream not far from the fall. Another fungus of the same group, but much commoner—*Mitrella paludosa*—was also collected. The Bird's-nest Orchid (*Neottia Nidus-avis*) was noticed near Powerscourt House, and *Corydalis claviculata* on the rocks near the Waterfall.

Mr. Bullock collected a number of beetles on Douce Mountain :—*Calathus picus*, *C. melanocephalus* v. *nubigena*, *Patrobus assimilis*, *Pterostichus vitreus*, *Nebria Gyllenhali*, *Bradycellus distinctus*, *B. cognatus*, *Philonthus decorus*, *Tachinus elongatus* (a specimen of this rare beetle was also found at Powerscourt), *Byrrhus fasciatus*; and at Powerscourt—*Cicindela campestris* and *Anchomenus junceus*.

Liverworts were well looked after by Mr. M'Ardle, who found *Cephaloxia curvifolia* (a very pretty plant in fruit), *Jungermania incisa*, Schrad., *J. ventricosa*, Dicks., *Scopania undulata*, L. Dum., *S. aquiloba*, Schw., *Nardia emarginata*, Ehrht., and *N. scalaris*, Sch.

## CORK NATURALISTS' FIELD CLUB.

**MARCH 2.**—Mr. R. A. PHILLIPS delivered a lecture in the Library of the School of Art on "Collecting, Preserving, and Identifying Plants." The President (Mr. W. H. SHAW, M.E., J.P.), occupied the chair, and there was a good attendance of members. Mr. Phillips described at length the various ways of drying and mounting plants, illustrating his remarks by an exhibition of specimens, and impressed on his audience the necessity for taking full and accurate observations with regard to plants which they would be collecting, as without such records specimens are, from a scientific point of view, useless. He also dwelt on the pleasure to be derived from the possession of an herbarium which, on looking over, brings back to the collector's mind many pleasant recollections of his journeys in search of specimens.

**MARCH 9.**—Mr. R. A. PHILLIPS lectured on "Rare and Characteristic Plants of Co. Cork." The chair was occupied by the President (Mr. W. H. SHAW, M.E., J.P.), and there was a large attendance. The lecturer first dealt with the importance of studying the topographical and geographical distribution of plants as a means of obtaining a knowledge of the past history of species and of throwing some light on the geological problems of the present day. He then described the features of the flora of Cork as contrasted with that of other parts of the British Isles; illustrating his remarks with specimens of flowering plants and cryptogams, selected from his herbarium, which were arranged in groups under Watson's "types" of distribution—Hibernian, Atlantic, Germanic, English, Highland, &c.—indicating briefly the geographical range and other peculiarities of each species. The lecture was much appreciated, many of the audience taking notes, and it is hoped will have the effect of arousing among members an interest in the flora of one of the richest botanical districts in the British Isles.

**APRIL 13.**—The Fifth Annual General Meeting was held in the Library of the School of Art, Mr. DENHAM FRANKLIN, J.P., in the chair.

The minutes of the previous meeting having been read and signed, Mr. COPEMAN (Hon. Sec. and Treas.) read the annual report, of which the following is an abstract:—

The Committee are pleased to report a steady increase during the past year to the ranks, the membership now standing at 58 as against 52 for the previous year, which, with five honorary members, makes a total of 63. Four members have resigned during the year, and ten new members have joined, making the nett gain six. The following ten excursions were made during the year, one only being interfered with by bad weather. **MAY 2.**—Fota, attended by over fifty members and friends. **MAY 30.**—Douglas, Ballyphehane Bog, and Vernonmount. **JUNE 10.**—

Ballincollig and the Lee Valley. JULY 1.—Carrigaline and Rennie's Point, a whole day drive attended by fourteen. JULY 11.—Waterford to Ballincollig. JULY 25.—Youghal, a useful afternoon spent in and around the marshes. AUGUST 12.—Whole day, visiting Rostellan Castle, the grounds of Castlemary and the village, and Round Tower of Cloyne. AUGUST 22.—Waterfall and Ballinhassig Glen. SEPTEMBER 5.—Blarney and St. Anne's Hill. The winter meetings were—DECEMBER 10.—A lecture by Mr. G. H. Carpenter on "Irish Animals, past and present," delivered in the Ball Room, Imperial Hotel, to a crowded audience. FEBRUARY 14.—Mr. R. Lloyd Praeger gave a very interesting account of Bogs and Bog-bursts, with special reference to the recent Kerry disaster, a subject of special and painful interest, which drew a large number. MARCH 2 and 9.—Mr. R. A. Phillips gave two useful and interesting lectures on "Collecting, Preserving, and Identifying Plants" and "Rare and Characteristic Plants of Co. Cork." The Committee did not see their way this year to hold a *Conversazione*, but hope that one may take place before the next General Meeting. No large joint excursion is fixed for the coming summer, but members will be invited to join the Dublin and Belfast Clubs in a three days visit to Ballycastle, Co. Antrim, while in August we hope in conjunction with the Dublin and Limerick Clubs to visit the scene of the bog-slide in Kerry. The Committee would urge upon members the desirability of more systematic study in the various branches of Natural History; we have lying at our very doors in the Counties Cork and Kerry rich fields for the naturalist in which there is always the incentive to new discoveries, as illustration of which take the following finds by our indefatigable worker Mr. R. A. Phillips—*Ranunculus tripartitus* found near Baltimore in April, 1896, an addition to the flora of Ireland, while the following species, mostly found on Sherkin and Cape Clear Islands and the Schull promontory last August, are additions to the Cork flora—*Fumaria muralis*, *Helianthemum Breweri*, *Ornithopus perpusillus*, *Rubus macrophyllus*, *R. fissus*, *Galium uliginosum*, *Crepis biennis*, *Mentha gentilis*, *Lamium intermedium*, *Sparganium affine*, *Carex acuta*, and *Triticum pungens*.

To these may be added *Cochlearia anglica* and *Geranium pusillum* which, though recorded by the earlier botanists, have been rejected by recent writers. Both were found in the neighbourhood of Cork Harbour. The Balance Sheet is very satisfactory and shows a sum of £14 to the credit of the Club, the Committee think that this money should be expended in furthering the objects of the Club, and therefore make the following suggestions:—1st. That juniors (age under 20) be allowed to enter by paying a subscription of 2s. 6d. 2nd. That a prize scheme be formulated to try and create an interest in botany, entomology, and other branches. 3rd. That the nucleus of a reference library be made, the books to be available to any member under properly formulated rules. The Secretary, who has held office from the inception of the Club, is resigning owing to want of time properly to look after its interests.

The adoption of the Report and Balance Sheet was moved by Mr. J. L. COPEMAN, seconded by Mr. E. B. HUGHES, and passed unanimously. The following office-bearers for 1897-8 were then elected—President, W. H. Shaw, M.E., J.P.; Vice-Presidents, Prof. M. Hartog, D.Sc., F.L.S.; T. Farrington, M.A.; Miss H. A. Martin, M.R.C.P.; J. H. Bennett, John Gilbert, and J. L. Copeman; Secretary and Treasurer, E. Brooke Hughes; Curator, R. A. Phillips; Committee, Mrs. E. B. Hughes, Mrs. T. Russell, F. R. Rohu, H. Lund, J. Noonan.

It was decided to hold the first summer out-door meeting at Fota on May 8th. A discussion then followed relative to other places suitable for excursions.

On the motion of Mr. R. A. PHILLIPS, seconded by Mr. E. B. HUGHES, a hearty vote of thanks was passed to Mr. Copeman for the able and efficient manner in which he had at all times during his five years of secretaryship advanced the interests of the Club.

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## NOTES.

### ZOOLOGY.

#### INSECTS.

#### Entomological Notes from Poyntzpass.

The excessive wetness of the spring has made insect life very scarce. On the few warm fine days that we had in April some *Bombus terrestris* appeared and a few *Aphodius prodromus* and *A. fmetarius*. *Vanessa urtica* was as usual the first butterfly to appear, but I did not see it out of doors till April 18th, *Pieris napi* appearing on April 26th. I have seen a few *Andrena cineraria* and *A. albicans*; while a solitary *Nomada* which is probably *borealis* was captured crawling on the ground. A few *Vespa vulgaris* have appeared but all were dull and sluggish, the earliest was noted on March 9th, and *Apis mellifica* was seen on the wing on March 16th. Beetles have not been more plentiful than other insects. In a boggy drain I got *Hydroporus umbrosus*, *H. obscurus*, *H. nigrata* and *Aqabus unguicularis*. In moss I took *Homalota graminicola*, *Staphylinus erythropterus*, *Quedius rufipes*, *Lathrobium fulvipesenne*, *Stenus tarsalis*, *Trichopteryx lata*, *Ptenidium evanescens*, *Halyzea xviii-guttata*, *Barynotus marens*, &c. In haystack refuse among other things I met with *Homalota sordida*, Marsh, *Ephistemus gyrinoides*, *Typhada fumata*, and *Cononimus norifer*. I was disappointed at not meeting with better things, as haystack refuse is usually rather prolific. *Geotrupes* is not as much in evidence this spring as last, though I have heard his "drowsy hum" occasionally and one sunshiny day



caught a specimen which I thought at first was *G. sylvaticus* but which seems to be only a small *G. stercorarius*, L. Moths have been positively rare. I got nothing at all at willows, but a nice *Xylocampa lithorrhisa* was obliging enough to settle on my bedroom window from whence it was soon transferred to my setting board, and on the same day I captured a *Depressaria* whose name I am not sure of. Since then (April 10) my net has not been of any use. However, I shall later on have more use for it.

W. F. JOHNSON.

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BIRDS.

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Spring Migrants at Poyntzpass.

The exceeding lateness of the season has made the arrival of the migratory birds very irregular, and though most have put in an appearance they can hardly be said to be properly arrived even yet. The Chiffchaff arrived on April 6th, and the Willow-Wren on the 10th. These two are to be heard and seen frequently, but the Swallow, which I observed first on April 18th, has only shown itself in small numbers. I do not think I have seen more than three at a time as yet. The Cuckoo was reported to me on April 22nd, but I did not hear it myself till the 26th; the Corncrake was heard some six miles from this on the 23rd, but here not till the 25th, but the cold of the past week seems to have driven them back again.

I saw a single Swift on May 4th, but none since.

W. F. JOHNSON.

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MAMMALS.

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Irish Bats.

The record of another county for the Lesser Horse-shoe Bat (*R. hipposideros*) will be found in the *Zoologist* for 1887 (page 92), namely, Muckross, Co. Kerry. Mr. J. Ray Hardy, of the Manchester Museum, found a large colony in the Abbey stables, and names also the parasite found on them, *Nycteribia biarticulata*.

English students of Mammalia await with interest a decision concerning the occurrence of the Noctule in Ireland.

J. E. KEELSALL.

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SOME OBSERVATIONS BY ENGLISH NATURALISTS  
ON THE FAUNA OF RATHLIN ISLAND, AND  
BALLYCASTLE DISTRICT.

I.—GENERAL, OBSERVATIONS.

BY R. STANDEN.

THE exceeding richness of the field for study of various departments of Natural History, afforded by Ballycastle and surrounding district, induced Dr. G. W. Chaster, of Southport, Mr. J. Ray Hardy, of Manchester, and myself, to avail ourselves of an opportunity of re-visiting a place which our experience of last year had proved to be well worthy of further investigation. Accordingly, the 18th of May found us again comfortably installed in our quarters at the Antrim Arms Hotel, with a valuable addition to our working force in the person of Mr. Lionel E. Adams (Hon. Treasurer of the Conchological Society of Great Britain and Ireland), an enthusiastic naturalist, and well-known conchologist, who had been induced to accompany us. Later in the week we were joined by Mr. R. J. Welch, and Mr. W. Welch, of Belfast.

Our stay lasted exactly a week, and it is hardly possible to imagine a pleasanter time, or a busier one. I cannot refrain from alluding to the kindness and indulgence shown by our host and hostess, Mr. and Mrs. Hunter, to "hunters" who cumbered the place with all sorts of extraordinary objects! It often happens when a party of naturalists engage in a campaign that each one sticks to his own speciality, without trying to help the others, but we, on this occasion, did not confine ourselves to the mollusca, though this was, primarily, our chief object; on the contrary, we severally went in for anything that came to hand at the time, and so not only learnt a great deal of each other's subjects, but immensely increased the various records and observations.

Most of the scenes of our last year's researches were again visited, including Fairhead, Murlough, and Whitepark—where we devoted a long day to the exploration of one of the famous "middens," working hard with spade and sieve, and obtained a large number of nice worked flints (scrapers, arrowheads,

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and the like), along with numerous fragments of pottery, which fully repaid us for our toil. We also extended our investigations to Glenshesk, Armoy, Glendun, Cushendun, and Rathlin Island. The day on Rathlin will not readily be forgotten by any member of the party, and general regret was expressed that we could not devote a full week to its exploration alone—the scenery, birds, insects, and plants all combining to make it a veritable paradise for any true lover of nature. The long row home in the evening, over a perfectly calm sea, enlivened by the gambols of a school of porpoises, with a glorious sunset lighting up the rugged coast-line, was something to be remembered. At Cushendun we were joined by the Rev. S. A. Brenan, of Knocknacarry, who received us most kindly and hospitably, and pointed out many of the more interesting features of the neighbourhood, together with the localities for several choice objects. He also gave us some valuable notes on the birds and wild animals of the district, and showed us his collection of local birds, birds' eggs, and pre-historic implements. Amongst the animals observed by Mr. Brenan may be noted—in addition to our own observations—the Fox (rare), Pine Marten, Brown Rat (very abundant), and Hedgehog. Colgan, our driver, also gave us some interesting details respecting the wild animals of the district. The Otter and Badger were common, he said, and we saw some stuffed specimens of the latter, captured in the district, where it has the reputation of causing much destruction amongst the young lambs. We saw the Stoat near the old ruined church at Ballycastle, and in the woods alongside the railway, not far from the town, large numbers of gnawed hazel-nuts indicated the presence of numerous mice. On the banks of the Margy—a pretty little river, abounding with trout, which falls into the sea at Ballycastle—we observed at dusk numerous bats, which, as far as could be judged from their flight, were the Lesser Horse-shoe, Long-eared, and Pipistrelle. From the resting-places of the Long-eared Owl in the pine-woods at Glenshesk and other places, a large number of Owls' "pellets" were collected. These "pellets," which consist of masses of the fur, feathers, and bones of small animals and birds felted together, are disgorged by the Owl after digestion of its prey, and there is no

better method of attaining a correct knowledge of the smaller mammalia inhabiting a given locality, than is afforded by a careful examination of the bones and skulls they contain. The skulls are generally in a fairly perfect condition, and are always easily identifiable by a competent osteologist. All the "pellets" we collected have been minutely examined by Mr. Lionel E. Adams. They numbered 225, and the following is his analysis of the species represented in them:—Lesser Shrew, 10; Brown Rat, 22; House Mouse, 5; Long-tailed Field Mouse, 357; Bats, 3; Blackbirds or Thrushes, 5; Sparrows, 7; other small birds, 21. In 6 pellets were the remains of a beetle (*Geotrupes stercorarius*). The district is a good one for birds, and the excessive tameness of many kinds was a striking and notable feature. This may, perhaps, be accounted for from their not being persecuted by boys to the same extent as in England. Enquiries from boys we met as to whether they knew of any nests, invariably elicited the remark, "We don't mind them." The nests of the Magpie were very numerous, and formed a conspicuous feature of the landscape. They were usually placed in quite low trees close by the cottages, and the country folk apparently never molest them, perhaps from a superstitious motive. A Cuckoo calmly sat on a roadside wall whilst our car drove past within a few feet of it; Thrushes and other small birds did the same. A Blackbird sitting on its nest allowed me to stroke its back, without showing the least alarm, and I had my hand within a foot of a Long-eared Owl, perched in a low fir-tree, before it deigned to flutter off into an adjoining bush. Many species were observed breeding. The Sparrow-hawk, Kestrel, and Long-eared Owl were common, and we came across several pairs of the latter nesting in the pine woods. We were informed that the Peregrine was nesting on Tor Head, and saw one of these splendid falcons fly from that direction and glide along the rocks at Murlough, where it swooped down upon and carried off a young Rook from a low tree. The Grey Crow and Jackdaw were plentiful. We found the well-hidden nest of the Wheatear under a heap of stones on Rathlin, and the Stonechat, Whinchat, Rock-Pipit, Twite, and Reed-Bunting, were all plentiful. The Chiffchaff and many other warblers abound. We found the beautiful nest of the Gold-

crest at Glenshesk, and a nest of the Wild Duck on Fairhead. Several pairs of Oyster-catchers and Ringed Plovers had nests at Whitepark and Murlough. Rev. S. A. Brennan has observed the following less common species nesting about Cushendun :—Barn Owl, Pied Flycatcher, Dipper, Ring-Ouzel, Grasshopper Warbler, Grey Wagtail, Bulfinch, Nightjar, Heron, and Rock Dove—which nests in the “Pigeon Cave”—but we did not meet with any of these. The sea-birds on Rathlin are well worth a special visit, but I have not the space to devote to their adequate description, especially as that has already been well done elsewhere.

The date of our visit was somewhat early for any but the usual spring species of butterflies, but, judging from the number of larvæ met with, there appears every likelihood of the district proving a prolific hunting-ground for Lepidoptera later on in the season. *Euchloe cardamines* was especially abundant in the wood adjoining the railway, and a fine series of both sexes was obtained, just emerged from the chrysalis, and in the choicest condition, flying in the “rides” cut through the wood, in company with *Pararge ægeria*, and *Pieris rapæ*; whilst *Pieris brassicæ*, *Vanessa urtica*, and *Chrysophanus phlæas* were fairly common elsewhere, along with the above, both on the mainland, and on Rathlin. Many species of bees were observed, and captured, as well as other insects, but so far we have not had time to work through any of this material, with the exception of the coleoptera captured on Rathlin, of which Mr. Hardy has prepared a list for this paper.

Near the harbour at Ballycastle, and at Murlough, the rock-pools swarm with anemones, and many pretty varieties of corallines and seaweeds, and would prove a capital collecting ground for those specially interested in these pretty objects. A few seaweeds we brought away have been identified by Mr. Harold Murray, of the Botanical Department, Owens College. They are *Laurencia pinnatifida*, *L. cæspitosa*, *Polysiphonia urceolata*, *P. Brodiaei*, *Callithamnion arbuscula*, *Enteromorpha intestinalis*, *E. linza*, *Porphyra ciliaris*, *P. laciniata*, *Gigartina mamillosa*, *Urospora speciosa*, *Nitophyllum laceratum*, *Dermocarpa prasina* (on *Laurencia*), *Cladophora rupestris*, *Himantalia lorea*, *Lithocystis Allmanni*, and *Ceramium rubrum*.

Everywhere the wondrous profusion of Primroses evoked general admiration. At Whitepark there were acres of them, interspersed with the Purple Orchis, Wild Hyacinth, and Scentless Violet; and the shady hedge-banks were one long line of starry blossoms. The Gorse, too, was a grand sight; the dense yellow masses on the hill-sides, and the golden bars stretching across country in every direction became at times perfectly dazzling to the eye as we drove along, relieved, however, at intervals by snow-white expanses of fields of Daisies. The Hawthorn was not in bloom, but gave ample promise of ere long adding variety to the flowery landscape. About Glendun the Holly grows luxuriantly, and on one bush the unusual sight of bright coral-red berries, presumably from a late autumnal flowering, side by side with spikes of flowers springing from the same branch was specially noticeable. The Hay-scented Fern (*Nephrodium amulum*) grows in great tufts amongst the dense Hazel thickets at Glendun, along with many other species. At Cushendun the cliffs of conglomerate are studded with tufts of *Asplenium marinum*, and near the castle the Sea-holly (*Eryngium*) grows abundantly. In several places, and particularly at Armoy, we were struck with the number of fine double-flowered *Cardamine pratensis*, the beautiful flower-spikes of which stood above the short grass, and, as seen from the car, were at first sight taken to be an orchid.

The many striking and varied geological features, as pointed out and explained by Mr. R. Welch, aroused the attention and interest of the most indifferent amongst us, and his knowledge of the archæology and folk-lore of the district made the various places visited most interesting. Standing on the high cliffs near Rue Point, Rathlin Island, itself an outlying area of the Antrim basaltic plateau, he pointed out the main geological features of North Antrim which can be seen from that point, on the long range of rugged coast-line that stretches from the headlands of the Giant's Causeway on the west to the ancient schists of Tor Head and Crochan Point to the east. First we have the great mass of the Causeway basalts faulted down against the Cretaceous cliffs of Whitepark Bay at Port Braddan, these cliffs slipping over the soft underlying Lias clays which show on the banks of a small stream, and are well

exposed on shore after storms (see *Geol. Mag.*, Dec., 1895, and *J.N.*, 1895, p. 192). Then Sheep Head, an intrusive dolerite, with its volcanic neck, Carrick-a-Rede, carries the eye eastwards to the long range of basaltic cliffs ending at Ballycastle Harbour, and broken only by the Chalk headlands of Kenbane and Castle Head, which show at this distance merely as two white spots. The little town of Ballycastle itself lies close to the great fault, which brings up to the S.E. the old schists and gneisses about 700 feet, and also the only Carboniferous area in the county, good sections of which show on the shore and in coast cliffs to the east of town. Knocklayd, the mountain (1,695 feet) which rises to the S.E. of town, is composed of the older rocks, with a capping of Chalk and basalt. Fair Head (636 feet), a great sheet of intrusive dolerite, penetrates the Carboniferous rocks about five miles east of Ballycastle; to the south of it is Murlough Bay, where we examined, a day later, the chalk cliff resting on Trias, and slipping down over these soft beds, several hundred feet to the water edge; and the Carboniferous sandstone with marine pot-holes and the old schists on the shore at Cottage. Tor Head, and Crockan Point, the nearest points of the Irish coast to Great Britain (13 miles from the Mull of Cantyre), consisting of pre-Devonian schists and gneisses, capped at Crockan Point by Cretaceous beds which rest directly on the schists complete the panorama.

The results of our marine dredgings, off Rathlin, are dealt with by Dr. Chaster in a separate section of this paper; and, similarly, Mr. Adams gives a list of additional records in Land and Freshwater Mollusca for the whole district in general, and Rathlin Island in particular. Mr. R. Welch was eminently successful in obtaining some excellent geological and other photographs, amongst them being a series of views of the dried up bed of Lough-a-veema—the “Vanishing Lake”—which, as an illustration of “Sun-cracks,” and “Cañon and Plateau” in miniature, are most remarkable, and absolutely unique.

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## II.—LAND AND FRESHWATER MOLLUSCA OF THE BALLYCASTLE DISTRICT.

BY LIONEL E. ADAMS, B.A.

HAVING heard such glowing accounts of the expedition to Ballycastle last September, undertaken by some members of the Conchological Society, I was very pleased when I was asked to join the same party in May of this year, as I particularly wished to study the slugs of the district.

The geology of the district has been fully dealt with elsewhere, so I will only mention, for the benefit of those who may come to the same locality in search of shells, that the whole of the district is not productive, the greater part consisting of extensive moorlands and peat bogs. The wooded glens in the valleys, and the landslips and bays on the coast, are the only spots where collecting is profitable. The distances between these spots are usually too great to work from a head-quarters by walking, and necessitate a car or a cycle. For the benefit of the cyclist I may say that the surface of the roads is good, and the gradients usually moderate.

Rathlin Island having been visited only once by a conchologist (Mr. R. Welch, who took 4 species in 1889), I give separately the list of the 34 species which we obtained from this isolated and often inaccessible spot. It must not be supposed that this list is exhaustive, as we only had a few hours on the island, and those on a very hot dry day, after a prolonged drought—which, by the way, continued to the end of our trip in spite of many and fervent prayers for rain—nor was more than a small portion of the island explored. After landing at Ushet Point, in spite of the efforts of a formidable Irish bull to repel the invading Saxons, we worked in more or less parallel lines over the hill to Ushet Lough by the crannoge, and thence along the cliffs to Church Bay, further than which we did not go.

It must be remembered, too, that throughout this paper the terms "common," "rare," &c., merely represent the circumstances of our particular visit, and not necessarily the average state of things.

For the sake of conformity to Mr. Standen's previous list in this journal (January, 1897), I use the nomenclature of Dr. Scharff's "Irish Land and Freshwater Mollusca."



## RATHLIN ISLAND.

- Vitrina pellucida**, Müller.—One very fine but "dead" shell was found at Church Bay. No doubt, in suitable damp mild winter weather it will prove common.
- Hyalinia cellaria**, Müller.—This species was found to be common at Church Bay.
- Hyalinia Draparnaudi**, Beck.—A few specimens were found with the last species.
- Hyalinia allaria**, Müller.—Both the type and the variety *viridula* were found, chiefly at Ushet Point. R. Welch also took it in 1889.
- Hyalinia pura**, Alder.—One specimen of the brown form was found at Ushet.
- Hyalinia contracta**, West.—Three or four of this form occurred near Ushet Lough.
- Arion ater**, L.—Both the type and the var. *brunnea* (Roeb.) were plentiful.
- Arion subfuscus**, Drap.—Though the typical form was not observed, the beautiful brilliant orange v. *aurantiaca* (Loc.) was very abundant.
- Arion hortensis**, Fér.—One or two specimens at Church Bay.
- Arion intermedius**, Normand.—Moderately common.
- Limax maximus**, L.—The var. *Férussaci* (Moq.) was very common, though the typical form did not occur. The prevalence of this handsome form to the exclusion of the type is also noticeable on the mainland opposite. Indeed, the true type only occurred once, at Murlough, the varietal form being exceedingly common.
- Limax flavus**, L.—A flourishing colony of this handsome species was discovered in the little wood at Church Bay, most of the individuals being of the form *suffusa* (Roeb.)
- Limax marginatus**, Müller.—(= *L. arborum* Br. Ch.) This slug is extremely common on the island. Many were of the pale colour usual in N. Ireland, but the handsome var. *Bettonii* (Sord.) was equally common.
- Agriolimax agrestis**, L.—Was extremely common, as also the purple-coloured var. *sylvatica* (Moq.)
- Amalia Sowerbyi**, Fér.—Common.
- Amalia gagates**, Drap.—Two specimens of the dark-backed type were obtained at Ushet.
- Helix rotundata**, Müller.—Common and diffused. (Welch in 1889).
- Helix pulchella**, Müller.—Two specimens of the type were found at Ushet.
- Helix hispida**, Linn.—Very common and diffused. Two specimens of the var. *albida* (Jeff.) were obtained at Church Bay.
- Helix virgata**, Da Costa.—A colony of the nondescript form known as *sub-maritima* was found along the shore of Church Bay—no types being found; and as far as my experience goes this is the case all along the N. coast of Ulster. Welch took it in 1889.

- Helix ericetorum*, Müller.**—The typical form and also var. *instabilis* (Zeigl.) and var. *minor* (Moq.) occurred on each side of Church Bay, but not with *H. virgata*. These two species are said never to live together in Ireland, though this is certainly far from the case in England.
- Helix acuta*, Müller.**—In Church Bay with *H. virgata*.
- Helix nemoralis*, Müller.**—As on the mainland opposite, the white-lipped variety was not uncommon. The following are the forms met with:—  
The Type.  
v. *libellula* (Risso) 00000, (1 2 3) 4 5, (1 2 3 4 5).  
v. *libellula* (Risso) and *albolabiata* (v. Mart.) 00000. Common.  
v. *rubella* (Moq.) 00000, 00300.
- Helix aspersa*, Müller.**—The rather dark form common in North Ireland was very plentiful, and two specimens of var. *tenuior* (Shuttl.) were obtained.
- Cochlicopa lubrica*, Müller.**—Several specimens were taken which, when cleaned, presented more of a greenish tint than usual. (Welch in 1889).
- Pupa cylindracea*, Da Costa.**—Some found near Ushet Lough.
- Clausilia bidentata*, Strom.**—This was found abundantly round the church and neighbouring wood.
- Succinea putris*, L.**—Many small specimens were found in a small stream flowing into Ushet Lough opposite the crannoge.
- Carychium minimum*, Müller.**—One or two were obtained near Ushet Point.
- Limnæa peregra*, Müller.**—Several small specimens were found in a small weedy pond near Ushet Lough.
- Limnæa truncatula*, Müller.**—In the little stream mentioned above, some small specimens were found.
- Physa fontinalis*, L.**—A single small specimen in Ushet Lough by the crannoge.
- Ancylus fluviatilis*, Müller.**—The same little stream furnished many specimens; and also another little stream by the church-yard at Church Bay.
- Placidium pusillum*, Gmel.**—In the stream flowing into Ushet Lough among some dwarf Water-cress a few small typical specimens were found; also a few in the Lough itself.

#### MAINLAND.

With regard to the mainland the following notes are intended as a supplement to Mr. Standen's previous list, not as a new independent list:—

- Myallina Draparnaudi*, Beck.**—Immature specimens were exceedingly plentiful at Murlough, though, as Mr. Standen found in September, adult specimens were not common—in fact our search only resulted in a few dead adults, though mature specimens ought

not to be rare in autumn and winter. Immature shells are not always easy to distinguish from *Hy. cellaria*, but the dark blue animal of *Hy. Draparnaudi*, with its equally dark footsole need never be mistaken for the other species, whose footsole is always white. It was also found to occur at Cushendun.

**Hyallia crystallina**, Müller.—The *contracta* form occurred with the type at Murlough.

**Hyallia fulva**, Müller.—The variety *Mortoni* (Jeff.) was found in the sand drift in Whitepark Bay.

**Arion ater**, L.—Very beautiful and varied forms of this slug occur in Ireland. Of all the varietal forms, *brunnea* (Roeb.) is far the commonest. At Murlough the forms *plumbea* (Roeb.) and *reticulata* (Roeb.) were also met with, and at Cushendun var. *Swammerdamii* (Kal.) was found. Besides these well-marked forms various gradations of colour impossible to separate by varietal names were plentiful. A tolerably large album might be filled with representations of the various combinations and shades of colour which this species assumes; and this method is, I fancy, the only way to preserve correctly the colours of slugs satisfactorily. Specimens of the type and of the var. *brunnea* were found at Loughaveema, 900 feet above the sea, in the midst of an extensive waste of moorland and peat bog. Young specimens of this species, of which we found plenty, were, like the English ones, all destitute of bands.

**Arion subfuscus**, Drap.—Though only three specimens seem to have been noticed at Murlough last September, this slug is extremely abundant all along the north coast of Antrim. In places the beautiful brilliant orange var. *aurantiaca* (Loc.) is far more common than the type. One specimen (type) was found at Loughaveema, 900 ft. above the sea, with several of the last species.

**Arion hortensis**, Fér.—Two pretty forms of this common species were obtained, viz., *nigra* (Moq.) in a wood near Ballycastle, and var. *subfusca* (C. Pfr.) at Murlough.

**Arion circumscriptus**, Johnst.—Common at all the places visited.

**Arion intermedius**, Normand.—This proved common everywhere.

**Limax maximus**, L.—Of this handsome species only one small example of the type occurred at Murlough, the var. *Férussaci* (Moq.) everywhere supplanting it.

**Limax marginatus**, Müller. [= *L. arborum*, Br. Ch.]—The pale watery-looking form is that usually met with in north Ireland, but var. *Bettonii* (Sord.) is commonly distributed, and in a wood at Ballycastle a beautifully dark striped tawny individual (af. ad. var. *fulva* (Norm.) was obtained.

**Agriolimax agrestis**, L. was in evidence everywhere, the purple var. *syloatica* (Moq.) being also abundant.

**Amalita Sowerbyi**, Fér.—This appeared only on the mainland, at Cushendun, where it was common. According to Dr. Scharff's "Irish L. and F. W. Moll." it is local in Ulster.

**Helix rotundata**, Müller.—Besides the type, the variety *pyramidalis* (Jeff.) was met with at Murlough.

**Helix arbustorum**, L.—A single "dead" shell was found at Whitepark Bay, which is another locality for this local shell. In Murlough as before it was far from scarce, and the variety *flavescens* (Moq.) was also noted.

**Helix virgata**, Da. Costa.—We expected to add Cushendun to the list of localities, as a stretch of grass-grown sand offered a tempting habitat, but though we did not see so much as a "dead shell," we saw other eager conchologists, in the shape of a multitude of fowls, which were quite sufficient to exterminate even this persistent species.

**Helix aspersa**, Müller.—Besides the form *tenuior* (Shuttl.) mentioned in the Rathlin list, no variation was noted in this plentiful species.

**Pupa cylindracea**, Da. Costa.—Besides the type, a small perfectly formed dwarf form occurred at Cushendun.

**Clausilia bidentata**, Strom.—A single specimen of the graceful var. *Everetti* (Miller), measuring  $8\frac{1}{2}$  mm., was found at Cushendun.

**Succinea putris**, L.—A small specimen was found in a roadside "flax-pool" at Glendun.

**Carychium minimum**, Müller.—A curious malformation occurred in a specimen from Murlough. The little creature had only one eye, the left, though it was perfectly formed in other respects.

**Limnæa peregra**, Müller.—The peaty nature of the soil combined with the mica schist which extends over a large portion of the north of Antrim is much against freshwater shells—yet we did come upon some small decollated individuals struggling against adverse conditions in the roadside flax-pool mentioned above. In a ditch near Ballycastle also small specimens were found, one or two being of the form *succineiformis* (Shuttl.)

**Limnæa truncatula**, Müller.—In a little stream coming out of the cliff at Murlough. At Cushendun were found several small individuals of Jeffreys' variety *elegans*.

**Acme lineata**, Drap.—The true habitat of this beautiful little species was discovered by Dr. G. W. Chaster. It is semi-subterranean in its habits, and though found occasionally in promiscuous moss-shakings, &c., it may be found plentifully *under* the moss, or even in dry weather beneath the surface of the soil. Dr. Chaster, at Murlough, going straight to what he considered a good "*Acme ground*," in a short time laid bare a dozen living specimens—some of the beautiful var. *alba* (Jeff.) He also informs me that it particularly affects the under side of the liverwort *Marchantia*, when this grows, not on the surface of the wet rock, but on slightly damp ground with moss, &c. If the *Marchantia* comes away easily in long pieces leaving the soil underneath porous and friable, you may look for the shell on the plant and the soil beneath, but if the plant adheres closely to a wet close surface the shell is not found.

**Pisidium pusillum**, Gmel.—A few specimens found in a small oozing stream at Cushendun.

III.—NOTES ON THE MARINE MOLLUSCA OF  
RATHLIN ISLAND.

BY GEORGE W. CHASTER.

ENCOURAGED by the success of our last year's work, four of our party determined to dredge again in Church Bay, Rathlin Island, our special object being the discovery of the habitat of *Montacuta donacina*. Unfortunately we were almost entirely becalmed, and our boatman considered that there was a risk of our being carried away by the tidal current if we ventured as far to the west side of the bay as our last year's ground. Our operations were therefore confined to the middle of the bay, and thence S.E. towards Rue Point. We obtained from our several hauls a very large quantity of sand, which was passed through our sieves and afterwards through a sieve of special construction designed to avoid the necessity of throwing away the enormous quantity of sand which still contained certain small forms. Ordinary sieves of wire gauze cannot conveniently be used with a smaller mesh than  $\frac{1}{8}$ -inch, as sand rapidly chokes finer gauze. Our "washer," as we styled it, served its purpose so admirably, that I will briefly describe it.

The framework consists of two rings of stout brass wire. On these a broad piece of sackcloth was sewn, whilst at the bottom was stitched a piece of corn-millers' silk bolting cloth, with 40 meshes to the inch. To the uppermost ring were fixed four cords meeting in a loop, by which was suspended the washer, which, when complete, looked like a large sieve with collapsible sides. It measured nine inches in depth, and fourteen in diameter. The washer was hung over the side of the boat from a rowlock, being half immersed in the sea and constantly rotated to and fro. It was surprising to see how quickly the sand was got rid of, leaving behind everything of value. Instead of several hundredweights we took home little more than a pint of material from our sieves and "washer."

This dredged material looked decidedly unpromising; a few living *Dentalia* and a mass of mostly broken bivalve shells being all there was to be seen. On carefully examining it at home it was found that, although we had failed to obtain even a valve of our desideratum, *M. donacina*, still the yield was of great interest. There were several examples of a little known species, *Neolepton obliquatum*, Monts., previously recorded as a rarity from two Mediterranean localities. This constitutes the fourth addition to the British molluscan fauna obtained from our dredgings off the Antrim coast.

The following notes on some of our finds may be of interest:—

**Turbonilla pusilla**, Ph. (non Jeff.)

*Chemnitzia pusilla*, Philippi, 1844. En. Moll. Sic., II., p. 224, pl. xxviii., fig. 21.

*Odostomia lactea*, var. (? *paullula*) Jeff. (Br. Conch. iv., p. 164.)

Dr. Dall has kindly compared typical specimens of this species with the shells in Jeffreys' collection. He informs me that there are no specimens named "*O. lactea*, var. *paullula*," but that the examples I sent agree with Jeffreys' "*O. lactea*, var. *d.*" It is certain that Jeffreys confounded the present species with *lactea* and that his variety *paullula* is untenable. Of this species we obtained one live and several dead specimens.

**Pyrgostelis Interrupta**, Totten. We obtained a fine series of live specimens of this species, better known by the name "*Odostomia rufa*." As the synonymy of the species has never been fully and correctly set forth, I will venture to give it. The species is the type of a very distinct group which the Marquis of Monterosato has designated *Pyrgostelis* (*Pyrgisculus* of the same author I cannot consider separable.)

FORMA TYPICA.

*Pyrgostelis interrupta*, Totten, sp.

*Turritella interrupta* Totten, 1835, *Am. Journ. Sci.*, O.S., vol. xxviii., No. 2., p. 352, fig 7.

*Turritella fulvocincta*, Thompson, 1840, *Ann. Mag. Nat. Hist.*, vol. v., p. 98.

*Odostomia rufa*, var. *fulvocincta*, Jeffreys, in all writings.

This well known form must be considered the type of the species. It has convex whorls, usually a peripheral reddish band, and sometimes less marked sub-sutural and basal bands as well. I have compared our shells with American specimens kindly sent by Dr. Dall, and can find no difference worthy of note. It is the most common form in our Church Bay dredgings.

## VARIETATES.

Var. 1. *rufa*, Phil.

*Melania rufa*, Philippi, 1836, En. Moll. Sic., I. p. 156, pl. ix., fig. 7.

This has flattened whorls and is of a uniform reddish colour. I find our few specimens quite similar in every way to Mediterranean types which I owe to the kindness of the Marquis of Monterosato.

Var. 2. *crenata*, Brown.

[*Pyramis crenatus*, Brown, Ill. Rec. Conch. Gt. Br. and I., 1827, pl. ix., fig. 53 (no description, figure too small to show sculpture)].

*P. crenatus*, Brown, 1857, Ill., etc., 2nd Ed., p. 14, pl. ix., fig. 53.

I see no reason for refusing to admit Brown's name at any rate so far as the second edition of his work is concerned. The description is far better than others which have been accepted without question, and is unmistakable. The form differs from the var. *rufa* in its "pellucid white colour" (Brown). We obtained a few live examples. Various forms intermediate between the type and the varieties were also noticed.

***Liostomia clavula*, Lov. (*Odostomia clavula*).**—Of this species, which in our former dredgings was found only in the dead state, one live specimen turned up this time.

***Pulsellum lofotense*, Sars. (*Siphonodentalium*).**—A small dead example.

***Neolepton obliquatum*, Monterosato, Nuova Rivista, p. 12.** This species, the most interesting of our finds, is represented by eleven valves. That shells measuring, as our larger ones do, 2.4 mm. by 1.8 mm. should have escaped observation will be surprising only to those who have not attentively studied the smaller marine Pelecypoda, amongst which the separation of immature forms from adult *minutiora* is a matter of very great difficulty. As the species has never been figured, I give a sketch of one shell (Fig. 2) and an outline of another of slightly different contour (Fig. 1). It will be found quite

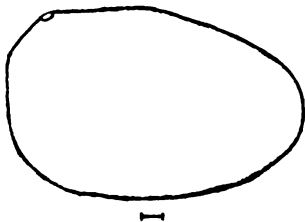


FIG. 1.



FIG. 2.

unlike any other British form. The outer surface is covered with fine and close-set concentric striae, which are however so strong as to give the shell a rough appearance.

Its distribution is Palermo (Monterosato), Livorno (Uzielli), Eleusis, Greece (G. W. C.)

My examples from different localities differ slightly in form, but all are easily recognizable as belonging to the same species.

The following species which were obtained by us last year were inadvertently omitted from my previous list:—

*Utriculus umbilicatus*, Mtg.

*Actæon tornatilis*, L.

*Venus (Clausinella) fasciata*, Da Cos.

#### IV. THE COLEOPTERA OF RATHLIN ISLAND.

BY J. RAY HARDY.

DURING our visit to Ballycastle in May last, I devoted myself more particularly to the Coleoptera of the district, and obtained a considerable number of species, the time of year being especially favourable for their collection. The opportunity afforded of visiting Rathlin Island gave us peculiar satisfaction, each having felt a strong desire to search this isolated spot, where we were unable to land on our previous visit to Ballycastle in September, 1896. After landing on the Island, careful search was made by the whole of the party in likely situations, with the result that many specimens were obtained. The abundance of the *Carabidæ* was remarkable, scarcely a stone being turned over which did not reveal some member of this interesting group.

As I believe there is no published record of the Coleoptera occurring on Rathlin, I have deemed it best to give a special list of those we obtained on the Island, which were as follows:—

*Cicindela campestris*, L.  
*Notiophilus aquaticus*, L.  
*N. palustris*, Duft.  
*N. rufipes*, Curt.  
*N. biguttatus*, F.  
*Elaphrus cupreus*, Duft.  
*Blethisa multipunctata*, L.  
*Cychnus rostratus*, L.

*Carabus granulatus*, L.  
*C. arvensis*, F.  
*C. catenulatus*, Scop.  
*C. nemoralis*, Müll.  
*C. violaceus*, L.  
*C. clathratus*, L.  
*Nebria brevicollis*, F.  
*N. Gyllenhalli*, Sch.



- Leistus spinibarbis*, F.  
*L. fulvibarbis*, Dej.  
*L. ferrugineus*, L.  
*Clivina fossor*, L.  
*C. collaris*, Hbst.  
*Dyschirius impunctipennis*, Daws.  
*D. globosus*, Hbst.  
*Dromius linearis*, Ol.  
*Loricera pilicornis*, F.  
*Chlanius nigricornis*, F.  
*Taphria nivalis*, Pz.  
*Calathus flavipes*, Fourc.  
*C. piceus*, Marsh.  
*C. melanocephalus*, L.  
*Anchomenus prasinus*, Thunb.  
*A. albipes*, F.  
*A. marginatus*, L.  
*A. parumpunctatus*, F.  
*A. viduus*, Pz.  
*A. gracilis*, Gyl.  
*A. fuliginosus*, Pz.  
*Olisthopus rotundatus*, Payk.  
*Stomis pumicatus*, Pz.  
*Pterostichus vernalis*, Gyl.  
*P. niger*, Schall.  
*P. vulgaris*, L.  
*P. nigrita*, F.  
*P. strenuus*, Pz.  
*P. vitreus*, Dej.  
*P. madidus*, F.  
*P. athiops*, Pz.  
*Amara consularis*, Duft.  
*A. spinipes*, L.  
*A. acuminata*, Payk.  
*A. plebeia*, Gyl.  
*Harpalus proteus*, Payk.  
*H. latus*, L.  
*H. ruficornis*, F.  
*H. neglectus*, Dej.  
*Bradycellus cognatus*, Gyl.  
*B. harpalinus*, Dej.  
*B. similis*, Dej.  
*Patrobus assimilis*, Chaud.  
*Trechus minutus*, F.  
*Bembidium obtusum*, Sturm.  
*B. biguttatum*, F.  
*B. guttula*, F.  
*B. atrocæruleum*, Steph.  
*B. littorale*, Ol.  
*B. lunatum*, Duft.  
*B. flamulatum*, Clair.  
*Choleva nigricans*, Spence.  
*Silpha atrata*, L.  
*S. nigrita*, Cr.  
*S. rugosa*, L.  
*Corymbites cupreus*, F.  
     var. *æruiginosus*.  
*Agriotes lineatus*, L.  
*Elater balteatus*, L.  
*Chrysomela Banksi*, F.  
*C. varians*, Schall.  
*C. staphylea*, L.  
*Gastroidea viridula*, De G.  
*Adimonia suturalis*, Th.  
*Malachius bipustulatus*, F.  
*Hydroporus obscurus*, Sturm.  
*Ocypus olens*, Müll.  
*O. morio*, Grav.  
*Quedius fuliginosus*, Grav.  
*Q. tristis*, Grav.  
*Q. rufipes*, Grav.

## ON THE FLORA OF THE SHORES OF LOUGH DERG.

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

WITHIN the thirty years which have elapsed since the publication of *Cybele Hibernica* marked an epoch in the history of Irish botany, great strides have been made in the exploration of our island flora. All of our mountain groups, almost all of our larger coast islands, a majority of our river-basins, and many of our larger lakes have been carefully surveyed by trained observers, so that absolutely virgin soil for the botanist must be sought in the wide midland areas which await, if they do not strongly invite, the attention of explorers. Yet it would be a mistake to assume that all the promising fields for methodical botanical work in Ireland have been exhausted. All of them, no doubt, have been skimmed from time to time by botanical epicures in quest of such strong sensation as may be found in a new record, or a first glimpse of some rare species in a known locality; but the thorough survey of not a few of such areas has been neglected, just because they lack the stimulus of complete novelty.

A typical example of such imperfectly explored, though by no means unvisited fields of inquiry is to be found in the shores of that imposing expansion of the River Shannon, which stretches for some 25 miles from Portumna in the north to Killaloe in the south. Since the late Dr. Moore made the beautiful lake botanically famous by the discovery on its north-west margin of the Willow-leaved *Inula* (*Inula salicina*), rarest of Irish plants, and mysteriously absent from the far richer flora of Great Britain, many a botanist, native and British, has visited Lough Derg, but none has undertaken so much as a preliminary survey of its shores. So having a week's leisure on my hands towards the end of July last it occurred to me that it might be very pleasantly spent in a botanical cruise down the lake from Portumna to Killaloe. With a shore-line of fully 90 miles in length it was obviously hopeless to aim at putting together in so short a time a complete list of even the summer plants. But, by a judicious selection of centres along both shores, the western or Galway shore, and

the eastern or Tipperary shore, one might reasonably expect to gain, at all events, a just idea of the characteristics of the flora. The following outline of each day's itinerary will show what particular sections of the lake-shore were carefully examined.

Leaving Dublin on the morning of the 24th July, Portumna at the head of the lake was reached, *via* Parsonstown, early enough in the afternoon to permit of the extreme north-western shore and a few of the smaller islands, including Church Island and the Silver Islands being examined before sunset. The second day, July 25th, was chiefly spent on the north-east shore in Tipperary. Coasting along Derry Island, Slevoir Point, and Gortmore, and making frequent landings at the most promising spots, the lake was crossed to Bonnavreen Point on the Galway side, where a further strip of the north-west shore, and a few more of its rocky islets were examined before the return to Portumna. The third day, July 26th, was a quiet one, spent on land, chiefly on the north-west shore. On the fourth day, July 27th, the northern end of the lake being fairly well examined, a move was made south by sailing-boat to my second station, Dromineer, at the mouth of the Nenagh river, on the Tipperary shore. On the way, Drominagh Point and the Bounla Islands on the Tipperary side, and the bogs round the mouth of the Woodford river on the Galway side were examined, the day's run by water amounting to fully 16 miles. On the fifth day, July 28th, an early start was made by sailing-boat from Dromineer across the lake to Farrahill Point in Galway. Here Hare Island was visited, and then running north 3 miles, still on the Galway shore, the Horse Islands were explored. Thence a run east was made to Ilaunmore, two miles in circuit and the largest of the lake islands, and having examined this a very laborious row in the teeth of a half gale took us back again to Dromineer, *via* the Corrikeens, a group of rocky islets lying midway between the Tipperary and Galway shores. The next day, July 29th, a move was made across the lake to the third station, Mount Shannon in Galway. Ryan's Point and Freagh Wood on the Tipperary side, and Cribby Island on the Galway side were touched at on the way, and in the afternoon visits were paid to Holy Island (Inishcaltra), Young Island, Bushy Island, and

Inishparran Point. On the seventh day, July 30th, Killaloe was reached by rowing-boat from Mount Shannon, and on the way down the lake numerous landings were made, as at Rineacrush Point, the Lushag Rocks, Scilly Island, Bull Island, and Cormorant Island, all on the east shore and in Co. Clare. Finally, on the eighth day, July 31st, before leaving Killaloe by the mid-day train, a flying ascent was made of Glounagalliagh mountain, 1,746 feet in height, and lying two miles inland from the lake shore, and four miles north-west of Killaloe.

Altogether, some 20 islets and 12 points or promontories along the lake shores were rather carefully examined, and as a result of the week's exploration 403 species were observed, or 408 including Characeæ. Considering the large area traversed this number may seem disappointingly small; but it must be borne in mind that in only one instance were the observations pushed inland for more than a mile or carried upwards for more than 50 feet above the lake-level, that fully half of the working hours were spent on the water and were comparatively barren of results, and that the season was so far advanced that many of the plants of spring and early summer were overlooked. A comparison of my notes with the detailed reports on the Lough Erne flora by Mr. R. M. Barrington<sup>1</sup>, and on the Lough Ree flora by Messrs. Barrington and Vowell,<sup>2</sup> seems to justify the conclusion that the Lough Derg flora if more fully investigated would prove by so much richer than that of Lough Erne as it would prove poorer than that of Lough Ree. Three weeks on Lough Erne, divided between the months of August, 1881, and June, 1882, yielded 417 species to Mr. Barrington, a fortnight on Lough Ree in June, 1885, and August, 1886, gave Messrs. Barrington and Vowell 481 species, and as the shores of all three lakes are preponderantly limestone, and the areas examined are not glaringly unequal, the floras admit of fair comparison.

Roughly speaking, the northern two-thirds of the Lough Derg shores are calcareous, the southern third non-calcareous, and the change of flora with change of rock was very strikingly shown on touching at Freagh wood when running west from

<sup>1</sup> On the Flora of the Shores of Lough Erne; *Proc. R.I.A.*, 1864.

<sup>2</sup> On the Flora of the Shores of Lough Ree; *Proc. R.I.A.*, 1887.

Dromineer to Mount Shannon. Five minutes on the rough grits here gave *Cotyledon Umbilicus*, *Galium saxatile*, *Pyrus Aucuparia*, *Vaccinium Myrtillus*, *Digitalis purpurea*, *Scilla nutans*, *Luzula maxima*, and *Lastræa dilatata*, not one of which had turned up in all the five days spent on the limestone farther north. And similar results had been arrived at in the hour spent on the Woodford bogs two days before when sailing down from Portumna. Here on the pure peat *Gnaphalium uliginosum*, *Senecio sylvaticus*, *Calluna vulgaris*, *Erica Tetralix*, *Rumex Acetosella*, *Juncus supinus*, and *Lomaria Spicant* immediately presented themselves when one passed from the limestone to the over-lying peat.

The most obvious characteristic of the Lough Derg flora is to be found in the great preponderance of a group of species, many of which are decidedly uncommon in various parts of Ireland. Omitting the very common plants, the chief members of this group are the following:—

#### CHARACTERISTIC PLANTS OF LOUGH DERG.

<i>Hypericum perforatum.</i>	<i>Eupatorium Cannabinum.</i>	<i>Erythraea Centaurium.</i>
<i>Geranium sanguineum.</i>	<i>Solidago Virg-Aurea.</i>	<i>Gentiana Amarella.</i>
<i>Rhamnus catharticus.</i>	<i>Antennaria dioica.</i>	<i>Lycopus europæus.</i>
<i>Rubus cœsius.</i>	<i>Carlina vulgaris.</i>	<i>Teucrium Scordium.</i>
<i>Rosa spinosissima.</i>	<i>Cnicus pratensis.</i>	<i>Litorea lacustris.</i>
<i>Parnassia palustris.</i>	<i>Lysimachia vulgaris.</i>	<i>Juniperus communis.</i>
<i>Viburnum Opulus.</i>	<i>Samolus Valerandi.</i>	<i>Schœnus nigricans.</i>
<i>Galium boreale.</i>	<i>Chlora perfoliata.</i>	<i>Selaginella selaginoides.</i>

Hardly an islet or promontory was landed on all down the lake, at least from Portumna to Mount Shannon, about which point a change of rock takes place, that this group did not present itself in full development. Some of the lonely rocky islets rising a few feet above the lake surface were positively ablaze with the coral berries of the *Viburnum*, standing out against the sober ashen green of the Juniper; the Dew-berry threw out its handsome bronzed streamers far over the naked limestone, and right in the wash of the waves the Water Germander (*Teucrium Scordium*) spread its matted roots through the shingle. However bare of novelty many of these desert islets may have been, and the uniformity of conditions was undoubtedly accompanied by a strong uniformity of

vegetation, not one of them lacked the charm of an absolutely unadulterated indigenous flora.

The water-plants of Lough Derg proved on the whole disappointing, the lake-bed being in general too rocky to favour the growth of a luxuriant aquatic flora. Those which were observed while cruising amongst the islands or which came up on the drag, which was freely used in all the likely shallows will be noticed in the following detailed remarks on the more interesting species of the lake flora. Not a single entry of any of the truly aquatic *Ranunculi* occurs in my notes of the week's work.

The whole of the eastern shore of Lough Derg belongs to the County Tipperary, and to District VII. of *Cybele Hibernica*, the western shore belongs partly to County Galway, partly to County Clare, and is all included in District VI. The district numbers are prefixed to each record in the following list, all of those marked VII. falling within the County Tipperary.

- Thalictrum collinum**, Wallr.—VII. Abundant in rock-clefts at Slevoir Point.
- Ranunculus lingua**, Linn.—VI. Abundant by the Shannon above Portumna Bridge, Galway.
- Nuphar luteum**, Sm.—VI. and VII. Not infrequent on both sides of the lake.
- Nymphaea alba**, Linn.—VI. Much rarer than the preceding, only noticed near Portumna. Appears to be decidedly calcifuge and to prefer a peaty bottom.
- Nasturtium amphibium**, R. Br.—VI. At Killaloe by the canal and in drains leading to the Shannon.
- Senebiera didyma**, Pers.—VII. By the old Castle at Dromineer.
- Viola odorata**, Linn.—VII. Under hedges by the Nenagh road near Dromineer, looking wild.
- Arenaria trinervia**, Linn.—VI. At Ballyvally near Killaloe, Clare, and—VII. At Gortmore.
- Malva sylvestris**, Linn.—VII. Round the old church and castle at Dromineer, obviously introduced as it usually appears to be in west Ireland.
- Geranium lucidum**, Linn.—VII. Drominagh Point; apparently quite rare round Lough Derg, though usually abundant on the limestone in west Ireland.
- Rhamnus catharticus**, Linn.—VI. Church Island, Stony Is., Rinnmaher, Horse Islands, Hare Is., Corrikeens, Cribby Is., &c., Galway; Long Is., &c., Clare.—VII. Bounla Islands, Ryan's Point, Scilly Is., &c., Tipperary; the prevailing shrub of the lake-shores and islands, occasionally becoming a small tree from 10 to 12 feet high.

- Rhamnus Frangula**, Linn.—VI. Abundant on Hare Is., Galway, but seen nowhere else along the lake. A rare plant in Ireland.
- \***Medicago falcata**, Linn.—VI. One well-grown plant by the roadside north of Killaloe, Clare, a casual.
- Anthyllis Vulneraria**, Linn.—VI. and VII. A limestone species, but very rare on Lough Derg; only seen at Farrahill Point, Galway, and at Dromineer, Tipperary.
- Lotus pilosus**, Becke.—VI. Inishcaltra (Holy Is.) and Mount Shannon, Galway; Bull Island, Killaloe, and Glounagallagh Mountain, Clare. Not seen on the limestone.
- Rubus cœsius**, Linn.—VI. and VII. Abundant on all the limestone shores and islands, where other forms of *Rubus* seem very rare. The ubiquitous *R. rusticanus*, with *R. leucostachys*, were the only other brambles gathered, but special attention was not given to this genus.
- Poterium Sanguisorba**, Linn.—VII. Banks above the Nenagh road near Dromineer.
- Pyrus Aria**, Linn.—VI. Sparingly at Rinmaher, near Portumna, Galway, and on Long Is., Clare.
- Sedum acre**, Linn.—VI. Ilanmore and Cribby Is., Galway.—VII. Ryan's Point and abundant on rocks at Drominagh Point; rare in inland stations.
- Myriophyllum verticillatum**, Linn.—VI. Shannon Canal, Killaloe.
- Oenanthe crocata**, Linn.—VI. Cormorant Is.; Bull Is., and Killaloe, Clare. Not seen on the limestone.
- Caucalis nodosa**, Scop.—VI. Roadsides near Portumna.
- †**Cornus sanguinea**, Linn.—VII. One bush on Bounla Is., possibly introduced though growing among native shrubs.
- Gallium boreale**, Linn.—VI. and VII.—Very abundant on all the rocky islands and promontories and most luxuriant in some places, as on Hare Is., &c.
- G. uliginosum**, Linn.—Frequent in bogs near the mouth of the Woodford river, Galway; a rare plant in Ireland.
- Gnaphallum sylvaticum**, Linn.—VI. At the foot of Glounagallagh mountain near Killaloe, Clare.
- Inula salicina**, Linn.—VI. On an island three miles south-west of Portumna, and again in considerable quantity on an islet 8 miles farther south. Also found on the opposite, or Tipperary, shore of the lake at Curraghmore and Brynas island by Mr. C. J. Lilly in 1895 (*Ir. Nat.*, 1896, p. 269.) These records show an interesting extension of range for this very rare plant.
- Crepis biennis**, Linn.—VII. Abundant in a fallow field and in moist meadows by the Nenagh river, near Dromineer.
- C. paludosa**, Moench.—VI. By streams on Glounagallagh mountain, Co. Clare.

**Hieracium umbellatum**, Linn.—Abundant on many of the islets and promontories of the lower half of the lake as (VI.) on Young's Is., Hare Is., Yellow Is., and Farrahill Point, Galway; on the Lushag rocks and Long Is., Clare, and (VII) on Scilly Is. and Ryan's Point, Tipperary.

**Samolus Valerandi**, Linn.—Generally supposed to prefer the sea-side, but more abundant round the shores of Lough Derg and its islands than I have ever observed it to be by the sea. Also recorded as common on Lough Ree by Messrs. Barrington and Vowell.

**Gentiana Amarella**, Linn.—VI. Rinmaher, Horse Islands, Bushy Is., Ilanmore, ac., Galway.—VII. Derry Is., Slevoir Point Dromineer, &c.; abundant along the lake as far as the limestone extends.

**Scrophularia aquatica**, Linn.—VI. Bonaveen Point.—VII. Gortmore and Drominagh Point; abundant in the latter stations in dry rocks some feet above water mark.

**Orobanche Hederae**, Duby.—VI. Round the ruined church on Church Island near Portumna.

**Utricularia neglecta**, Lehm. (?).—VI. and VII. A form with small bladders which came up on the drag from deep water at Rinmaher near Portumna, and at Slevoir Pt., Tipperary, Mr. A. Bennett is inclined to place here, but the absence of flowers prevents a positive identification.

**Origanum vulgare**, Linn.—VII. Near Dromineer and on the Corri-keen islets, but rare.

**Teucrium Scordium**, Linn.—Perhaps the most characteristic of the littoral plants of Lough Derg, appearing in profusion all along the shores of the lake and of its islands from Portumna south to Rineacrush, Co. Clare. The following are a few of the stations noted:—On the west side—Rinmaher, Stony Is., Horse Islands, Ilanmore, Cribby Is., and Inishcaltra; on the east side—Derry Is., Slevoir Pt., Gortmore, Bounla Islands and Ryan's Pt. Not seen on the lower lake from Rineacrush to Killaloe. Also abundant on Lough Ree.

**Plantago maritima**, Linn.—VI. Farrahill Point, Ilanmore and Yellow Is. The last station is 25 miles distant from the nearest sea, and appears to be the most inland hitherto recorded for the species in Ireland.

**Juniperus communis**, Linn.—An abundant shrub or dwarf tree on the islands and along the lake shores from Portumna to Mount Shannon, apparently ceasing with the limestone. The following are a few of the stations noted:—VI. Church Is., Rinmaher, Stony Is., Yellow Is.—VII. Gortmore, Slevoir Point, and Bounla Islands.

**Jodea canadensis**, Michx.—At Portumna, at Mount Shannon, and flowering in bog drains at Killaloe, but rare all along the lake and said by the boatmen to have much decreased of late years. In Lough Gill, Sligo, and in Lough Erne and Lough Ree, a marked decrease of this aggressive weed has also been observed.



- Epipactis palustris**, Crantz.—VI. Farrahill Point, Galway.—VII. Bounla Islands, Tipperary.
- Slyrinchium angustifolium**, Mill.—VI. Frequent on boggy ground near the mouth of the Woodford river, growing amongst Ling, Rushes, *Molinia*, &c., and looking quite wild. This is the original station where the plant was first found wild in Ireland in 1845.
- Narcissus biflorus**, Curtis.—VI. Abundant in pastures near the round tower on Inishcaltra. The withered leaves were pointed out to me by a boatman who has known the plant to flourish here in a thoroughly wild state for many years. A few roots taken from the island produced flowers with me in Dublin towards the end of April last.
- Sparganium simplex**, Huds.—VI. On Ilaunmore, Galway, and near Killaloe, Clare.
- Sagittaria sagittifolia**, Linn.—VI. Near the harbour at Portumna, and at the mouth of the Woodford river.
- Butomus umbellatus**, Linn.—VI. Sparingly in bog drains by the Shannon at Killaloe—and (VII.) in the Nenagh river near Dromineer.
- Potamogeton plantagineus**, Du Croz.—VI. Bog drains near Portumna, Galway. Previously recorded from this station by Dr. Moore in *Cybele*.
- P. lucens**, Linn.—VI. and VII. Abundant and very luxuriant in many parts of the lake, often growing in water from 8 to 10 feet in depth. Its dense tangles are a favourite haunt of the Perch, and hence the plant is known locally by the name Perch-weed. Only four other Potamogetons were observed in or about the lake, *i.e.*, *P. natans*, *P. perfoliatus*, *P. crispus*, and *P. pectinatus*, but *P. densus* has also been recorded.
- Zanichellia brachystemon**, J. Gay.—VII. Dromineer Bay. This appears to be the prevailing form in Ireland, and is seldom found so far inland.
- Carex filiformis**, Linn.—VI. Near Bonnaveen Point and abundant by the Shannon near Portumna.
- C. Pseudo-Cyperus**, Linn.—VI. Rinmaher, Galway.—VII. Slevoir Point and at Gortmore.
- Deschampsia flexuosa**, Trin.—VI. On Glounagalliagh Mountain, Co. Clare.
- Sesleria caerulea**, Scop.—VI.—Ilaunmore.—VII. Derry Is., Slevoir Point, &c., frequent on the limestone.
- Poa nemoralis**, Linn.—VI. Woods at Ballyvalley near Killaloe, Clare.
- Glyceria aquatica**, Sm.—VI. By the Shannon at Portumna.
- Polypodium vulgare**, Linn.—Remarkably luxuriant on moist grit boulders in the wood on Scilly Island, several fronds measuring 1 ft. 11 in.

- Chara fragilis**, Desv.—VI. Mouth of the Woodford river and by the Shannon near Killaloe.  
var. **barbata**, Gant.—Drains by the Shannon at Killaloe.
- C. aspera**, Willd.—VII. Dromineer, Tipperary.
- C. contraria**, Kuetz.—Rinmaher Point and mouth of the Woodford river.
- C. tomentosa**, Linn.—VI. Near the mouth of the Woodford river. Previously found in the lake near Portumna by Dr. Moore in 1845.
- Tolypella glomerata**, Leonh.—VI. Rinmaher, and (VII.) Slevoir Point, Tipperary.

Of the plants recorded in this list the following seven are additions to the flora of District VII. of *Cybele Hibernica*:—*Galium uliginosum*, *Gnaphalium sylvaticum*, *Sparganium simplex*, *Potamogeton lucens*, *Deschampsia flexuosa*, *Poa nemoralis* and *Glyceria aquatica*.

Messrs. H. and J. Groves have kindly examined and named for me the specimens of Characeæ gathered in the lake, and I am indebted to Mr. Arthur Bennett for assistance in identifying some three or four of the more critical Phanerogams.

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## PROCEEDINGS OF IRISH SOCIETIES.

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### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Long-eared Owl from Mr. J. R. Lloyd, a number of freshwater fish from Mr. F. Godden, a Rabbit from Master Moloney, a Blue and Yellow Macaw from Judge Boyd, a pair of Bonnet Monkeys from Major W. Lloyd, and a Ring-tailed Coati from Mr. H. A. Murray. A hybrid calf between a Male Yak and a Chillingham Cow, and two Wolf-cubs have been born in the Gardens. A Black-buck, a Zebra, an Alligator, three Mandrills, two Grey Squirrels, and a Diamond Snake have been bought.

11,283 persons visited the Gardens in May.

## DUBLIN MICROSCOPICAL CLUB.

MAY 20.—The Club met at the house of Mr. GREENWOOD PIM, who showed *Papulaspora sepedonioides*, a minute hyphomycete, for which he was indebted to a pupil of Prof. Scott. It occurred on potatoes in a cellar, and presented to the naked eye a powdery stratum of a brick-red colour. The mycelium and hyphæ were extremely delicate and hard to detect, and were densely covered with the spores, which are produced in globular heads, the individual sporidia adhering with considerable persistence, and not readily separating. The nidus on which it occurred was rather dry, which possibly accounts for the great amount of spores as compared with small development of the hyphal portion of the plant.

Mr. G. H. CARPENTER showed *Eustochus atripennis*, one of the Mymaridæ or fairy-flies, a family of excessively minute hymenoptera, whose larvæ are parasitic on the eggs of other insects. For the very beautifully mounted slide exhibited Mr. Carpenter was indebted to Mr. F. ENOCK, of London, who is making a special study of the family.

Prof. T. JOHNSON showed a preparation of *Streblonema minimum* (Sauvag.), an endophytic brown alga, forming tufts, 1 mm. high, on old *Fuci*. The material was collected at Dungarvan in October last, and had been worked out with the help of Miss M. C. Knowles, the species being new to Ireland.

Mr. MCARDLE exhibited fertile specimens of *Fossombromia angulosa*, Dickk., which Mr. Moore collected recently on a ditch-bank near the entrance to Dingle harbour, Co. Kerry, where it grew in great abundance. The plant is local in this country, and has only been found in the south-west. The specimen under the microscope showed a ripe capsule with spores and elaters, the spores are remarkable for their large size and alveolate reticulations.

Dr. FRAZER described interesting effects produced by handling *Primula obconica*, a Chinese plant, commonly grown in many greenhouses, the leaves and stems are furnished with translucent hairs filled with fluid, and it appears to be deleterious to certain susceptible individuals, some of whom suffer so severely as to be unable to handle the plant in any stage of its growth. The patient who brought it under Dr. Frazer's notice had twice experienced its evil effects at intervals of several months. It should be stated that these effects are well known to gardeners though not to the public generally.

Mr. ALLAN SWAN sent for exhibition *Saccharomyces membranifaciens*, a peculiar yeast which has been described by Hansen. It forms a yellowish scum on the surface of liquids in which it grows favourably, and will produce its endospores rapidly by the usual gypsum black method, but unlike most yeasts, these spores also regularly appear on the nutrient gelatine of surface-cultivations in tubes. This yeast is peculiar from the fact that it does not bring about alcoholic fermentation in solutions of the carbo-hydrates, nor has it any effect in inverting cane sugar.

The mounted cultivation was prepared for the morphological observation of the scum vegetation, and shows the unusual short sausage-shaped cells, with their tendency to spread out in a thin film of single cells, which never overlap each other. It was made from a pure gelatine received from Mr. Därgensen, of Copenhagen, by the following method :— A thin cover glass, thoroughly cleaned, is passed through the flame of a spirit lamp, then a tiny droplet of weak sterile malt extract from a capillary glass pipette is placed on it, and inoculated with a platinum needle which also serves to spread out the liquid to a thin film, about one-quarter inch in diameter, the cover glass is then inverted on to a wet paper cell on a glass slip and placed in a damp chamber to develop ; the growth is watched from day to day until the necessary stage of maturity be reached, when the cover glass is lifted off the cell and dried, after which it can be stained and mounted on a slip with a spun cell in Hg. Cl.  $\frac{1000}{1}$  dilution. By this means the cells are retained in the exact position in which they grew, and the mount will keep for a long time.

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#### DUBLIN NATURALISTS' FIELD CLUB.

JUNE 5.—Excursion to Edenderry.—Members and their friends took the 9.15 train from Broadstone to Edenderry. After visiting the several places of interest and taking lunch at Smith's Hotel, the party took car to the Cnahaling bog, and under a local guide in waiting explored on foot (and sometimes in water) the bog. The Black-headed Gulls were seen in thousands, and their nests were met with about a mile into the bog. All stages between the egg in the nests and the mature bird were seen, and Mr. Greenwood Pim obtained several photographs. The Derris bog was crossed on the return journey. The Redshanks, many of which were seen, were already on wing. The Royal Fern, Bladderworts and Sundews were in plenty, but no Butterwort, Vacciniums, or other characteristic bog plants were seen. *Empetrum nigrum* was abundant. One member explored the extensive bog entomologically. After tea, the Museum, due mainly to Mr. Murray, in the Town Hall, was visited and inspected with interest. The party returned to town after an enjoyable excursion, thanks not a little to the excellent local arrangements, which, the Secretary stated, Mr. Palmer had made.

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## NOTES.

## ZOOLOGY.

## INSECTS.

**Cupido minima near Ballyshannon.**

I captured a Little Blue butterfly (*Cupido minima*) at Brownhall the other day, the only one I have ever seen in Co. Donegal.

W. A. HAMILTON.

## MOLLUSCA.

**Land and Freshwater Mollusca from Co. Westmeath.**

Whilst collecting Mollusca this spring in the neighbourhood of Multyfarnham, Co. Westmeath, I obtained a few specimens of *Helix arbustorum*, which has not, I believe, been yet recorded from this part of Ireland. The other shells taken, of which Dr. Scharff kindly named all about which I was uncertain, were:—

*Vitrina pellucida*.

*Hyalinia cellaria*, *H. alliaria*, *H. nitidula*, *H. pura*, *H. radiatula*, *H. nitida*, *H. crystallina*, *H. fulva*.

*Helix aspersa*, *H. nemoralis*, *H. hortensis*, *H. rufescens*, *H. hispida*, *H. virgata*, *H. ericetorum*, *H. rotundata*, *H. rupestris*, *H. pulchella*.

*Cochlicopa lubrica*, *Pupa cylindracea*, *Vertigo pygmaea*, *V. antioertigo*, *Balix perversa*, *Clausilia rugosa*, *Carychium minimum*, *Succinea elegans*, *S. putris*.

*Limnaea peregra*, *L. stagnalis*, *L. palustris*, *L. truncatula*.

*Physa fontinalis*, *Aplexia hypnorum*.

*Planorbis marginatus*, *P. coronatus*, *P. contortus*, *P. spirorbis*, *P. vortex*, *P. crista*, *P. albus*.

*Bythinia tentaculata*, *Ancylus fluviatilis*, *A. lacustris*, *Neritina fluviatilis*, *Valvata cristata*, *V. piscinalis*, *Sphaerium corneum*, *Pisidium amnicum*, *Anodonta cygnea*.

G. P. FARRAN.

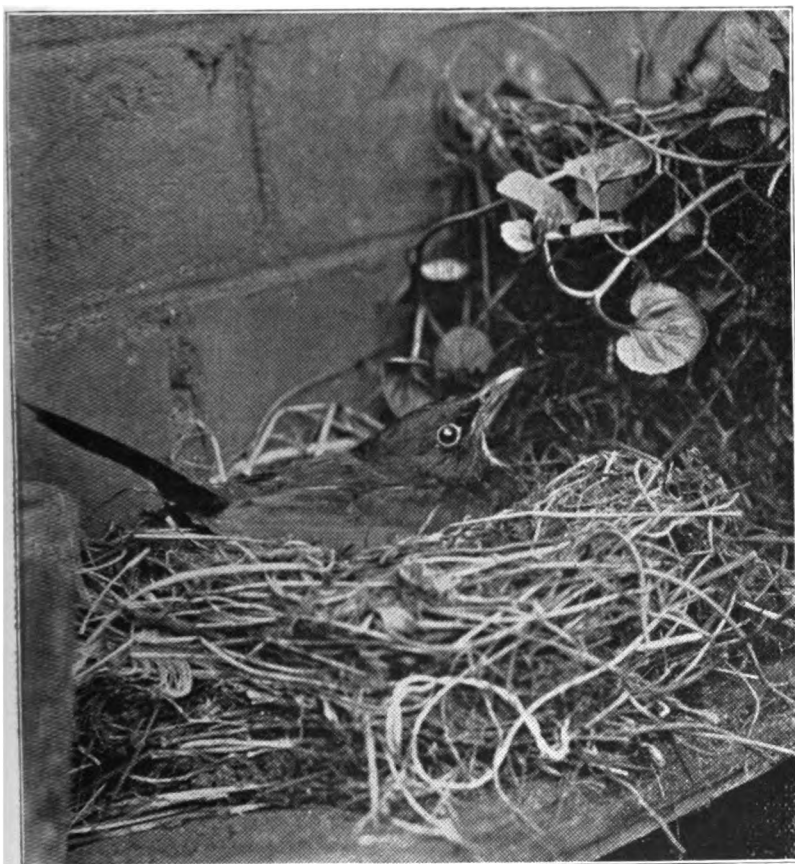
## BIRDS

**White Swallow at Coleraine.**

In a back number of the *Irish Naturalist* the appearance of a White Swallow in a field near Limerick was noted. In the summer of last year I saw a similar bird being chased by other swallows at the Salmon Leap, Coleraine.

It came suddenly on the scene, was pursued by the others for a few minutes, and disappeared as suddenly. Its forked tail and white colour attracted my attention, as I had never previously seen such a bird

SAMUEL HENRY.



**BLACKBIRD ON NEST IN GREENHOUSE, BELFAST.**

*From a photograph by Mr. R. Wickh.*



## A BLACKBIRD'S NEST.

BY JAMES STELFOX

[Plate 1.]

A BLACKBIRD has recently built her nest on a shelf against the wall of my small lean-to greenhouse in Ormeau Park, Belfast, and has, up to the end of May, laid three eggs. My gardener is working there for some time daily, and goes in and out without in the slightest degree interfering with her engagements. One day I got Mr. R. Welch to photograph her, and he succeeded in obtaining two beautiful negatives. The bird showed no signs of fear, and permitted all the manipulations of the photographer without movement, though the lens was only about three feet from the nest, and wound up by submitting to a couple of 20-second exposures with a steadiness which the accompanying plate will best indicate. The next day she was quite at home, and apparently pleased to see friends. Surely this is remarkable conduct on the part of a Blackbird.

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## A BOG-BURST SEVEN YEARS AFTER.

BY R. LLOYD PRAEGER, B.E.

LAST June, while enjoying the hospitality of Sir Henry Burke at Marble Hill, beyond Loughrea, I had an opportunity of examining the scene of the bog-burst that occurred in that neighbourhood in January, 1890. A report on the occurrence was made to the Board of Works by Mr. A. T. Pentland a few months after, and an abstract of that report will be found in my recent Paper on bog-bursts in this Journal (p. 157) In view of the various opinions which have been given as to the ultimate effects of the Kerry bog-burst both on the bog which gave way and on the land which was submerged, a brief account of the present state of the site of the Loughatorick slide, now that seven years have elapsed since the outbreak, may be of interest.

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We visited first the scene of the outburst—an extensive stretch of undulating bog-land lying on a range of low hills at an elevation of about 600 feet. The subsided portion of the bog is long and narrow. Its appearance was in every particular similar to that of the Kerry bog, which has been described with some minuteness. There was the same saucer-shaped depression: the same rapid drop around the margin; the same abundance of “crevasses,” parallel near the margin, confused nearer the centre. As in the Kerry bog, there was a flow of the whole mass along the central and lowest line, where in many spots the bog was entirely cleared away, and we walked over blocks of Carboniferous sandstone, and gravel formed of the same material. Although the bog had dried in consequence of the valley formed by the outflow, pools of water still occupied many of the crevasses. A noticeable feature was that the surface of the bog had not settled down to a smooth surface; the ridges and crevasses, hummocks of old surface and great lumps of old bog that had risen from below to fill the wider cracks, were all still in evidence. An interesting point was that the drainage of the patches of old surface, owing to the network of crevasses, has resulted in an increase in the growth of Ling and diminution of grassy plants, such as *Molinia* and *Eriophorum*, so that from afar the disturbed area is at once recognisable by its browner colour. On the bare surface left by the opening out of the crust, very little growth has taken place; the Cotton-grass, *Eriophorum angustifolium*, is pushing its rhizomes through the soft peat here and there, but most of the new surface is still quite bare. We walked down the course of the flow. In the case of the Kerry disaster, the bog burst from the face of a turf-cutting at once into a cultivated valley. Here, on the contrary, the flow followed the sinuous line of a streamlet that meanders through unreclaimed bog. The effect is just as if a gigantic plough had passed down the valley. On each side a ridge of peat, sometimes in large masses, sometimes disintegrated, has been left along the high water mark of the flood, while down in the centre the bog has been gouged out in many places to the bed-rock.

Presently signs of cultivation appeared, and we passed into a valley with a rippling stream in the centre, and cultivated

fields on either hand. Mr. Pentland states in his report that the land was covered with peat to a depth of only 12 inches ; but the cottagers assured me that in places the deposit was six feet in thickness. Be that as it may, the important point is that not a trace of the deposit now remains. It lay on the land for about two years, and was then cut, and made excellent and valuable fuel. From this precedent it would appear that the loss of land in Kerry will be only temporary, and will be compensated for by a considerable saving in the cartage of fuel, when the peat-deposit has had time to consolidate and dry.

Three miles below the scene of the outburst lies the little lake of Ballinlough, a sheet of water occupying sixty acres ; the streamlet which drains the bog enters it from the west, and flows out at the opposite side. Sir Henry Burke states that he formerly found, when fishing, depths of over fifty feet near the centre of the lake. The lake checked the flood, and has been left with its western half entirely filled up by the peaty deposit. Where there was formerly deep water, a smooth black deposit now extends. Most of this surface is quite bare of vegetation, but around the margin a coarse weedy flora has sprung up, and rendered it possible to walk over portion of the deposit. The more conspicuous plants noticed on the peat-deposit here were as follows:—*Comarum palustre*, *Spiræa Ulmaria*, *Galium palustre*, *Lythrum Salicaria*, *Senecio aquaticus*, *Pedicularis palustris*, *Rumex Acetosa*, *Salix aurita*, *S. cinerea*, several Rushes (too young to name), *Eriophorum angustifolium*, *E. vaginatum*, *Carex flava*, *C. echinata*, *C. vulgaris*, *C. rostrata*, *Glyceria fluitans*, *Equisetum palustre*. A few of these were probably brought down from the bog by the flood, such as the Cotton-grasses ; but it will be noted that most of them are marsh plants which have spread to the bog-deposit from the adjoining swampy shores of the lake.

The only permanent damage done by this bog-burst is to the lake itself. Where formerly good pike-fishing was obtainable, there now stretches a useless black slimy flat, and the fish in the portion of the lake that still remains are few and small.

## NOTES FROM A TRIP TO IRELAND'S EYE.

BY ERNEST BLAKE KNOX.

IN the second week of May last, accompanied by my brother, I secured a boat at Howth, and crossed to Ireland's Eye. On the water outside the island we observed several bunches of Razorbills and Guillemots, while sunning themselves on the rocks with outstretched wings were Cormorants and Shags. Only one representative of the duck family did we see, a common Sheld-Duck bobbing up and down in the water off a sandy point studded with rabbit-holes, of which I made a mental note to examine later on.

As we rowed slowly along within easy distance of the shore, numbers of Ringed Plover, Tit-Larks, and a few Oystercatchers kept crossing us, seeming to resent our intrusion by their piping cries. Having need of some pebbles to use with a catapult against the cliffs I landed; and while picking them I found two Ringed Plovers' nests, with their usual four eggs end to end. The nests were placed well above high-water mark, on a part of the beach where sand and gravel were fairly mixed; each nest was a mere shallow cavity in the sand, lined with little bits of broken shells and small white pebbles, the white lining being quite a contrast with the surrounding darker beach when the eggs were taken out.

We then rowed round the island keeping close to the cliffs, and saw several Black Guillemots leaving their fissured retreats, which on examination proved empty, as they had not as yet begun to lay. There was quite a number of Herring-Gulls' nests to be seen. Two of us clambered up to the top of the stack and examined several of their nests, some having the full clutch—three eggs. The nests themselves showed some slight difference in the materials used for their construction, the bulk of each being of fine dry grass and Bracken, the outer covering being either lichen or seaweed. The Gulls kept flying round screaming, almost daring to attack us whenever we should get on the more difficult parts of the cliff. Several Guillemots, Razorbills, and Kittiwakes were sitting on the ledges, but laying had not become general among them as yet.

Further round the island, on the north side, we found a pair of Peregrine Falcons breeding, with young in their nest, their abode being above a colony of Gulls, the whir-r-r of the Falcons' wings as they shot downwards among the Gulls being very striking to the ear. On this part of the island we disturbed a few Puffins.

After lunch we all landed, and separating, closely beat the island, finding nests of the Lapwing, Shore-Lark and Tit-lark, and numbers of Ringed Plover. On the beach near where it joined the sod, among the larger gravel, we came across an Oyster-catcher's nest which was merely represented by a slight hollow in the sand, no attempt at lining being present whatsoever.

Among the rabbit-holes on the point off which we saw the Sheld-Duck, I made a careful search, and after some time came across a suspicious-looking hole, having the characteristic odour of the duck family. No such thing like a spade being obtainable, I set to work to excavate away the sand with a small piece of board I picked up on the strand. After a good deal of energy and loss of heat I was able to touch something soft at the end of the hole, which proved to be the female bird. Pulling her out I gave her her liberty, and proceeded to investigate the nest. The nest was made of bents with a lining of soft down off the bird's breast, and contained two young birds and four eggs which were chipping. Having tried to settle things as I found them, we went some distance off, and after some time had the satisfaction of seeing the female bird return to her nest. In another rabbit-hole we found a Wheatear sitting on eggs.

As light was failing, we had to leave the island, after a very enjoyable day. I was quite surprised to find such an interesting collection of birds breeding so close to the city, and hope that this short sketch will be the means of protecting rather than diminishing their security.

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## ANNELIDS NEW TO IRELAND.

BY THE REV. HILDERIC FRIEND.

AMONG the material which I have collected in Ireland, or received at various times from my esteemed correspondents, I have found a number of species of annelids which, while known from other countries, are new to Ireland, and usually to the British Isles. A few of these will be described or recorded in the present paper.

On June 18th, 1897, I received some specimens from Dr. Trumbull, of Malahide, with the remark that they were "from moss among the Portmarnock sandhills in this county (Dublin). I first came upon them in November last (1896), but they were then too immature for identification." From my study of the material received, together with the published accounts, I am able to draw up the following account.

1. *Fridericia Ratzell* (Eisen).

The full-grown specimens were fully an inch in length, corresponding with the 30 mm. of foreign authorities. The worms are very strong and active, being able to jerk themselves to a considerable distance by bending the body round in different directions, as an eel or Purple Worm (*Lumbricus purpureus*, Eisen) will do. They are pinkish in the adult, but white in the younger stages. The setæ in the front segments are usually six in number, or three pairs in each bundle, the innermost being about two-thirds the length of the outer pair. This is one of the characteristic features of the *Fridericias*. The setæ are strong and stout, in highly muscular sacs; a fact which fully accounts for the activity of the creatures when excited. On segment 12 a pair of orifices, with protrusible sacs, are found. Internally we find the brain rounded off posteriorly, not concave as in many worms. I could not, however, detect any 'copulatory glands' or enlargements of the nerve-cord on segment 13 as described by Hesse, though they are perfectly familiar to me in many other species. They are not mentioned by Ude or Eisen, so that possibly Hesse was examining an allied form. The body is striated as in many other *Enchytræids*. One peculiarity deserves special note. In a young specimen just a score of opaque white bodies appeared in the coelem of the middle and hinder segments, which proved to be eggs. They were apparently being gradually passed out of the body by the anal orifice.

## 2. *Mesenchytraeus fenestratus*, Eisen.

The middle of May, 1897, Dr. Trumbull collected some specimens near the waterfall, Powerscourt, Co. Wicklow, one of which I examined. It had, however, begun to decompose when it reached me, so that it was not in a fit state for identification, and I had no duplicate with which to check my diagnosis. I have, however, every reason to think that it belonged to the species named above, the number and shape of the setæ, with some other characters, being sufficient to indicate its genus satisfactorily, as well as shadow forth the species. Perhaps some other collector will favour me with material from the same locality that the species may be made absolutely certain.

## 3. *Limnodrilus udekemianus*, Clap.

I received from Dr. Trumbull on April 1st, 1896, a very interesting consignment, which included specimens of this worm or a very close ally. The descriptions which I have seen are very meagre, but for the present this is the only name which will fit my material. One specimen had a regenerated tail, which was interesting, because it had not yet been differentiated into segments; setæ usually about five or six per bundle in the anterior segments, four behind the girdle. Female pores prominent in front of setæ; dilating heart in segment nine, sometimes, when throbbing, reaching into segment ten. There were no penial setæ, and the penis-sheath was not more than four times as long as broad. This curious structure is trumpet-shaped, and closely resembles that of my new species (*L. wordsworthianus*) found in Cumberland. This genus has uncinatæ setæ only, and the upper tooth is much larger than the lower in this species. The receptacles are very elongated pear-shaped bodies, without coils. There is reason to believe that the fresh waters of Ireland would yield several species of *Limnodrilus* if carefully worked. I have since received this worm from Co. Antrim by the kindness of Dr. Trumbull.

By a curious oversight I find I omitted to include among the species found at Belfast (supra, p. 63), one which was exceedingly plentiful, and about whose identity there could not be a moment's doubt. I therefore include it here.

## 4. *Pachydriilus verrucosus*, Clap.

In March, 1897, I received specimens of the same worm from a collector at Grantham, in Lincolnshire, England, but I believe that the worm has not heretofore been reported as British. Mr. Beddard's definition shows it to be about 12 mm. in length, with an average of 40 segments and three to five setæ per bundle. It is a flesh-coloured or red-blooded worm, and when seen in numbers, as under the algæ of the Connswater, is quite conspicuous. Descriptions of each of the foregoing, with full bibliography, will be found in Beddard's Monograph of Oligochaeta.

## THE DISCOVERY OF BONES OF THE GREAT AUK IN COUNTY WATERFORD.

BY R. J. USSHER.

I RECENTLY sent to Professor Newton some birds' bones, found by me in kitchen-middens on the coast of this county, from which I have also obtained bones or horns of Ox, Goat, Horse, Pig, Red Deer, and domestic fowl; an abundance of shells of Oysters, Cockles, Mussels, and Limpets, with many pot-boilers or burned stones. I have just received back the birds' bones from Professor Newton, who kindly writes as follows:—

“Cambridge, 8th June, 1897.

“I think all but two of them are fairly determined, thanks to the care bestowed on them by Dr. Gadow. The real work of determination was done by him, though I have gone over it for my own satisfaction. I congratulate you on possessing remains of at least two Great Auks, for you will notice that the two coracoids are of the same side. I hope you will duly record the occurrence of *Alca impennis*. Read in the light of these relics, Mr. Davis's famous bird of 1834 must have been visiting the home of its forefathers.”

On the 14th June, accompanied by Mr. Percy Manning, I revisited the kitchen-middens, and we picked up some additional birds' bones, which I submitted to Dr. Gadow, who again kindly determined them. They contained a humerus, tibia, and metatarsus of Great Auk.

Bones of this extinct bird have been found in the kitchen-middens of Denmark, in one or two places in Scotland, in Durham, and on the North American coast. More recently, Mr. Knowles, of Ballymena, has found them on the Co. Antrim coast.<sup>1</sup> I am glad to be able to corroborate his discoveries, and to show that the range of the Great Auk extended in Ireland nearly as far south as 52° N. latitude; and I should like to know if its remains have been found so far south in Europe before. Careful search should be made for similar remains in kitchen-middens on other parts of the Irish coast, and those who do so should bear in mind that no bit of birds' bone obtained from such a source should be discarded until examined by a competent expert.

I wish to express my obligations to Dr. Gadow, to whose painstaking kindness we owe the knowledge of this interesting discovery.

<sup>1</sup> *Proc. R. Irish Academy* (3), Vol. iii., 1895, No. 4, pp. 650-663.

## THE BOTANY OF A RAILWAY JOURNEY.

BY R. LLOYD PRÆGER, B.E.

As the train steams out of the terminus at Belfast, the high hills which overhang the western end of the city rise into view. In the foreground are tall mill-chimneys and factories built of bright red brick, and the graceful twin spires of St. Peter's Church; and behind rise the brown mountains, the southern escarpment of the lava-plateau of the north-east. The Chalk shows out in white patches on the slopes, where it is being quarried; higher up the dark basalt forms a sombre capping. This volcanic district has a flora of its own; and many of the characteristic plants are species usually found on limestone hills. It is on the cliff-ranges of the grand coastline of Antrim that this flora attain its full development; but even on the rounded hills which look down on us, and on the rocks and in the glens adjoining, some interesting species occur—*Vicia sylvatica*, *Epilobium angustifolium*, *Circea alpina*, *Saxifraga hypnoides*, several rare Hawkweeds, *Pyrola media* and *P. minor*, *Orobanche rubra*, *Juniperus nana*, *Equisetum umbrosum*; and two others, *Adoxa moschatellina* and *Equisetum trachyodon*, have here their only Irish habitat. The train now gathers speed as it glides onward, with the populous Lisburn-road suburb on the left, and on the right the marshy stretch known as the Bog Meadows—classic ground to the Belfast naturalist. Close by, on the left, stands the old mansion of Cranmore; and here it was that John Templeton lived and laboured a hundred years ago. He was a man of wide sympathies, a keen observer, a loving and reverent student of nature; and he was the pioneer of natural history studies in the North of Ireland. The volumes of manuscript which he left behind him, intended to form part of the "Flora Hibernica" which he projected, bear eloquent testimony to his skill and accuracy as an observer, and to his talent as an artist; it is much to be regretted that no part of his notes or drawings was ever published.

The train rattles through Dunmurry, and onwards towards Lambeg. By the side of the railway here *Vicia sylvatica* has come down from the glens on the hills, and grows luxuriantly. Now we speed past the bleach-greens of Glenmore, which the



pen of Mr. J. H. Davies has made familiar to the readers of this Journal as the only north-eastern station for *Poterium Sanguisorba*. Its nativity here has been called in question. It grows in an old meadow on the Bunter sandstone; in general it is found on limestone. However it may be with this species, there can be no doubt regarding the claim of another calcicole plant, *Orchis pyramidalis*, which grows on chalk quarry-rubbish over yonder on the side of the White Mountain a few miles to the eastward; elsewhere in District XII. it is found only on the sands of Magilligan, in County Derry.

That tall yellow flower which brightens the embankment is *Crepis biennis*. About Belfast it is as abundant as its ally *C. taraxacifolia* is about Dublin; yet the former is unknown in the northern district, and the latter is not found in the metropolitan area. Both have been originally introduced with grass and other seed, and have now fairly taken possession of their respective territories. *C. taraxacifolia* appears to be spreading more rapidly than *C. biennis*, and is now found almost across Ireland, and far to the southward.

From Lisburn to Lurgan is a pretty run through the fertile hilly country so characteristic of the Ordovician area of the north-east. The canal which we thunder across at Moira is fringed with two interesting plants—the Flowering Rush, *Butomus umbellatus*, and the Sweet Flag, *Acorus Calamus*. The latter is believed to have had its origin in Sir John Rawdon's gardens at Moira, where it is known to have been planted prior to 1744<sup>1</sup>; it now grows in abundance along the canal, from Lough Neagh to near Belfast.

Now we get glimpses of Lough Neagh out to the north-west, its smooth surface glistening in the afternoon light; we see the low promontaries of the southern shore, and the wooded Antrim edge; and far across the wide expanse rise Slieve Gullion, and the Sperrin Mountains, in Derry and Tyrone. To the botanist, Lough Neagh brings pleasant recollections—visions of shores glowing with Purple and Yellow Loose-strife, which alternate with patches of Bull-rushes and Reed-mace. What a paradise these lake-shores

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<sup>1</sup> Harris: Ancient and present State of the County of Down, pp. 103-4, 1744.

must have been before the drainage operations in the middle of the century laid them bare, and drove away many of the rarest plants from their habitats ! *Calamagrostis Hookeri* is gone from several of its stations, but happily survives in others ; *Carex Buxbaumii* appears to be on the verge of extinction ; *C. elongata*, *C. filiformis*, and *Cladium* have disappeared ; *Tolypella nidifica* has never been refound ; *Subularia*, *Lathyrus palustris*, *Pilularia*, formerly abundant, are now very rare ; *Sium latifolium* and *Elatine Hydropiper* have not been seen at the lake by the present generation ; *Rhamnus catharticus* seems to have gone too, though the rarer *R. Frangula* survives in one station at least ; *Lastrea Thelypteris*, formerly plentiful, we now seek in vain. Truly the interests of the botanist and the agriculturist are widely divergent !

A long whistle heralds our entry to Portadown, and our rapid rush down into the valley of the Bann ceases amid the hum of the vacuum brake. We are soon off again, and cross on a jingling iron bridge

“ The gay little river  
That smiles as it flows to the main.”

The Bann is here a slow and deep stream, bordered by green pastures, and frequented by canal-boats ; and for the botanist offers little interest. Jerking across the points, we now turn southward, and speed along with the flat river-meadows on the left, and Brackagh Bog on the right hand. The bog is for the most part cut away, and pools and swamps are left, where Sundews (*Drosera anglica* and *D. rotundifolia*), and Bladderworts and Royal Fern grow ; and from this place Mr. Lett recently added *Lycopodium clavatum* to the flora of Armagh. Beyond Tanderagee, the railway runs alongside the Newry Canal, here bordered by deep pools. From the train we catch sight of tall plants of *Cicuta* and of *Ænanthe Phellandrium*. White and yellow Water-lilies float on the surface, and among them Water-hens and Dabchicks splutter out of sight as the train thunders by. The canal is fringed with a grove of Arrow-head and floating Bog-bean in full blossom, and as we flash past we wish for an opportunity of exploring a spot that looks so promising. The speed decreases as the line begins to ascend, and climbs along the slope on the Armagh side to Goraghwood Junction, perched on the steep hill-side. And now we get a

glorious prospect. All County Down lies spread to the eastward, billow upon billow of green and brown fields, which towards the south give way to higher ridges, dark with heather; and behind these rise the Mourne Mountains. Far to the eastward, beyond the rugged crags which crown Slieve Bearnagh, towers the sunny dome of Slieve Donard. The western end of the range presents a series of high ridges which, above Rostrevor, drop suddenly into the waters of Carlingford Lough. Facing this steep slope rises the bold rugged form of Carlingford Mountain. Here is a district not half as well known to the naturalist as it ought to be. The deep untrodden valleys and high granite cliff-ranges of the Mournes can vie in interest and beauty with any mountain-range in the kingdom. And, though not rich in Alpine plants, the botanist finds delight in climbing the cliffs for *Hieracium argenteum*, or searching for the rare *H. hibernicum* and the Parsley Fern, or gathering the lovely Welsh Poppy above Rostrevor, or the Narrow-leaved Willow-herb on Eagle Mountain, where the cliffs re-echo the scream of the Peregrine Falcon and the hoarse croak of the Raven.

Meanwhile we are steadily climbing, past Bessbrook, and along the slope of Camlough Mountain. We have left behind the Ordovician lowlands, and are in a region of volcanic rocks. As we cross the Dundalk road, we get a beautiful view of Newry lying in the valley below, and then plunge in between the high rocky walls of Wellington Cutting, to emerge on the boggy elevated plain that stretches between Slieve Gullion and the mountains of Louth.

Here we have a different flora. Splashes of purple Heather pass in rapid succession, and the heads of the Sheep's Scabious flicker everywhere like blue stars. The dreary bogs gleam white with patches of Cotton-grass, lit up here and there with red daubs of Lesser Sorrel. And now on our right hand towers the long ridge of Slieve Gullion, clothed with woods below, deep with heather above. The little lake of Calliagh Berras, which lies close to the summit of the mountain, is famous as the scene of the enchantment of the hero Fionn by Milucra, the daughter of Culand the smith; and hard by, on the hill-summit, Fionn was restored to his youth and beauty by means of a magic drinking-horn.

Where the horn fell on the ground, a thicket of slender twigs grew up; "and any one who looks on it in the morning fasting, will know in a moment all things that are to happen that day."<sup>1</sup> I have searched for this thicket in vain; but possibly my want of success was the result of my visits being post-prandial.

Now we are over the summit; Ulster lies behind us, Leinster in front, and we rush down into the plain of Dundalk, with the rugged hills which surround Forkill on the right, and the wooded slopes of Ravensdale Park on the left. The pace is very fast, and the long bogie carriage hums like a big top, and rolls like a ship at sea. We slow up as we cross the bridge over the muddy river at Dundalk, and for the first time we see maritime plants—Sea-Pinks and Sea-Asters, *Statice Bahusiensis* and *Atriplex portulacoides*; a moment later we draw up at the broad island-platform of the new station. Here we are again on the Ordovician grits, which are seen in low cuttings on each side of the line; but eastward and southward they are buried under recent estuarine deposits. The shores of Dundalk Bay are the flattest portion of Ireland that I have seen. The tide ebbs nearly out of sight across the muddy sands, as it does at Morecambe Bay; the shore is occupied by a broad dreary stretch of salt-marsh, which gives way as one goes inland to swampy meadows, with broad ditches and slow-flowing streams. The salt-marsh is stained grey with the leaves of *Atriplex portulacoides*, and in August is purple with the flowers of *Statice Bahusiensis*. *Artemisia maritima* finds its northern limit by the river below Dundalk. Two other characteristic salt-marsh plants of the Dublin district, *Trifolium fragiferum* and *Statice auriculæfolia*, do not come quite so far north, but appear to stop at Clogher Head, twelve miles to the southward.

Leaving Dundalk, we are soon flying across this flat country. The pools by the side of the line are full of Frog-bit, and we catch sight of the lovely yellow blossoms of the Common Bladderwort rising out of the water. Beyond Castlebellingham we cross the end of an extensive bog, which was visited by the Dublin Field Club in 1895, on which occasion Dr. M'Weeney obtained here a fungus new to science,

<sup>1</sup> See Joyce's "Old Celtic Romances": The Chase of Slieve Cullinn.

*Stysanus Ulmariz.* This bog is one of the few east coast stations for the Royal Fern ; from our carriage we can see fine clumps of green fronds tipped with golden-brown fructification. A stop at Dunleer enables us to note a large *Galium*, either *Mollugo* or *sylvestre*, growing abundantly on the edge of the line just south of the station. We turn eastward now, to avoid the high ground that stretches seaward from Collon, and are soon rushing down hill into Drogheda, with the two spires of Termonfeckin on our left, and beyond them the shimmering expanse of the Irish Sea. As we cross the lofty Boyne viaduct, we glance to the right at the busy town, built on the high steep river-bank, and the line of steamers in the water far below ; and to the left, where marshy meadows and brackish lagoons fringe the river. Beyond them lie the yellow sandhills of the coast, and the open sea. Interesting ground for the botanist, is this estuary of the Boyne. The sandhills yield *Festuca uniglumis* and *Centunculus* and *Filago minima* and *Cuscuta Trifolii* ; the salt-marshes *Trifolium fragiferum*, *Artemisia maritima*, and abundance of *Chenopodium rubrum*, which is apparently very rare in Ireland in stations which are above suspicion ; the great Island of Aran is the only other place where I have seen it in which it appears undoubtedly native.

As we pass into Drogheda Station *Sambucus Ebulus* is noticed growing on the east side of the railway. When we get under way again our course lies south-east, and at Laytown we strike the coast. We cross on a new bridge the Nanny River, where *Zostera nana* grows in the soft ooze, and pass along close to a beautiful yellow beach backed by sandy and swampy ground. Here the tall blue spikes of the Viper's Bugloss brighten the landscape ; it grows mixed with Dyer's Rocket and coarse Burdocks. This spot is the most northerly point to which I have succeeded in tracing that very local plant *Senecio crucifolius*. It grows by the railway at this place, and again at Laytown Station, and is abundant southward as far as the further end of County Dublin. The late Dr. Moore has recorded it from "between Drogheda and Dundalk," which furnishes an interesting extension of range ; and I wish that some botanist more keen-eyed than myself, would verify this record, which I have vainly tried to do. The locality is exceedingly indefinite.

In crossing the Boyne we have left Louth behind us, and entered Meath; and we have also at last changed the Ordovician slates for the Carboniferous limestone. The change of soil makes itself felt upon the flora. We see for the first time the bright rose-coloured spikes of the Pyramidal Orchis, the yellow flower-heads of the Rough Hawk-bit, the erect stems and leaves of the Yellow Goat's-beard, and the fruit-heads of the Cowslip. Just beyond Gormanstown we cross the Delvin River, and enter County Dublin. Balbriggan, with its pretty little harbour, is left behind, and soon the large gravel-pit at Skerries attracts our attention by its fine section of false-bedded and contorted glacial gravels. This spot yields many of the characteristic plants of the Dublin neighbourhood. The botanist coming from the north will note with interest the occurrence of the Blue Flea-bane (*Erigeron acris*), the Greater Knapweed (*Centaurea Scabiosa*), *Melilotus officinalis*, the Carline Thistle, *Diploxaxis muralis*, *Geranium pyrenaicum*, &c.—plants, many of which extend westward across the Limestone Plain, but are rare or absent further northward.

We speed onward, and soon cross the muddy estuaries that lie north of Malahide, where *Zostera* and *Salicornia* dispute the ground with seaweeds, and the shining leaves of the Beet fringe the stone-pitched margin of the railway. The pace is too fast for botanizing now, and from our carriage we can only guess at the identity of the flowers that show as flashes of colour of varied hue. But this familiar ground brings back many pleasant recollections of long field-days. Lambay Island, Malahide, and Portmarnock are classic ground to the Dublin naturalist; and yonder rises, a couple of miles away, the heathery Hill of Howth, dear to every botanist. Now we are past Raheny, and dash out of the long cutting, across the Clontarf road. The city bursts upon our view, and behind it the rounded granite hills of Dublin, and the quartzite peaks of the Great and Little Sugar-loaf. As we enter the town and slow down, we see banks and patches of waste ground covered with the familiar Field Poppy and Slender-flowered Thistle and Wall-Barley—characteristic plants of the Dublin suburbs; a minute more and we glide into the terminus at Amiens-street, our three-and-a-half hour run of 113 miles completed.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Rosella Broadtail from Mr. J. K. Richardson, a White Peacock from Mrs. A. E. Lauder, a pair of Cockatoos from the Rev. D. Greatorex, a Peacock from Mrs. Beck, a pair of Marsh Harriers from Mr. H. M. Smith, and a Cockatoo from Mr. J. B. O'Callaghan. Four Golden Agoutis have been bought.

16,900 persons visited the gardens in June.

### THE IRISH FIELD CLUB UNION.

#### EXCURSION TO BALLYCASTLE.

The associated societies held their annual excursion on the 2nd, 3rd, 4th, and 5th of July. On this occasion the members visited the north coast of Antrim, making Ballycastle the centre—a district full of interest to the naturalist and picturesque in the extreme. On the 2nd July the members of the Dublin Club and others joined the Belfast Club at the Northern Counties Railway, and took train to Ballycastle. Arriving here, the party proceeded to the Antrim Arms Hotel, which was made the headquarters during their stay. Early luncheon awaited the party, after which brakes and cars were mounted, and the start made to visit and explore the sands of White Park Bay and the neighbourhood round Ballintoy. From the new road, which was the route selected, one gets a good idea of the geography and general character of the country. As the summit of the road is reached, an extensive panorama of the district opens up. To the north the white cliffs of Rathlin Island are seen; to the east, far in the background, lies the Mull of Cantyre, with Fair Head as a middle distance, whilst in the foreground Ballycastle and the shores of its bay were bathed in sunshine; to the south and west are seen the peat bogs, now white with Bog-cotton, and on the sloping hills the well-tilled farms; whilst Knocklayd rises, with its basalt-covered dome, high above the whole district. At White Park Bay a halt was called, when the party soon scattered over the sand-dunes in search of worked flints and pottery. The late storm had cleared the sand from many of the likely sites, and soon a fair number of finds were made, including some pieces of pottery with rude sunk ornament, whilst pockets in the sand yielded good results to the conchologist. The botanists found the beautiful Meadow Crane's-bill, or Flower of Dunluce, in brilliant bloom throughout the day. The Lias beds which occur in the bed of the stream at the east end of the bay were not well exposed in situ, as much weathering and slipping appeared to have taken place, but blocks of the Lias which were found yielded numerous and characteristic fossils. Proceeding by the shore the scenery became more rugged and the geology of more interest. Here sea-stacks and tunnels in the rock were observed, whilst the beds of bole and lithomarge showed as brilliant bands in the dark rock. Passing Ballintoy Harbour and the quaint old wind-swept church, the village was reached, where afternoon tea was served

at the Temperance Hotel. The party then proceeded past the quarry of ophitic olivine-dolerite to Carrick-a-Raide, where the volcanic neck and the characteristic beds of ash, with included fragments of basalt, were observed. The cliff scenery is here very fine and imposing, the danger of the swinging bridge heightening the attraction of a coast awe-inspiring in its grandeur. After this the road was taken for Ballycastle, but occasional halts were made at likely botanical localities, and also to see the very beautiful example of fine-grained and columnar basalt on the roadside near Glenstaghy. Dinner was ready when the party reached their hotel at eight o'clock. Afterwards some of the members proceeded to the woods in search of moths, spending several hours wandering about amongst the trees with a lantern examining different plants and the sugar-smear'd trunks of trees. The programme for the second day took the party to Fair Head and Murlough. A start was made shortly after nine o'clock along the shore road to the sandstones and shales with coal-seams near Colliery Bay. Judging from the extent of the shafts found some time ago, these seams were worked extensively in early times, but latterly they have been altogether neglected. There is now another start being made to open these mines, and the party found a steam-engine and pump in full work clearing the shaft of the mine not far from Bath Lodge preparatory to further work. At many sections of the shales fossils were found, chiefly *Stigmaria ficoides*, *Sphenopteris*, *Sigillaria*, and their mode of occurrence was noted and the age of the rocks was explained. On reaching Carrickmore the ascent of Fair Head—one of the finest headlands in Ireland—was made, and extensive views obtained from the summit. Passing Lough-na-Cranagh, the Gray Man's Path was approached, and near this the immense and almost completely detached columns of basalt were observed, whilst a fissure was noted which gives promise of a change in the scenery at some future time, when the overhanging rocks of this headland will go to increase the enormous talus of blocks already formed at the foot of the cliffs. Whilst these general features were being observed, some of the naturalists noted the occurrence of the Peregrine, and of Hooded Crows, which were frequent all along the coast. The botanists on the descent collected specimens of the Rose-root, Welsh Poppy, and Narrow-leaved Willow-herb. Soon the wooded slopes of Murlough Bay came into view. On reaching the shore, lunch was served at Miss Clark's cottage, after which the members broke up into parties to go in search of specimens and finds, and to explore the woods, which form a good collecting-ground for zoologists and botanists. A shower of rain had brought out a large number of the commoner species of land and fresh-water shells, which were collected in abundance, whilst *Helix arbustorum* was found on the grassy slopes under the Chalk cliffs. Further round the coast a few specimens of type and variety *cincta* were noted. *Helix rotundata* was fairly common, with a thin, fragile variety of *H. nemoralis* on the headlands to the east. Here the rare *Helix fusca* was also found among the Wood-rush on the wet glen slopes, with *Hyalinia* and *Pupa anglica*. The botanists collected the Yellow Saxifrage, Brittle Bladder-fern, Mossy



Saxifrage, and Bree's-fern. The land planarian *Rhynchodemus terrestris* also occurred here as well as in other localities. In fresh water, *Polycelis cornuta* was very widely distributed, occurring right down to the shore, although on the Continent this species frequents high altitudes. Other planarians not yet identified were collected. Some of the geologists went round Rue-Bane Point, and the stiff climb was well repaid by the view of some splendid dykes and sills of diorite (camptonite of Rosenbusch), which are here seen about six feet thick, with fragments of embedded crystalline schists on their margins. On the return, near the summit of the slopes of Murlough, a visit was paid to the interesting conglomerate at the base of the Chalk, and overlying the brilliant red beds of sandstone which have of late been the subject of investigation by Dr. Hume. On reaching the road again, cars were taken for Ballycastle, and fine views obtained of the gravels and well-marked terraces of the Carey River. After a late dinner an exhibition of bat-hunting was given by some members, which caused much amusement to the natives of Ballycastle, and resulted in the capture of *Vesperugo pipistrellus*. Late in the evening a conversazione was held, when the members made a display of, and explained, their various finds, and a very beautiful collection of land shells obtained in the neighbourhood were exhibited by Mr. Standen, of Manchester, and showed what could be done by a well-directed search over this locality in a short time. Sunday was an open day, and members made their own arrangements. Good weather and sunshine favoured the party all through, but on Monday the weather looked less favourable, and there were some showers. However, all the members turned out at the sound of the whistle, and a start was made for the valley of Glenshesk. The road to the bridge was taken, where the party dismounted, and were soon in pursuit of various objects, a few to visit the micaceous schists in the bed of the stream. The damp state of the ground prevented most of the members from attempting the ascent of Knocklayd, which all through the morning had been capped with cloud and mist, so attention was concentrated on the ravines and burns on the eastern slopes of the mountain, which yielded, as usual, some good species. The Fresh-water Limpet (*Ancylus fluviatilis*) was noted to be unusually large and fine for this county. Under one of the bridges the nest of the Dipper was found, and some of the members observed the bird in flight. Botanists collected the Moonwort, Stag-horn moss, Mountain Buckler-fern, and Bree's-fern. All again assembled at the hotel after four o'clock for dinner, after which, as this was the last day of the excursion, a few remarks were made by some of the senior members expressing the pleasure derived, and the many advantages of combined excursions, such as the present. The 6.15 train brought many of the members to Belfast, and others remained to return the next day by rail or road—the general impression that a most delightful and instructive holiday had been brought to a close, one that would be long remembered by those who took part in it.

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## NOTES

## BOTANY.

## · PHANEROGAMS.

**Carex filiformis and Cladium Mariscus in Co. Down.**

One day last May, driving from Strangford to Downpatrick, I observed in a reedy lake, not far from the road, groves of a tall sedge-like plant which, even at a distance of a quarter of a mile, I recognised as *Cladium Mariscus*. A visit to the lake showed the plant growing abundantly and luxuriantly; and, better still, the swamp was dotted all over with a sedge which, though only in flower, I felt sure was *Carex filiformis*. My brother, E. A. Præger, has since re-visited the spot, and sent mature fruiting specimens, which show that my diagnosis was correct. This lake, or swamp with pools, lies not far from the main road from Strangford to Downpatrick, half a mile north-west of the hillocks marked "White Hills" on the one-inch Ordnance Survey map; and both the species named grow therein in abundance. These are two of the rarest members of the North-eastern flora. *Cladium* was found near Castlewellan by Templeton, and after an interval of a century was re-discovered growing sparingly there by Mr. Stewart and myself; its only other station, and the only station of *C. filiformis*, was Selchin, on the Antrim shore of Lough Neagh, where they grew with *C. elongata*, as discovered by Dr. Moore some sixty years ago. *Cladium* had been previously found there by Templeton. None of them have been seen in that station since, having been, no doubt, destroyed by the drainage operations carried out between forty and fifty years ago. *C. filiformis* was excluded from the local flora by Stewart and Corry in 1888 as doubtful, but was re-inserted in the *Supplement*, published in 1895, on the strength of specimens from Selchin discovered in Dr. Moore's herbarium. In view of the extinction of these two plants at Lough Neagh, and the paucity of *Cladium* in its only other local station, it is satisfactory to have a new locality where both grow abundantly, and are in little danger of a similar mishap.

R. LLOYD PRÆGER.

**Occurrence of *Callitriche truncata*, Guss., and *Leucojum aestivum*, L., in Ireland.**

During an afternoon ramble among the Slaney marshes, a little north of Macmine Junction, Co. Wexford, on June 11th, I had the good fortune to come across these two nice plants, not far from Macmine Castle. The former was plentiful in a broad ditch which the railway crosses, and in an adjoining pool; the latter grew in a swamp near the river, some sixty or eighty specimens being observed in flower or fruit; it looked quite as wild as I have seen it in England. These marshes deserve further examination; I only worked a small part of them.

EDWARD S. MARSHALL.

## ZOOLOGY.

## INSECTS.

**Leucophasia sinapis near Kildare.**

I found the Wood-white Butterfly in some numbers at a place I was staying at for a few days in the end of May and the beginning of June, about five miles west of the town of Kildare, this year. As this is, I believe, a new locality for it in Ireland, it may be worth recording. It seemed to prefer the open fields, or the proximity of small rows or groups of trees, to the plantations and heavy timber, which I would have thought more suited to it, but where I did not find a single specimen.

PERCY E. FREKE.

**Entomological Notes from S.E. Ireland.**

The following list of local insects captured by me while staying on a visit with my brother, Capt. Bonaparte-Wyse, of the Manor of St. John's Waterford, during some seven weeks, extending from the middle of May to the end of June, may prove of interest to readers of the *Irish Naturalist* :—

**LEPIDOPTERA.**—*Leucophasia sinapis*, L.—I took a few of this generally scarce butterfly at Curraghmore towards the end of May and beginning of June. I have recorded the occurrence of this butterfly in Co. Waterford in the *Entomologist*, vol. xxx., p. 200; also the capture of a single specimen near Mileport, Co. Kilkenny—a new locality, I believe, for this local insect.

*Lycana argiolus*, L.—This fragile little butterfly was very common during May in the woods of Curraghmore; it was quite over by the beginning of June.

*Melitæa aurinia*.—I found this local butterfly, not uncommonly, in a bit of marshy ground near Mileport, in the Co. Kilkenny, adjacent to a small fir-wood. The examples I took seem to be like the English specimens I have seen, with the fulvous patches of all the wings very uniform in hue. One female example, however, would seem to have the chief characteristics of var. *praclara*, Kane (vide *Entomologist*, vol. xxvi., p. 159).

*Vanessa cardui*, L.—I observed this beautiful butterfly very commonly flying along the edge of the cliffs near Baginbun Head, Co. Wexford, on the 14th June. I did not meet with it elsewhere. *V. io*, L. was generally common at Curraghmore and other parts of the Co. Waterford. I also saw a few specimens of it near Mileport, in the Co. Kilkenny, towards the end of May. *V. atalanta*, L. was much less common. I only noticed a few specimens, chiefly in the same localities as the last.

*Macroglossa bombylifformis*, Och.—I captured a fine specimen of this moth on the 24th May at Curraghmore hovering over the flowers of Wild Hyacinth (*Hyacinthus non-scriptus*).

*Ino statice*, L.—I found this pretty species rather commonly at Curraghmore in various different localities during the month of June. I took a single specimen near Mileport, Co. Kilkenny.

*Nemeophila russula*, L.—This moth occurred in abundance in the same bit of marshy ground which *Melitæa aurinia* frequented near Mileport. I took a single specimen of it near Curraghmore towards the end of June.

*Glisiocampa neustria*, L.—I found a larva of this species on the Youghal road, about a mile from Dungarvan, on the 1st June. I mention this because this moth does not seem to be of common occurrence in Ireland.

*Saturnia pavonia*, L.—I captured two specimens, male and female, of this beautiful moth on June 3rd in an open space in a small fir-wood near Mileport, Co. Kilkenny. I subsequently observed several male specimens of it darting over the heathy land adjacent to the wood, but was unable to make any captures. I was surprised to meet with this moth so late in the season.

*Macaria liturata*, Cl.—I took a rather worn example of this "Geometer" on June 3rd near Mileport.

*Fidonia (Bupalus) pinivaria*, L.—I took a male specimen flying round a fir-tree on June 3rd near Mileport, Co. Kilkenny, and saw a few others. I believe there are only two previous records for this insect in Ireland.

COLEOPTERA.—*Cicindela campestris*, L.—I found this beautiful beetle in abundance in a certain locality at Curraghmore. The Rev. W. F. Johnson, to whom I sent a few specimens, writes me that it has not been previously recorded from Co. Waterford.

*Carabus granulatus*, L.—I found one specimen crawling on a bye-road in Curraghmore demesne.

*Calathus melanocephalus*, L.—Two specimens under stones at Roanmore, Co. Waterford.

*Amara lunicollis*, Schöidte.—I took a single specimen of this scarce beetle under a stone at Roanmore on June 20th.

*Geotrupes sylvaticus*, Panz.—I found a specimen of this dung-beetle drowning in a rut full of water on a bye-road in Curraghmore demesne.

*Malachius viridis*, F.—This beetle I believe has not been previously recorded from Ireland. I took a single specimen at Curraghmore, in a bit of marshy ground bordered by trees, on June 5th.

*Agriotes sputator*, L.—I took a single specimen of this insect under a stone, on the sand-hills near Tramore, on June 21st. There is a slight doubt about this beetle. Mr. W. F. Johnson, to whom I sent this insect for identification, and several other species of Coleoptera, wrote me:—"I am not very sure of *Agriotes sputator*, but cannot make it anything else."

*Cassida viridis*, L.—I took two examples of this curious beetle in a marshy bit of ground near Tramore, Co. Waterford.

I am greatly indebted to the Rev. W. F. Johnson for kindly identifying the majority of the beetles mentioned above, together with several other commoner species I had sent him to name for me.

L. H. BONAPARTE-WYSE.

**Odynerus sinuatus (Fab.) In Co. Carlow.**

I found this species common at Rhododendron blossoms this year at Borris, Co. Carlow, and also found it burrowing in an old wooden post on the bank of the river Barrow in some numbers. As it is new to the Irish list of Aculeate Hymenoptera it is worth recording.

PERCY E. FREKE.

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**BIRDS.**
**Mass-Migration of Birds at Londonderry.**

In the beginning of May a great mass-migration of birds passed over our city. It was observed by Mr. Wm. Roddy, editor of *Derry Journal*; Mr. Edward M'Court, our local bird-stuffer; and by many others who were in the street at the time. Mr. Roddy has kindly given me particulars of his observations. The flight commenced to pass over the city about 10.30 p.m., and between 11 and 12 was at its height. An hour or two later it dwindled down to scattered flocks. The number was beyond all calculation, not thousands, but hundreds of thousands, of birds. Mr. Roddy said that the columns were so great that he could only describe them by saying that "acres of birds passed overhead." The glare of the electric light so illuminated the sky that it was possible to distinguish the species now and then. Wild geese formed the outside columns, while the great bulk of the flight was made up of duck, Wigeon, Curlew, Oyster-catchers, and plover. Mr. M'Court heard the call-notes of both Golden and Ringed Plover, and a friend described to me how he had observed a flock of the former species, attracted by the glare of the electric light, circling round and round an electric lamp for some time before joining the mass of birds again.

The direction of the flight was from S. or S.W. to N.E. The columns were moving at a considerable height, but now and then a flock passed close to the roofs of the houses, attracted it may be by the electric light. The call-notes were incessant, and now and then above the cry of the plover and Curlew was heard a harsh "croak" like the cry of the Heron or the Great Northern Diver.

D. C. CAMPBELL.

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**The Icterine Warbler in Ireland.**

With reference to the very interesting paper on the Icterine Warbler (*Hypolais icterina*) in the *Irish Naturalist* for May, I wish to point out that the birds heard by the Rev. A. Ellison and the Rev. Murray A. Mathew in Co. Wicklow and Pembrokeshire were (supposing that they belonged to the genus *Hypolais*), very probably examples of *Hypolais polyglotta*, the "Melodious Warbler," which has a more western range than has *H. icterina*, and is not at all unlikely to occur in the south or south-western parts of these islands; indeed, I believe that its nest has been found on one occasion at least in the South of England, although the fact was not proved. This species is smaller (perceptibly so in life) than *H. icterina*, and as one of the last-named observers compares the bird he saw to a Willow Warbler, and the other to a Chiffchaff, it is

probable that they saw birds which were smaller than *H. icterina*. The smaller species has a much finer song than has the larger; and I venture to think that some observers who have praised the song of *H. icterina* very highly, may, just possibly, in some instances, have had their opinion formed partly by the song of its more melodious relation. But this, apparently, could not occur in Holland, Germany, Norway, &c. However, when, last summer, I heard *H. icterina* on one occasion in Norway, I heard as I surmised I should (*Zool.*, 1896, pp. 125 and 228), a much better song from it than I did in North Africa. Mr. Benson might have referred to this further note of mine on the subject (*Zool.*, 1896, p. 418).

O. V. APLIN.

### The Birds of Rathlin and Ballycastle.

In the July number of the *Irish Naturalist*, Mr. Standen, in his "Observations on the Fauna of Rathlin Island and Ballycastle," states "that the Chiffchaff and many other warblers abound." Now these observations with regard to Rathlin are quite the opposite of those of my friend, Mr. R. Patterson in his exhaustive list of the "Birds of Rathlin." He mentions the "Chiffchaff as only an occasional visitor, not known to breed. One was taken in an apple-tree in March, 1862. The Willow Wren is rarely seen—one caught alive near the Light-house, and another found in Mr. Gage's garden in April, 1867." While the Whitethroat is the only warbler mentioned as a "regular summer visitor," and even the Sedge-warbler is rare, according to Mr. Patterson; and neither Mr. Patterson nor Mr. Gage (in his list of the birds of Rathlin in the *Proc. Dublin Nat. Hist. Soc.* of December, 1861), mentions the Whinchat. So it is very evident that if the information received by Mr. Standen in reply to his inquiries is correct, a very great increase must have taken place in the visits of these warblers to Rathlin. I also wish to direct attention to the list of birds breeding at Cushendun given by the Rev. Mr. Brennan to Mr. Standen, in which the "Pied Flycatcher" is named, a bird so rare in Ireland that its capture has very seldom been recorded. The first specimen taken here at Moy View, Co. Sligo, in April, 1875, and two or three others at light-houses off the coast—e.g., at the Tearaght, September the 21st, and at the Fastnet October the 5th, 1886, and again at the Tuskar, 28th September, 1888, recorded by Mr. R. M. Barrington.

ROBERT WARREN.

### "Pied Flycatcher" in Co. Antrim: a correction.

In my article on the "Fauna of Ballycastle District" in the *Irish Naturalist* for July (*ante*, page 174), I give the above species—on the authority of Rev. S. A. Brennan—as breeding about Cushendun. Mr. Ussher having pointed out to me the extreme rarity of this bird in Ireland, as an occasional visitor on migration, I communicated with Mr. Brennan, who informs me that it is the Spotted Flycatcher which he has observed, and not the "Pied Flycatcher," as inadvertently written in his list.

R. STANDEN.

### House Martins nesting in Sea-Cliffs.

That House Martins originally built in cliffs and rocks is pretty evident, and that they do so in many places still is well known; but I was not aware until last month that they built in overhanging cliffs at Bray Head, about 30 feet above high-water mark. There are about seven pairs now breeding there, and from the situation of the nests it is quite possible that the waves might reach them in easterly gales.

R. M. BARRINGTON.

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### GEOLOGY.

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#### Bog Bursts.

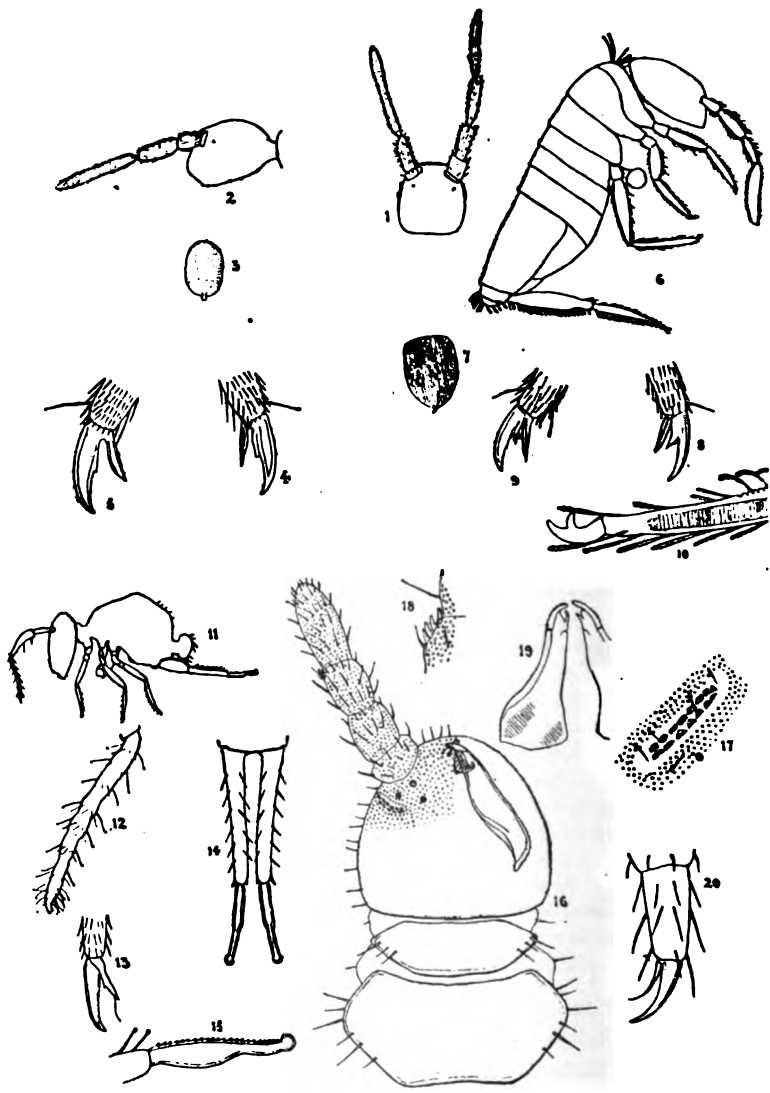
I have been much interested in Mr. R. L. Praeger's admirable paper on this subject in the *Irish Naturalist* for June last, and can add another instance to the solitary one he records of the occurrence of this phenomenon in England (Solway Moss). In an article in the *Gentleman's Magazine* for 1745, the writer states that on "Saturday, January 26th, 1744, a part of Pilling Moss, in the district of Amounderness, Lancashire, lying between the rivers Wyre and Cocker, and situate between Eskham House and an estate of Mr. Butler's, of Wild Boar, was observed to rise to a surprising height. After a short time it sank as much below the usual level, and moved slowly towards the south side. In half an hour's time it covered 20 acres of land. The improved land adjoining that part of the moss which moved was a concave circle, containing near 100 acres, which was well nigh filled with moss and water. In some parts it was thought to be five yards deep. A family were driven out of their dwelling-house, which was quite surrounded, and the fabric tumbled down. A part of the moss, which was sunk like the bed of a river, ran north and south for about a mile in length and near half a mile in breadth, so that it was apprehended there would be a continual current to the south. A man who was going over the moss, to the eastward, when it began to move, perceived to his great astonishment that the ground under his feet moved southward. He turned back speedily, and had the good fortune to escape being swallowed up." This incident must have made a strong impression upon the inhabitants of the district, for it is still talked about, and I have heard the older people, in alluding to some particular event in local history, date from "the slipping of Pilling Moss."

R. STANDEN.

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COLLEMBOLA FROM MITCHELSTOWN CAVE.

[To face p. 225.]

## THE COLLEMBOLA OF MITCHELSTOWN CAVE.

[Report on Material collected for the R.I.A. Flora and Fauna  
Committee.]

BY GEORGE H. CARPENTER, B.S.C.

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[Plate 2.]

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Two years ago in a paper (1) read before the Dublin Naturalists' Field Club, I described two species of Collembola from the famous cavern of Mitchelstown. Subsequently Mr. H. L. Jameson visited the cave and, during an exploration of several hours, obtained a large series of specimens of its insect inhabitants. He gave an account of his expedition before the Dublin Club, and published a short list of the various species observed, with some suggestive remarks as to their varying degrees of adaptation to cave life (2). The specimens which he collected were far more numerous than those obtained by the members of the united Field Clubs in 1894 and described in my former paper; while a large proportion of his material was in very good condition. I have, for some time past, been examining the insects with a view to supplement and correct my former observations.

The two species described by me in 1895 were the *Lipura* (*L. Wrightii*, Carp.) which the late A. H. Haliday and Prof. E. P. Wright discovered in the cave forty years ago (3) and a white blind springtail which I referred to the genus *Sinella* (Brook) under the name of *S. cavernicola*. The very large series of the *Lipura* which Mr. Jameson collected has enabled me to examine a number of specimens and correct several errors in my earlier description. The most important point now brought to light is that the species does possess a post-antennal organ, which Mr. Haliday and I both failed to find in the specimens we collected in the cave. As this organ is the best specific character in the *Lipura*, it is of value in comparing our species with its congeners. Of the springtail

A

which I called *Sinella cavernicola*, Mr. Jameson found only three or four specimens. These are in much better condition than my types and it is evident that the species is scaled, not, as I supposed, destitute of scales. It is therefore not a *Sinella* and must be transferred to *Templetonia*. I may perhaps be forgiven for not having seen the scales which had been rubbed off, but I certainly should not have overlooked the proportions of the abdominal segments which I figured. Unfortunately I had not examined many springtails at the time, and I did not appreciate the importance of this character in the discrimination of genera.

A large number of white springtails, which I, at first, believed to be the young of *Templetonia cavernicola*, were collected by Mr. Jameson. Detailed examination has, however, shown that these represent a species new to the fauna of Mitchelstown cave and probably new to science. They are, I believe, referable to the genus *Cyphoderus*, but closely approach a French cave-species *Seira cavernarum*, recently described by Moniez (8) from the cavern of Dargilan, which according to that author might almost as well be placed in the *Cyphoderus*. But they differ sufficiently from his description to make a new name advisable, and I have pleasure in dedicating the species to the intrepid French explorer, M. Martel, whose journey through Ireland has done so much to arouse interest in the caves of our limestone districts.

Mr. Jameson has himself recorded (2) the occurrence in the cave of *Tomocerus tridentiferus*, Tullberg (*plumbeus*, Lubbock) which was found there by Messrs. Wright and Haliday. Among his numerous specimens of *Lipura Wrightii*, I now find a few examples of three other species, which, like the *Tomocerus*, are not typical cave-insects. These are *Achorutes armatus*, Nicolet, *Anurida granaria*, Nicolet, and *Smyntkurus cæcus*, Tullberg. The last-named species is a minute, white, eyeless springtail, which, though found in flower-pots on the Continent, should be quite at home in a cave. It does not seem to have been hitherto observed in the British Islands. Altogether, therefore, we are now able to record seven species of Collembola from the cavern of Mitchelstown. It remains to deal with each species in detail.

## FAMILY SMYNTHURIDÆ.

*Smynthurus cæcus*, Tullberg (12)

Pl. 2, figs. 11-15.

The single specimen of *Smynthurus* found by Mr. Jameson, being white in colour and destitute of eyes, might naturally have been supposed to belong to a typical cave-species. The very characteristic spring (figs. 14, 15) with the elongate mucro, two-thirds the length of the dens, ending in a rounded knob, agrees exactly however with Tullberg's figures (12, pl. iii., ff. 24-5) of *Smynthurus cæcus*, a species found by him in flower-pots in Sweden, and since recorded by Reuter (10) from Finland. Tullberg states that this species is without eyes, and that its body is white with red spots. No trace of such markings is to be seen on the Mitchelstown specimen, but the disappearance of pigment would be a natural result of underground life, and is not of more than varietal value.

The antennæ of this species are long, the fourth segment being nearly as long as the second and third together; the third is greatly thickened specially at the proximal end; the fourth, as in many *Smynthuri*, is ringed and provided with whorls of clubbed hairs (fig. 12). The feet are destitute of clubbed hairs; the upper claw is simple, while the lower claw carries a small tooth near its base, and a long threadlike process near its point (fig. 13).

As mentioned above, *Smynthurus cæcus* is an addition not only to the fauna of Mitchelstown Cave, but also to that of the British Islands. So minute an insect—its length is only about 7 mm.—might be very readily overlooked, and it probably awaits discovery above ground in similar situations to those it affects in Sweden and Finland. It is possible, however, that, like so many other animals of northern range it will be found characteristic of Ireland, perhaps even altogether absent from England, though it should almost certainly be found in Scotland. Mr. Jameson's collection of the cave-insects was so extensive that he would probably have taken more than a single individual if the species had colonised the cave to any extent. Joseph (3) has described four species of *Smynthurus* from the Carniolan caves, to one of which he gives the name *S. cæcus*. He states, however, that it is nearly related to *S. fuscus*, Nicolet, which is a *Papirius*, not a true *Smynthurus*.

## FAMILY ENTOMOBRYIDÆ.

*Tomocerus tridentiferus* (Tullberg). (12).*T. plumbeus*, Lubbock (4) nec Linné.

Messrs. Wright and Haliday found a springtail in the Mitchelstown Cave which they referred to this species (13). Mr. Jameson obtained several specimens not differing in any particular from the examples of this common species which one finds above ground. He remarks (2) that the insect seems equally at home in caves or in the upper world under stones. Packard (9) has recorded this springtail from North American caves.

In their recent systematic works, Schött (11) and Reuter (10) follow Tullberg (12) in regarding *T. longicornis* of Müller and Lubbock (4) as the true *T. plumbeus* of Linné. The present species (*T. plumbeus*, Lubbock) is readily distinguished from other species of the genus by the trident-like spines on the dentes of the spring.

**Cyphoderus Martelli, sp. nov.**

Pl. 2, figs. 6-10.

*Sinella cavernicola*, Jameson (2) (for the most part).

Antennæ one-and-a-quarter times as long as the head, second segment slightly longer than third, fourth segment still longer; thorax with a few clubbed hairs; fourth abdominal segment three and a half times as long as third (fig. 6). Upper claw of foot with a delicate but prominent tooth; lower claw three-quarters as long as upper (fig. 8, 9). Mucro of spring short and recurved, as in *Seira*, bearing a strong tooth. Dens with numerous long clubbed ciliated hairs (fig. 10). White, with a slight yellow tinge. Length 1.5 mm.

Mr. Jameson took a large number of examples of this springtail, which next to *Lipura Wrightii*, seems the dominant species in Mitchelstown Cave. It may, I think, be safely referred to the genus *Cyphoderus*, Nicolet, in its modern, restricted sense (= *Buckia*, Lubbock), as it resembles the type-species, *C. albinus*, Nicolet, in the form of its antennæ and the structure of its feet. The mucrones of the spring however are relatively much shorter than in *C. albinus*, and recall rather those of a *Seira*.

I have already alluded to the French cave-species *Seira cavernarius* described by Moniez (8) from the cavern of Dargilan. That insect would seem to agree to a great extent with the present springtail in the relative length of the abdominal segments, the structure of the feet, and the mucrones of the spring. The antennæ of the French insect, however, are more than half as long as the body, and this proportion seems to have led Moniez to place it in *Seira* rather than in *Cyphoderus* in spite of the absence of eyes.

The two European species of *Cyphoderus*, *C. albinus*, Nicolet, and *C. argenteus* (Lubbock) are both blind, so it would seem that our Mitchelstown insect is, in this respect, no more degenerate than its above-ground relations. *C. albinus* lives in various concealed situations, and is often found in ants' nests on the Continent. The blindness of various animals which live with ants is well known, as in the case of gamasid mites, the beetle *Claviger* and the woodlouse *Platyarthrus*; probably the darkness and the ease of gaining a living in the ant-colonies render sight needless, and so it may be that the blindness in the cave-species and in *C. albinus* has been independently acquired. It is noteworthy that according to Joseph (3) *C. albinus* is itself an inhabitant of certain caves in Carniola.

I have already indicated the difference in the form of the mucrones of the spring which separates our species from *C. albinus*. The third antennal segment, moreover, is much longer relatively in *C. Martelli*. In this last character the species resembles *C. argenteus* (Lubbock) (4), but it

differs from the latter in the scantiness of its thoracic tuft of clubbed hairs and the absence of any silvery reflection from the body. Unfortunately Lubbock gives no distinctive structural characters except the relative length of the third antennal segment.

### **Templetonia cavernicola** (Carpenter).

Pl. 2, figs. 2-5.

*Sinella cavernicola*, Carpenter (1).

do., (in part), Jameson (2).

As mentioned above, the discovery that this species is scaled (fig. 3) necessitates its removal from the genus *Sinella*. The ringed terminal segment of the antenna and the structure of the feet leave no doubt that it is a *Templetonia*, and closely allied to the type species *T. crystallina* (Müller), which is widespread throughout Europe.

In his figures of *T. crystallina* (*nitida*, Templ.), Tullberg (12) called attention to the remarkable deformation of the antennæ in certain specimens which had presumably been mutilated. The Mitchelstown species gives excellent illustration of this phenomenon. One of the individuals collected by Mr. Jameson had one normal five-segmented antenna; the other antenna had but three segments (fig. 1). Other specimens possessed antennæ with four segments (fig. 2). It is interesting to notice that the terminal segment is in all cases the longest and surrounded with rings of clubbed hairs; while in antennæ with less than five segments, it is proportionally longer than in those where the normal number is developed. Lubbock (4) calls attention to a similar phenomenon in *Tomocerus*.

In *Templetonia crystallina* there is a single ocellus on either side of the head situated on a pigmented eye-patch. In *T. cavernicola* no ocelli can be seen, but there are vestiges of the eye-patches in a few granules of brown pigment (figs. 1, 2). The feet of *T. cavernicola* closely resemble those of *T. nitida*, but the lower claw is more lanceolate and less linear in the cave-species. In my former description of this insect, I stated that the feet were destitute of clubbed hairs; I now find that while those of the second and hind pairs are furnished with long hairs ending in a fine point (fig. 5), the long hair on each front foot terminates in a very slender club (fig. 4).

A species of *Templetonia*, *T. major*, has been recorded by Moniez (5, 7) from mines and wells in the north of France, as well as under stones above ground, it also occurs in the Azores (6). It is larger than the other species of the genus and the upper claw of the foot has two teeth.

### **FAMILY LIPURIDÆ.**

#### **Achorutes armatus** (Nicolet).

Mr. Jameson found three or four specimens of this species. In examples which occur above ground the surface of the body is, for the most part, covered with pigment. But in these Mitchelstown insects the amount of pigment is reduced, appearing in scattered spots on a white ground.

**Lipura Wrightii** (Carpenter).

*L. stilicidii*, Wright and Haliday (13).

I have referred in my introductory remarks to the discovery of a post-antennal organ in this species—the dominant and characteristic insect of Mitchelstown Cave. The organ is harder to make out than in other species of *Lipura*, but it can be seen in most specimens, after treatment with caustic potash has rendered the head transparent. I have figured the organ in its position on the head (fig. 16), and given a more highly magnified sketch (fig. 17) of an example with fifteen prominences. Some examples have as many as eighteen. Between the organ and the antenna are three ocelliform punctures (fig. 16).

In *Lipura inermis*, Tullberg (= *L. fimetaria*, Lubbock) there are fourteen prominences in the post-antennal organ and two ocelliform punctures. In *L. stilicidii*, Schiödte, from the Adelsberg cavern, Carniola, there are also fourteen prominences, but there are three ocelliform punctures as in *L. Wrightii*. Since my former paper on the Mitchelstown Cave fauna, the Dublin Museum has received specimens of *L. stilicidii* from Prof. Hamann, of Steglitz. Examination of these leaves no doubt that the structures described and figured by Schiödte are the prominences of a post-antennal organ, as Tullberg and Lubbock suggested, and not ocelli. Both our Mitchelstown species and *L. stilicidii* are therefore truly referable to *Lipura* and not to *Anurophorus*, which, in its modern sense, is restricted to *A. laricis*, Nicolet, a species with ocelli, but no post-antennal organ.

*L. Wrightii* can no longer be differentiated from *L. stilicidii* by the absence of a post-antennal organ, and it is seen that this structure differs but very slightly in the two forms. Both species have a strongly granular skin covered with bristles. In our specimens of *L. stilicidii* I find two stout spines on the last abdominal segment. These spines are absent in *L. Wrightii*. Those present in the Adelsberg species are much smaller than the prominent anal spines characteristic of *L. ambulans* and other *Lipura*, and according to Schiödte's figures copied by Haliday (13) they disappear in perfectly adult specimens.

Both in *L. stilicidii* and *L. Wrightii* the apex of the third antennal segment bears a number of stout curved spines (fig. 18). I have found similar but smaller structures in a corresponding position in *L. ambulans*. I can find no mention of these in the literature, and have no idea of their function. Moniez, however (8), states that the apex of the second antennal segment of a French cave-species, *L. cirrigera*, bears a tuft of cirrhi which he believes to be some special adaptation to cave life. Beyond the obvious fact that it is some kind of sense-organ, the function of the post-antennal structures is also unknown.

It is certain that I was mistaken in describing the back margin of the head of *L. Wrightii* as sinuate, as well as in supposing the pronotum to be indented on either side. In the latter error I seem to have followed Haliday; it is some consolation to have made a mistake in such excellent company. I was deceived by the lateral projections of the thorax in the first segment, as Schiödte seems to have been in all the segments. I have figured (fig. 16) the head and two first thoracic segments as they really are, and in *L. stilicidii* they are closely similar.

**Anurida granaria** (Nicolet).

A few examples of this species were among Mr. Jameson's specimens of *Lipura Wrightii*. It is a white species, found somewhat rarely under stones. The genus *Anurida*, Laboulbène, in which it is now placed, is characterised by the circular arrangement of the prominences of the post-antennal organ. Moniez (5) states that this species has been drawn up in well-water in France.

In my previous paper on the Mitchelstown cave fauna, I drew attention to the apparent similarity of cave-insects in widely-separated localities, and ventured to suggest the possibility that the identical surroundings might have induced the independent development of similar forms in Europe, Ireland, and North America.

I have now been able to compare the Adelsberg and Mitchelstown species of *Lipura*, and find the differences between them even less than was before supposed, and that they are so closely allied, as to be hardly separable. It is evident that my "*Sinella cavernicola*," being really a *Templetonia*, can have no close affinity with *Entomobrya cavernarum* (Packard) from the North American caves. I find, however, that Moniez has pointed out the close similarity of his *Seira cavernarum* to that species of Packard's. Of course *Seira* has scales and *Entomobrya* has none, but Moniez, finding the difficulty of seeing the transparent scales on these white cave insects, thinks it possible that Packard may have failed to make them out, and the form of his insect seems to suggest a *Seira* or a *Cyphoderus* rather than an *Entomobrya*. I have already dwelt on the apparent similarity between the Mitchelstown *Cyphoderus Martelii* and *Seira cavernarum*, and it is interesting to notice that in Packard's species the lengths of the antennæ vary inversely as the depth of the caves where the specimens occur, thus bridging over one of the differences between the Mitchelstown and the French species. It is to be hoped that further explorations of our caves may throw more light on this most fascinating problem of the possible multiple origin of identical species.



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## EXPLANATION OF PLATE 2.

- Fig. 1. *Templatonia cavernicola*.—Head from above, showing one five-segmented (normal), and one three-segmented antenna. Magnified.
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|----|---|---|
| 2. | Do.,                                    | Head from side showing a four-jointed antenna. Magnified. |
| 3. | Do.,                                    | Scale from back of abdomen. Highly magnified.             |
| 4. | Do.,                                    | Foot of fore-leg. Highly magnified.                       |
| 5. | Do.,                                    | Foot of hind-leg. Do.                                     |
| 6. | <i>Cyphoderus Martelii</i> .—Magnified. |   |
| 7. | Do.,                                    | Scale from back of abdomen. Highly magnified.             |

- Fig. 8. *Cyphoderus Martelii*.—Foot of fore-leg. Highly magnified.  
 9. Do., Foot of hind-leg. Do.  
 10. Do., End of spring, showing extremity of dens and mucro. Highly magnified.  
 11. *Smyntaurus cacus*.—Magnified.  
 12. Do., Terminal segment of antenna. Highly magnified.  
 13. Do., Foot of second leg. Highly magnified.  
 14. Do., Spring from above. Magnified.  
 15. Do., Mucro of spring from side. Highly magnified.  
 16. *Lipura Wrightii*.—Head and first two thoracic segments. Magnified. On the left side of the head are shown the antenna, post-antennal organ, and three ocelliform punctures; on the right side the mandible is seen in position, with the tip of the left mandible.  
 17. Do., Post-antennal organ. Highly magnified.  
 18. Do., End of third antennal segment. Highly magnified.  
 19. Do., Maxillæ. Magnified.  
 20. Do., Foot. Highly magnified.

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## OBITUARY.

### MISS E. J. KELSALL.

It is with deep regret that we record the death of Miss Kelsall which took place on June 28th, at her residence, Blackrock, Co. Dublin. The deceased lady was the daughter of the late Colonel Kelsall, and was born in 1832. She was one of the original members of the Dublin Naturalists' Field Club, and up to the time of her last illness, she continued to take a deep and active interest in the welfare of that Society. For many years she served on the Committee, and she was most regular in her attendance at the meetings and excursions of the Club. Miss Kelsall was a good field botanist and an ardent horticulturist; she observed closely the animals frequenting her garden, and among the worms found by her was a planarian which has been pronounced new to science by the highest continental authority on the group. Her loss is mourned by a wide circle of friends, and not least by the members of the Dublin Field Club whose interests she had so much at heart.

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### WILLIAM ARCHER, F.R.S.

As we go to press we are grieved to learn the death of the late librarian of the National Library, one of the most eminent of Irish men of science. We hope to publish next month an account of Mr. Archer's work by his lifelong friend, Dr. W. Frazer.

## PALUDESTRINA [HYDROBIA] JENKINSI, SMITH.

## A NEW IRISH SHELL.

BY LIONEL E. ADAMS, B.A.

WHILE at Ballycastle last May, Mr. R. Welch, of Belfast, showed me some shells he had taken in 1893, and also with Captain Farrer in 1896, from my old hunting-ground at the mouth of the Bann, among which were some individuals of an extremely interesting species, and one new to Ireland, viz. :—*Paludestrina* (or *Hydrobia*) *Jenkinsi*.

Apart from its being an addition to the molluscan fauna of Ireland this species has an exceedingly interesting history, as I hope to show.

In the year 1889, Mr. Jenkins found a colony of shells on the bank of the Thames near Plumstead, which did not appear in any of the text-books, and which were quite unknown to himself and his conchological friends. Accordingly he sent a series to the British Museum, where Mr. E. A. Smith pronounced the species not only new to Britain but also to science. However, after seeing a greater number of individuals, Mr. Smith is not certain that the shell is not identical with a West Indian species, *Paludina crystallina* of Pfeiffer, and Canon Norman is decidedly of this opinion. Mr. Smith points out, however, that the threadlike keel round the whorls of some individuals of our British species differs from the carination of Pfeiffer's *P. crystallina* var. *coronata*, which consists of a row of spines forming a coronation rather than a carination.

In 1891, I came across the shell in dykes at Sandwich, and in that year also, under the guidance of the Rev. J. W. Horsley, I visited the Plumstead locality; and the next year, with Mr. C. Oldham, of Manchester, I took it in considerable numbers in a small tributary of the Exe, below Exeter, near Topsham. It then occurred to me that in several respects the three localities were similar, and I gathered the following facts. Both Sandwich and Topsham were of considerable importance as trading ports until, roughly speaking, two hundred years ago, when from different causes both subsided in favour of their respective sisters, Dover and Exeter. Two

men-of-war, which afterwards fought against the Armada, were built near Topsham on the very spot where *P. Jenkinsi* now flourishes. They must have been vessels of very small draft to have navigated the Exe at all, though the river may have been deeper then. Between 1840 and 1855 there was a regular trade between St. Petersburg and Finland and Topsham in timber, &c., but this trade ceased some twenty years ago, the timber being now unshipped at Exmouth, and sent to Exeter by rail or canal.

Sandwich, too, in former times, imported timber from the Baltic, as well as from other places, and this trade continued till quite recently, when the improved harbours of Dover and Ramsgate killed it. Along the south bank of the Thames timber has been unloaded from the Baltic, and other places, from time immemorial.

Now, the fact of the same foreign locality exporting timber to three different British ports (the only known habitats (then) of the species in question), and that same foreign locality being the only one, so far as I have been able to ascertain, trading mutually with two out of the three seemed a curious coincidence, and one which formed a plausible hypothesis. I ascertained that Newhaven and Wisbech also imported timber from the Baltic, and I suggested that search should be made there. I made two excursions to Wisbech and neighbourhood, but I had very little time to search the far-extending dykes thoroughly, and I failed to find it. However, in 1894, Mr. C. H. Morris, of Lewes, found an exceedingly abundant colony at Newhaven. Curiously enough Mr. Morris and several others had worked the locality for several years, and had never met with it before. Hearing that Baltic timber was still unloaded at Rye, I searched for the shell there, but my limited time again prevented me from investigating the many miles of dykes that intersect the plain round that charming old Cinque Port. However, I did find it close by in the Military Canal at Hythe, which is joined to the Rye dykes by sluices in several places. In 1893, Mr. A. T. Daniel, of Stoke, found a thriving colony in a Staffordshire canal, near Dudley, which was the first inland locality noticed; but I have been unable to obtain any information respecting this spot, though probably there is a timber wharf not far off.

And now Mr. Welch makes the further interesting discovery of the shell in Ireland, and he has ascertained for me that three firms import Baltic timber at Coleraine, and that a considerable amount was used for the Bann-mouth Extension works.

In 1883-1884 I did a good deal of collecting in this locality, and I fancy I should have remarked the shell if I had come across it, as it was then an unknown form.

Such, briefly, is the history of this species, and the following points are suggested :—

Had the shell come from Norway, Sweden, or Prussia, it is likely that it would have been discovered ere now by some of the keen investigators of those countries, but it is not so likely that conchologists have wandered along the low-lying shores of Russia and Finland, which shores, from personal knowledge, I can testify to being extremely desolate and difficult to traverse. These shores have large inlets and brackish marshes where the timber is stored previous to shipment, and I imagine it is from these places that the shell comes. Of course it may be indigenous to the British Isles but in that case it is difficult to account for its having escaped the notice of the numerous conchologists, who for the past forty years have made many of its habitats their favourite hunting-grounds; the Staffordshire canal and the mouth of the Bann being the only habitats that have been little worked.

In my "Collector's Manual of British Land and Freshwater Shells" I have figured the shell and discussed its alleged identity with the West Indian species, but even if this identity turns out a certainty, another question arises. Is it indigenous to the West Indies, or was it imported there in Baltic timber?

Of course it remains to be seen whether it exists on the shores of the Baltic, for it must be remembered that its existence there is merely based upon a hypothesis, which, however, seems probable.

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## THE BORDERLAND OF EUROPE.

**On the Origin of the European Fauna.** By R. F. SCHARFF, PH.D.  
*Proc. Roy. Irish Academy* (3), vol. iv., no. 3, 1897. Price 1s. 6d.

It is difficult for anyone other than Dr. Scharff himself to review this remarkable paper. I have sought to avoid fate by flight; but the work still remains within my hands. With the actual connivance of the editors, I write in the far north, away from books, and in contact with primæval Ireland. A peasantry, clad in the simple brilliance of old days, in scarlet and green, orange and tawny brown, moves through the market beneath the windows, and carries the mind a century from Dublin or Belfast. To the north rises the gneissic moor of east Tyrone, one of the oldest backbones of the country, swept this day with cloud-drift, and chill with August rain. And here I am directed to sit me down and discuss the European fauna.

The appropriateness, however, lies in this: Dr. Scharff centres his argument in ancient Ireland, and shows how the distribution of life-forms in this island may be used as an indication of their successive advent into Europe. His main thesis is that what he styles the eastern or Siberian element in the British fauna does not occur in Ireland; some members of this Siberian fauna occur in the East-Anglian Forest-bed; and the same fauna in Europe at large is posterior to the Lower Boulder-clay. Hence the Forest-bed is Postpliocene, while some part of the British Pliocene is contemporaneous with the Lower Boulder-clay of Europe. At or soon after the period of the Forest-bed, on the above evidence, Ireland was cut off from England and from Scotland. But the Arctic and southern elements of the fauna of our islands both occur in Ireland; hence they must have arrived prior to the deposition of the Lower Boulder-clay of Europe, and must have survived the glacial epoch in the area in which they are now found.

This, I take it, is the principal contention of the present paper; but its eighty pages are full of valuable information, and of new light thrown upon facts which have been elsewhere set before us. Much of our knowledge of the Irish fauna, from the point of view of distribution, will be found to be due to recent researches, and notably to those of Dr. Scharff himself. The encouragement given by the Field Clubs and by the *Irish Naturalist* to individual observers is certain to bear further fruit; but it seems doubtful if the central facts, the absence of the Siberian fauna from Ireland and the date of its spread across Europe, can be shaken by future observations.

Dr. Scharff at the outset makes light of the supposed accidental or artificial introduction of species into Ireland, and argues that the present fauna contains 95 per cent. of species (p. 434) which are sound for the purposes of his zoo-geological argument. This fauna, it is only reasonable to suppose, migrated from Europe—if it did migrate at all—across dry land. Whatever point of view we may take, a land-connexion, on and off through Cainozoic times, existed between our isles and the continent of Europe.

Now, here comes the possible difference of view between the geologist and the zoologist. The latter, arguing from his most natural study, distribution at the present day or in very recent deposits, concludes that a species arose near its position of maximum abundance. For some reason or other, moreover, the fact that the British Isles are islands now-a-days, has made everyone ready to speak of the migration of forms into those islands. The origin of European species within the area of the British Isles, and their migration outwards when local conditions became less favourable for their multiplication, are possibilities that seem too often disregarded. Yet the geologist must see in the western borderlands of modern Europe a diminished continent from which land-animals must have again and again moved eastward. The south-eastern sea, at one time a series of gulfs, at another a swelling ocean, has been a phenomenon of such frequent recurrence and of such amazing geological antiquity, that even at the present day one may be chary as to landed investments in the East. Species of Carboniferous labyrinthodonts may have originated in Kilkenny; mammals may have arisen at Bristol independently of their South African relations; the land-fauna of Jurassic and of Cretaceous times must have been thrown far westward by the spread of the eastern ocean, and must have gone on flourishing in the hills of Donegal and Connemara. The mammals of Eocene times are best known from French deposits; but they must have found a broader ground for exercise in the dry land that stretched continuously where our western isles at present stand. In middle Miocene times, during the Helvetian age, there must have been a veritable huddling together of the land-fauna towards Great Britain; the crowding would lead to fiercer competition, the keener processes of selection would lead to the origin of species. Hence geologists may fairly be unwilling to look on our isles as barren lands waiting to be peopled in Pliocene or later times. Far rather has the breaking up of a broad land-area along the present continental edge sent our land-fauna to the new steppes that opened eastward, leaving us a mere diminished remnant to struggle with the glacial epoch.

The rich terrestrial population here suggested would leave, however, scarcely any traces in our own Cainozoic strata. It is only in fortunate pockets, as it were, in the river-swept lands of Europe that any number of mammalian remains have been preserved. To this day, the little digging on the farm of Pikermi, and the local deposit of Mont Lébéron, are our chief storehouses for the land-fauna of the lower Pliocene in Europe. The richness of these deposits, however, points to an abundance of individuals across the continent. In our own area, the enormous denudation that accompanied the glacial epoch, whether we regard swollen rivers, or marine currents, or even moving ice-sheets, as the agent, would effectually sweep away the larger part of our previous land-deposits, some of which may have dated back to Eocene times. How much is now buried under "drift" is quite uncertain; but it is improbable that any recognisable deposit can remain. It required half the plateau-eruptions of Antrim to preserve the only Cainozoic land-

remains with which we are acquainted in Ireland, prior to the Glacial epoch; and even these land-remains, as we may fairly say in this country, are lacustrine.

All this is here put forward as showing that geologists, if allowed a loop-hole, will be anxious to claim the British area as a breeding-ground for the European fauna. And Dr. Scharff, by arguing that the fauna was not extinguished in Ireland by the glacial epoch, provides a loop-hole of some magnitude.

The discussion of the climate and physical geography of Europe during the glacial epoch is one of the most valuable features of the paper. Anything that keeps open the position maintained by Lyell and others, that extensive glaciation is compatible with mild and sheltered nooks and corners, and that much of the distribution of boulder-clay was performed in seas and not on land, may be welcomed by rationalists, at any rate until further research has been carried on among the Arctic glaciers. At present, every year brings evidence of modern marine boulder-clays in high latitudes, and removes us farther and farther from belief in a *moraine profonde*. Dr. Scharff, for example, in his extensive reading, has not overlooked the recent observations of Captain Feilden (p. 475); and Mr. Russell's description of the forest growing on the ice of the Malaspina glacier would also have provided him with a useful argument.

The absence of marine organisms from the Russian boulder-clay is met by the suggestion (p. 464) of "a persistent current, carrying icebergs, laden with detritus in an already turbid sea." But these conditions must have prevailed in almost any region where boulder-clay was forming under water; and the explanation must be regarded as tentative. The difficulties surrounding the discussion of glacial questions are admirably illustrated on p. 492, where Dr. Scharff's remarks are not only edifying, but exhilarating:—"A number of land and freshwater shells are quoted by Prof. J. Geikie from the Arctic freshwater bed on the coast of Norfolk, in evidence of a rigorous climate. These are spoken of by him as high northern forms; but in this he is mistaken. Everyone of them are inhabitants of Ireland at present, and all but one very common."

While Dr. Scharff does much to explain away the evidence in favour of an arctic climate in our islands, we may remember that the tables can be turned, and that the puzzle as to the Hippopotamus and Spotted Hyæna (p. 486) may be solved by supposing that, of a large number of such individuals subjected to a temperate climate, a sufficiently large number may be found capable of surviving and perpetuating the race. This, by the by, is only what happens when we send young men from our Universities and Staff-colleges to compete with natives in India.

When we come to old sea-barriers, and land-connexions now submerged, we are still largely in the region of hypothesis. Dr. Scharff treats candidly, yet firmly, the supposed connexion between Europe and America, by way of Spitsbergen (maps on pp. 461 and 466), and seems to regard Mr. Carpenter's suggestion of a dual origin of certain species as still beyond the range of probability (p. 476). But Cope argued for the dual ancestry of so complex a creature as the horse



—to admit which would be to deal an almost treacherous blow at our masters in the study of animal distribution. The land-connexions asked for are not only possible, but geologically probable; but there is no real reason for making the barrier between the North Sea and the Atlantic end off, as is here done, at or about the 100 fathoms line. Any western extension, if drawn, would certainly be guesswork; but it would make the proportions of land and water on the map more akin to those of a region undergoing elevation on the west and depression on the east. Dr. Scharff quotes Mr. Maxwell H. Close and Prof. Bonney (p. 494) in support of a greater elevation of the west coast of Ireland in recent times; but it is not made clear that such elevation is not likely to have occurred *en bloc*, as an uplift of the present continental edge. I am aware that map after map has been drawn in various works upon the basis of some such supposition—a supposition opposed by the variable heights of raised beaches or old sea-terraces on the actual margins of our continents. Even the remarkable hollow between Stranraer and Larne (p. 439) may be due to recent warping, and may have had no existence until the glaciers melted from our steadily subsiding shores.

I feel that I have dealt unfairly by the mass of facts brought together in this memorable paper in pointing out the wide field for favourable or unfavourable hypothesis. Even where Dr. Scharff speaks with decision, he may underrate the equal decisiveness of the other side. Though personally I cordially agree with him as to the indications of subsidence at Moel-y-Tryfaen and Three Rock Mountain (p. 498), it must be remembered that the advocates of ice-sheets are prepared to scoop cubic miles of material out of the sea. Even if we do not grant this as the simplest explanation, yet we cannot easily limit the area over which land-ice has existed in Ireland (p. 494). The almost level ice-filled centre, resembling the Malaspina glacier of Alaska, with local glaciers descending from the hills would leave little of the country, as we now know it, uncovered by solid ice. But these glacial conditions were probably dependent on considerable continental uplift to the west. In the lowlands bordering on the old Atlantic ocean, Dr. Scharff may find ample refuge for the pre-glacial fauna, concerning which he has argued so logically and consistently. As the land fell, as the great "piedmont" glacier melted, as the esker-drift appeared, brown and barren, from beneath it, the colonisation of the region known as Ireland began—a region that probably represents only a portion of a tract of plains and mountains once teeming with Cainozoic life.

As I close this comment—in place of a review—the sun streams across a land of mingled eskers, grown with grass and heather, and turns to gold the last relics of the glacial lakes. In such a scene, the "revolution of the times" seems very near us; and Dr. Scharff's paper, rising from the realms of learned disquisition, appeals to us direct as naturalists, speaks to us through the Ireland that we know.

GRENVILLE A. J. COLE.

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## THE HYDROIDS OF VALENCIA HARBOUR, IRELAND.

BY EDWARD T. BROWNE,  
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IN the *Irish Naturalist* (May, 1896), there is an article "On Shore-collecting and Dredging" in Valencia Harbour by my friend and colleague, Mr. F. W. Gamble. In that article Mr. Gamble gives the names of the Hydroids which were found in the harbour, but the identification of the species was done by myself, though most of the specimens were collected by Messrs. Gamble and Beaumont. The name of *Coryne pusilla* must be withdrawn from the list, as a subsequent examination of the specimens show they are not to be distinguished from *Coryne vaginata*. A second visit to Valencia Harbour was made last year (1896), and a few more species were found. It is my intention to give now a list of all the Hydroids which we found, and a brief description of some of the specimens.

From the situation of Valencia Harbour, its large area, its sheltered position, and the varied nature of its shores, it would be expected to yield a considerable hydroid fauna. The tow-net captured several species of Medusæ which are known to be derived from hydroid colonies, but the Hydroids themselves we failed to find, though much dredging and shore-collecting were done, especially during our second visit, when we had a sailing-trawler for dredging in the deeper water outside the harbour. The Hydroids turned out to be poor in the number of species and below the average compared with the other groups of animals, and only a few species were found in abundance. To judge from the abundance of certain species of Medusæ there must exist colonies of Hydroids, covering large areas, not far from Valencia, but the frequent dredgings did not reveal to us their grounds. The absence of certain Hydroids, though their Medusæ may be abundant, I have noticed in other localities. It appears to me that a distinct hydroid fauna probably lives upon rocks lying in a moderate depth of water not far from shore. Such places the dredger avoids as much as possible from the fear of tearing the net or losing the dredge.

The finding of *Rhizogelton fusiformis* is of great interest, as I do not think that a specimen of this genus has been recorded before for Europe.

For the notes on *Tubularia* I am mainly indebted to the Misses Delap. To the Rev. A. Delap, the Rector of Valencia, and his family we are greatly indebted not only for their kind hospitality, but also for valuable information relating to the marine fauna of the district.

### I. GYMNOBLASTIC HYDROIDS.

(Allman. 1872. Monograph of the Gymnoblasic Hydroids.)

#### *Clava multicornis* (Forsk.)

A single colony growing upon a stone was found near low-water mark. The gonophores contained ripe ova and formed a broad ring round the hydranth immediately behind the proximal tentacles. The hydranths were about 4 mm. in length, with whitish tentacles. The endoderm cells of the hydranth and of the spadix of the gonophores were of a blackish colour. July, 1896.

#### *Clava squamata* (Müller).

A few colonies found attached to sea-weeds growing near low-water mark. All the colonies possessed gonophores which showed considerable variation in colour. The gonophores are usually of a reddish colour, but in some of the colonies the gonophores were of a purplish colour, or even bright blue. The purple and blue colours were only present in mature gonophores. The unripe gonophores were of the usual reddish colour. April, 1895.

#### *Coryne vaginata* (Hincks.)

This species was fairly common in the harbour, attached to sea-weeds or to the sides of rock-pools.

There are two well marked forms of this species. The one is characterized by its length, and agrees with the description given by Allman. It is usually two or more inches in length, and connected with the stolon by only a few stems; sometimes only one long stem is present. The tendency of the colony is to grow in length, and it is usually attached to the side of a rock-pool. The other form makes a close, compact colony, usually attached to sea-weeds along which the stolon ramifies and gives off numerous stems. In general appearance it resembles *Coryne pusilla*, but not in detail. The gonophores are situated in the axils of the tentacles, and the perisarc of the stem extends to, or nearly to, the lowest tentacles. In these points the Hydroid may be distinguished from *Coryne pusilla*, in which the perisarc does not send off a

sheath upon the base of the hydranth, and the sporosacs are developed among the tentacles from the body of the hydranth. In the compact form of this species the extension of the perisarc to the base of the hydranth is not always visible, owing to its thinness and its closeness to the ectoderm of the hydranth. But the existence of this extension may be easily demonstrated by placing a part of the colony in dilute potash for a short time, and then removing the hydranth. To the naked eye these two forms appear to be distinct species, especially when the extremes of each kind are compared. The presence of the gonophores in the axils of the tentacles and the extension of the perisarc to the base of the hydranth show that they belong to the same species. The difference in the form of the colonies is probably due to their situation, as the compact colonies are usually found growing on sea-weeds, and the long colonies attached to stones or the sides of rock-pools. May, 1895.

**Eudendrium ramosum** (Linn.)

A small colony, about  $1\frac{1}{2}$  inches in length, with male gonophores, was dredged in the harbour. August, 1896.

**Hydractinia echinata** (Fleming).

Fairly common in the harbour growing on shells inhabited by hermit crabs.

**Myrlotheta phrygia** (Fabricius.)

Fairly abundant on Church Island, and near Murreagh Point. It lives near low-water mark, attached to stones.

**Rhizogeton fusiformis** (Agassiz).

The genus *Rhizogeton* possesses only one species—*R. fusiformis*—which has hitherto only been found in Massachusetts Bay, U.S.A.

During our visit to Valencia Harbour in April, 1895, Mr. Beaumont found several colonies of this Hydroid living on the under side of stones, near low-water mark, on the shore near Knightstown. The Valencia specimens do not agree in every detail with the species described by Agassiz, as the following description shows;—

The trophosomes and the gonosomes are situated at irregular intervals upon a creeping stolon which is closely and irregularly branched. The lower half of the hydranth is covered by a perisarc which at the base is conspicuous by its being covered with brownish particles, forming a kind of collar about half a millimetre in width, and the upper portion of the perisarc is clear, very thin, and difficult to see. The hydranth is about 2–3 mm. in length and about  $\frac{1}{2}$  mm. in width.

It carries about 20 long tentacles which are situated upon its distal half. The gonosome, like the trophosome, is also situated upon the stolon. It is 1–2 mm. in length and completely covered by a very thin and delicate perisarc. The gonophore is oval in shape, and is situated upon a peduncle so that the gonosome appears club-shaped. In mature specimens the ova were seen free inside the gonophore. The general colour of the colony is pinkish. All the colonies were situated upon a dead polyzoon (? *Membranipora*) which had encrusted the stones.

The hydranth of the American *Rhisogton* is about 3-6 mm. in length, with about 12 tentacles. The perisarc extends nearly to the base of the tentacles. The colony is of an orange colour. The hydranth of the Valencia specimens is, therefore shorter, but carries more tentacles. It shows also a difference in colour.

#### **Tubularia indivisa** (Linn.)

Colonies taken in Douulus cave by the Misses Delap. May, 1897. Actinulæ visible inside the gonophores.

#### **Tubularia larynx** (Ellis and Solander.)

One of the commonest Hydroids in the harbour, where it lives attached to the bottom of boats. Anchored in the harbour were two large old hulks used for storing ice, and during our visit they were beached for repairs, and also a smaller hulk used for storing coals. The bottoms of these hulks were completely covered with barnacles, ascidians, and *Tubularia larynx*. A large number of nudibranchs, chiefly *Dendronotus arborescens* and *Eois lineata*, were feeding upon *Tubularia* and they partly accounted for the great masses of old stalks, as the number of hydranths in each cluster was small compared with the number of headless stalks. The clusters of *Tubularia*, often four to five inches in height, were not formed by the growth of a single colony, but by a succession of colonies. The young actinulæ settling down upon the stems of the old colonies, which had died away or been eaten by the numerous nudibranchs. In some places on the hulks the old stems only remained, forming a thick matted mass upon which polyzoa were growing. *Tubularia larynx* was only found on the bottom of the hulks, small boats, and buoys, which had been some time in the harbour. It was not seen upon the shore between tide marks, nor dredged. A small boat which had for some time been at the bottom of the harbour in a few fathoms of water was recovered and beached during our visit. I examined the boat soon after it was hauled ashore and found it completely and solely covered with thousands of specimens of *Lepas Hillii*. Not a single Hydroid was seen; even *Ascidella aspersa*, common in the harbour and on the bottom of the hulks, was also absent.

Although this species was confined to the bottom of boats and other floating objects, yet the shape of the colonies showed considerable variation, extending from a close, compact colony with stems less than an inch in length, to straggling colonies from three to four inches in length.

In some of the colonies the stems are straight and slender, in others greatly contorted and twisted. The stems are only branched close to the base, and vary in thickness in the different colonies. The annulation of the stems is also very variable, in some colonies quite smooth, except at the base, in others the annulations occur at irregular intervals.

The stems in some of the specimens have the appearance of being branched at intervals, but a close examination shows that the branch formation is due to the attachment of the actinulæ liberated from the

gonophores, and the subsequent growth of their stems to nearly an inch in length. The distinction between a true branch and the attachment of another Hydroid to the stem may be easily recognised, as the cœnosarc is not connected in the latter case.

The hydranth is pinkish with white tentacles. The gonophores are on branched peduncles and crowned with four conical tentaculiform tubercles when mature, but not in the early stages. The spadix of the gonophores is of a brilliant dark red colour.

The growth of a colony is fairly rapid. A sailing boat, belonging to the Rev. A. Delap, was launched on the 27th of April, 1896, and on the 1st of July actinulæ were present in the gonophores of a fair-sized colony. Large colonies, 3-4 inches in length, were taken from the same boat on the 12th of August, when it was hauled up for cleaning. On the 6th of October the boat was again brought ashore. Miss C. Delap informed me that the bottom of the boat was almost completely covered with *Tubularia*, and some of the colonies measured 2½ inches in length. The barnacles (*Lepas anatifera*) measured from 2—2½ inches in length, and two of the specimens sent to me by Miss Delap had Hydroids growing upon them. On one was a colony of *Tubularia larynx* attached to the peduncle, about an inch in length, with actinulæ in the gonophores, on the other a fine colony of *Clytia Johnstoni*.

Darwin in his book on Coral Reefs (3rd. Edit., 1889, p. 106), gives the following note on the growth of *Tubularia*:—"The anchor of the 'Beagle,' in 1832, after having been down exactly one month at Rio de Janeiro was so thickly coated by two species of *Tubularia*, that large spaces of the iron were entirely concealed; the tufts of this horny zoophyte were between two and 3 inches in length."

## II.—CALYPTOBLASTIC HYDROIDS.

(Hincks, 1868, British Hydroid Zoophytes.)

### *Antennularia antennina* (Linn.)

On shells dredged in the harbour.

### *Antennularia ramosa* (Lamarck).

Common on shells dredged in the harbour.

### *Campanularia flexuosa* (Hincks.)

Common on sea-weeds near low-water mark. April, 1895.

Planulæ seen inside the gonothecæ. July, 1896.

### *Clytia Johnstoni* (Alder.)

A fine colony with gonophores growing on *Lepas anatifera*. October, 1896.

### *Malecium Beanii* (Johnston).

A colony bearing gonophores dredged in the harbour. May, 1895.

### *Obelia geniculata* (Linn.)

Colonies with gonophores growing along with *Clytia Johnstoni* on *Lepas anatifera*.

**Sertularella polyzonias** (Linn.)

A small colony found in a rock-pool.

**Sertularia cupressina** (Linn.)

A single colony dredged in the harbour. May, 1895.

**Sertularia operculata** (Linn.)

A single colony 2½ inches in length.

**Sertularia pumila** (Linn.)

Common on *Fucus* between tide marks.

The Medusæ belonging to the following Hydroids were taken in the harbour, but the Hydroids were not found:—*Bouguinvillia*, *Clavatella prolifera*, *Corymorpha nutans*, *Hybocodon prolifer*, *Lar sabellarum*, *Perigonimus*, *Podocoryne*, *Zygodactyla*, *Syncoryne*.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include freshwater fish from Major Gamble, a Silver Pheasant from Mr. H. M. Smith, and a pair of White Herons from Dr. C. B. Ball. Three Capybaras have been born in the gardens, a Lioness has been obtained in exchange, while a kangaroo, seven Sheldrakes, ten Puffins, and three gulls have been bought.

Upwards of 20,800 persons visited the gardens during July.

### DUBLIN MICROSCOPICAL CLUB.

JUNE 17.—The Club met at the house of Mr. F. W. MOORE, who showed portion of the posterior sepal of *Cirrhopetalum fimbriatum*, an Indian epiphytal orchid. The edges are elegantly fimbriated, and it was shown that these fimbriations were not mere trichomes or out-growths of the epidermal cells, but that they were caused by irregular growth of the tissues of the edges of the sepal.

Mr. GREENWOOD PIM showed the æcidial stage of *Puccinia graminis* on Barberry leaves collected at Avondale, Co. Wicklow. The uredo and teleutospore forms of this fungus (wheat rust) are exceedingly common, but the œcidiospores are much rarer, the Barberry on which they occur being far from common in Ireland.

Mr. M'ARDLE exhibited a proliferous form of *Jungermania barbata*, Schmidel., which he collected recently on Brandon Mountain, Co. Kerry. The specimens showed various stages of adventitious budding, which first appears on the leaves; a few cells are conspicuous by their dark green colour. Closer examination shows them to be copiously nucleated, and from rapid cell division a protuberance soon arises from the tissue of the leaf which is but one cell thick. As growth continues

they become more prominent and surrounded with a hyaline ring ; and in later stages the buds are divided by transverse or longitudinal septa, and root-hairs are developed. At this stage the connection with the parent plant becomes very limited, and finally they fall off, and under favourable circumstances reproduce the plant. It may be of interest to note that this mode of reproduction is not to be confounded with the gemmæ borne in groups on the apex of stems in *Kantia*, *Cephalosia denudata* and *Jungermania ventricosa*, &c., but, like those of *Sendtnera juniperina*, described by Dr. R. Spruce, *Phytologist*, vol. ii., 1885, p. 85, and Mr. M'Ardle's own description, *Irish Naturalist*, vol. vi., 1895, late 3, of *Lejeunea serpyllifolia*, they invariably form plantlets with stem and leaves before being separated from the parent plant.

Prof. T. JOHNSON exhibited a preparation of *Comatricha Persoonii*, Rost., a slime-fungus found among dead leaves. The preparation was one of a set of specimens, illustrating nearly a hundred species of the British Mycetozoa (*Myxomycetes* or Slime-fungi) recently presented to the Botanical Collections of the Dublin Science and Art Museum, by A. Lister, V.P.L.S., by whom the Catalogue of the group was prepared for the Trustees of the British Museum.

Mr. ALLAN SWAN sent for exhibition a mounted cultivation of *Cladotrix dichotoma*, and a species of *Achlya* which appears identical with de Barig's *Achlya polyandra*. These two forms were grown together on a cover glass cultivation for identification purposes ; *Cladotrix* appears with the very characteristic short rods and spores which have broken up from the long twisted filaments of earlier growth ; *Achlya* shows only the earliest stages of development, with no sign of spore-formation, and the protoplasmic contents of the hyphæ has been injured by drying. *C. dichotoma* is one of the commonest of fresh-water organisms, it flourishes whenever organic impurity is present, and if traces of iron be present in the water, its massed filaments have a marked red colour, which can be shown to be iron by the ferrocyanide of potassium test ; *Achlya* and allied forms of the Saprolegniæ are much more common in our water supplies than is generally supposed. The exhibitor has never failed to find them after a proper search. These two forms of life are generally to be found on submerged animal or vegetable matter in streams or ponds, but he has lately found them flourishing luxuriantly in air-exposed situations, with restricted water supply, and taking their nourishment entirely in the soluble form, from an impure water which was only sprinkled or bespattered over them, as they grew side-by-side on a perpendicular wall near a sewer grating. The identification of *C. dichotoma* is a simple matter as it is easily cultivated, and its characteristic red colour (which formerly caused it to be called *Leptothrixochracæ*) can be shown to be an iron oxide. The *Achlya* forms by quite recent investigation are shown to be more numerous than were formerly supposed, for this reason the exhibitor is unable to identify the species, until he can consult the latest work on the subject. The form here shown is easily cultivated on flies, and its two forms of spores more readily produced, the zoospores are non-motile, and after liberation remain grouped at the mouth of the sporangium ; with



restricted nourishment and air supply oospores were produced in about eight days, they were generally formed at the extremities of the hyphæ and did not exhibit antheridia, the oospores are spherical and number from four to twelve, commonly four to six, thus resembling the commonest *Achlya* form of our open waters.

The massed growth of *Achlya* which was found on a wall near a sewer, was several inches in diameter and almost an inch thick, it was of a pale grey colour, and much resembled the fungus of salmon disease (*Saprolegnia ferax*) as it appears on a fish after being taken from the water; microscopically examined the mass of filaments showed no sign of spore-formation, nor was any tendency towards protoplasmic thickening or granulation noticeable.

Mr. H. J. SEYMOUR exhibited a section of a spherulitic rhyolite or felsite from a dyke a few miles south of Newcastle, Co. Down. Under the microscope a large number of spherulites are seen, embedded in a crypto-crystalline ground-mass, which may have been once in a glassy state. Some porphyritic feldspars also occur in the slide. The rock section was kindly lent by Miss M. K. Andrews, of the Belfast Naturalists' Field Club.

Dr. C. HERBERT HURST exhibited a microscope of simple construction adapted to be handed round in a class or meeting. The body of the microscope carries the objective and eye-piece as in an ordinary microscope. The tube in which it slides is enlarged at the lower end somewhat like the bell of a trumpet, and the slide under examination is held by a spring inside this bell. A metal lid with a small hole in the centre fits upon the bell, serving as a diaphragm, and at the same time protecting the slide from injury. A powerful screw-clamp prevents the body from sliding in the tube after it has been adjusted, and fine adjustment is accomplished by sliding the eye-piece. Those whose valuable slides have been destroyed by having the objective thrust through them by inexpert members of an audience will recognise the importance of this clamp. A large concave mirror inside the bell, and perforated at its centre for the objective lens, serves, when the diaphragm (or "lid") is removed, to illuminate opaque objects. The microscope when in use is simply held in the hand and directed towards the light. It gives excellent results even with high powers.

#### BELFAST NATURALISTS' FIELD CLUB.

JULY 31.—EXCURSION TO CRANFIELD POINT.—A start was made for Randalstown in the 9.45 train. Arriving there, the route was taken to the shore of the lake, passing the old Oak Cross, only the shaft of which now remains. The great quantities of Meadow-sweet in every field filled the air with fragrance, and helped to make the walk a pleasant one. Near the old church a small settlement of fishermen in their tents and booths gave quite a primitive air to the district, with their long double rows of pollan-nets hung out to dry, whilst scattered around were the fishermen baiting long lines, of 100 hooks each, for eel-fishing. The ingenious method adopted by the men to prevent entanglement was

noted, also the way in which the bait was kept fresh on the hooks, which were laid after baiting at one end of the flat basket on damp sand. Here the party scattered along the shores of the lake, bent on different pursuits, traversing the rich carpet of Harebells along the rocky margin. The botanists and geologists did fair work during the day. The former collected many of our gayest wildflowers. *Leonurus Cardiaca*, a rare labiate plant, was found growing spontaneously in a hedge and field at Cranfield. It is not, however, to be classed as a native, but as an escape from cultivation, it having been a medicinal plant of renown in the olden times. *Potamogeton heterophyllus* was found somewhat plentiful in the lough; and *Galium boreale* was abundant amongst the rocks on the shore. Here also grows *Hieracium auratum*, just coming into bloom now with *Rosa mollis*, *Circaea alpina*, and several other plants of note. The geologists visited the plant-beds in the basalts of Eocene age which are exposed on the shore of the lough about half a mile west of the old church, and picked up some erratics, including Ailsa eurite (?) at various points along the margins, in the thin patches of gravel which only partly cover the surface of the basalt all round Cranfield Point. The shell-collectors found *Limnaea palustris*, *Planorbis marginatus*, and *Ancylus lacustris*, in all stages of growth, covering the rocks along the shores of the lake, whilst a colony of the rarer *Limnaea stagnalis*, much larger specimens than those in the lough, flourished in a little pond at Rabbit Point. The albino variety of *Bythinia tentaculata* occurred in several places in flood-material, quite fresh, though dead, with *Physa fontinalis*, and masses of the young shells of the wandering snail, *Limnaea peregra*, and a few *Pisidia*. The old church at Cranfield Point may be said to occupy the "point" itself, as the graveyard in which it stands forms a small cape on the north-west end of Lough Neagh. The church is a small rectangular ruin, measuring 42 feet 6 inches by 21 feet 5 inches, the height of the site being about 10 feet 6 inches on the inside, but nearly 3 feet less on the outside, owing to the gradual heightening of the graveyard. The gable walls of the east and west ends are in fairly good preservation—having received some attention from the Board of Works—but it was noticed that the Ivy is causing a very serious fissure to appear at the north-west groin, and unless its growth is arrested, will eventually undo the good performed by the Board of Works.

After some hours spent here a return was made to Randalstown, where a hearty meal was partaken of in Macaulay's comfortable little country inn. The 5.25 train was taken to Belfast, bringing back a party well satisfied with their visit to this out-of-the-way but enjoyable district.

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## NOTES.

## BOTANY.

## FUNGI.

## A Big Boletus.

On a roadside near Stradbally, Queen's Co., last month I found a remarkably large *Boletus*. It stood 9 inches high, and the pileus measured 42 inches in circumference, and 18 inches in its greatest diameter. The stalk at its junction with the pileus was 13 inches in circumference. It was impossible to bring away such a gigantic specimen, but from my description Dr. M'Weeney believes the species to have been *Boletus edulis*.

R. LLOYD PRAGER.

## HEPATICÆ.

## A Check-list of British Hepaticæ.

We should like to draw the attention of botanists interested in the *Hepaticæ* to the convenient "Catalogue of British Hepaticæ," which Rev. C. H. Waddell has compiled for the Moss Exchange Club. The list is printed in the same style as the "London Catalogue of British Plants," and is intended to serve the same purpose—to facilitate exchanges and the cataloguing of collections. The classification is with some slight exceptions that of the late Dr. Spruce. A useful feature is the addition in italics after the names of many of the species, of synonyms by which the plants are better known to many collectors. This is, indeed, rendered almost necessary by the continual revision and alteration of plant names. The list is well printed on eight pages of good paper, and is published at 6d. by Messrs. W. Wesley & Son, 28, Essex-street, Strand.

## PHANEROGAMS.

*Cenanthe pimpinelloides*, Linn., in Ireland.

This rare and interesting plant, which hitherto has not been recorded from Ireland, except in apparent error, grows in some plenty at Trabolgan, Co. Cork, where I have seen it during the past two summers. It ranges in patches over a couple of acres of the extensive pastures close to the sea at that place.

Mr. Arthur Bennett, F.L.S., to whom my thanks are due, has kindly examined and identified my specimens.

The plant is one unlikely to have been introduced, and looks like a native, the habitat being similar to those in which the species occurs in the south of England; still, pending its discovery in other Irish stations, it will perhaps be safer for the present to regard it as "probably indigenous."

R. A. PHILLIPS.

### **Epipactis latifolia in Co. Dublin.**

Mr. Joseph Meade sends a fresh specimen of this Orchid collected at Old Connaught. In his "Orchids of County Dublin" (*J.N.*, iv., p. 193, 1895,) Mr. Colgan quotes Ballybetagh as the only reliable habitat for the plant in the county.

R. LLOYD PRAEGER.

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## ZOOLOGY.

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### INSECTS.

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#### **Bites of Telephori.**

In the March number of this journal, p. 86, Rev. W. F. Johnson, under "Insect Folk-lore," mentions the popular idea in certain rural districts that *Telephorus fulvus* is capable of inflicting a "very sore bite." I have never been bitten by this species, but some years ago, when collecting beetles in Co. Meath, I was rather sharply bitten by a specimen of *Telephorus pellucidus*. The insect succeeded in nipping me several times at the base of the second finger, drawing blood. And I remember well that its pointed mandibles were as sharp as needles. I am led by this experience to think there is some good foundation for the rural idea.

H. G. CUTHBERT.

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#### **Abundance of *Vespa austriaca*, Panz.**

For several weeks in July (July 1st to 20th) I have noticed an unusual abundance here (Blackrock, Co. Dublin) of these wasps. I captured ten specimens in the garden, hovering about the bee-hives. All are females, the males being unknown, or unrecognized, so far, in the British Isles. *Vespa rufa*, L., a wasp closely resembling *austriaca*, I have taken with it also in some numbers. In my past experience as a collector I have found *V. rufa* a very scarce species here.

H. G. CUTHBERT.

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#### **Scarcity of Wasps at Bray..**

We have no wasps this summer, only two of this year's brood having been seen. There are none in the garden where the gooseberry bushes are usually swarming with them during August. Such a complete disappearance is very remarkable, I never remember anything like it before. The gardener killed 233 queens in May and June, but I hardly think this is the reason, because a large number (but not quite so many) have been destroyed other years.

It will be interesting to know whether a similar scarcity has been noticed in other parts of Ireland.

RICHARD M. BARRINGTON.

***Enistis quadra* in Co. Waterford.**

I found a caterpillar, unknown to me at the time, of this rare moth crawling on the trunk of an elm-tree in Curraghmore on June 30th. The full-fed larva spun a whitish cocoon, and pupated on July 3rd, and the moth, a female example unfortunately with crumpled wings, emerged on the 15th of the same month, thus only remaining twelve days in the pupa state. I believe there are only two or three known records of this insect's occurrence in Ireland.

L. H. BONAPARTE-WYSE.

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**BIRDS.**

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**The Blackcap Warbler breeding at Lucan.**

This interesting warbler revisited Lucan last spring. On the 11th of May I found a nearly completed nest built in a wild rose bush; visiting it again shortly after, it contained four eggs of the ordinary colour and markings, which were left undisturbed. This was the only nest found this year. On the 12th of May, 1896, I found four nests; three were empty, and the other contained eggs of the beautiful brick-red type. The birds built in exactly the same part of the demesne this year as they did in the previous spring.

K. M. DUNLOP.

Mr. J. F. Shackleton records, in the *Zoologist* for 1878, p. 256, the occurrence of the Blackcap Warbler at Lucan. It was observed by him on two occasions feeding on cherries in his garden during the second week of June.

J. N. HALBERT.

**The Yellow Wagtail in Ireland.**

To the *Zoologist* for August, Mr. Robert Warren contributes a useful paper "On the Breeding Range of the Yellow Wagtail in Ireland." The writer narrates the history of the discoveries by which the home of this species, in Thompson's time confined to Lough Neagh, has been extended to the lakes of Galway and Mayo, so that the bird is now known to have a continuous breeding range along the lakes of Carra, Mask, and Corrib.

**"Shore Lark" in Co. Dublin: a Correction.**

In my notes on Ireland's Eye in last month's issue, I used the above local name accidentally for the Rock Pipit; the Shore Lark being an extremely rare bird, and hitherto unknown in Ireland.

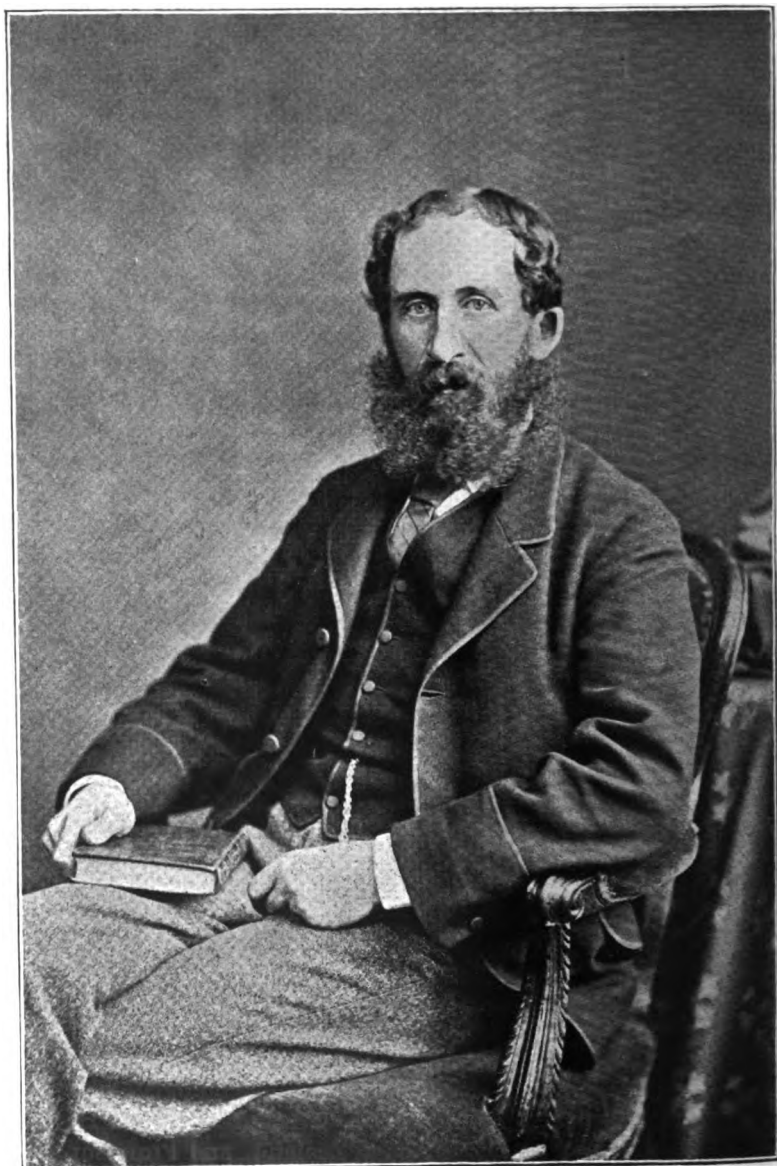
E. BLAKE KNOX.

**Grouse Disease.**

If any of the readers of the *Irish Naturalist* can forward to me at the Pathological Laboratory, Trinity College, Dublin, specimens of grouse affected by disease, sent as fresh as possible for pathological investigations, I shall be much obliged.

E. BLAKE KNOX.





**WILLIAM ARCHER, F.R.S.**  
(ABOUT 1877.)

**WILLIAM ARCHER, F.R.S.**

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**WILLIAM ARCHER**, eldest son of Rev. Richard Archer, belonging to an old Co. Wexford family, was born May 6, 1830, and died August 14, 1897, unmarried. His only brother, Holt Waring Archer, predeceased him in 1883, leaving two sons—the sole surviving male representatives of the “Irish Archers” of Enniscorthy. The earliest indication of his scientific tastes and special talent for patient investigations in connection with minute forms of vegetable and animal life, was associated with the Dublin Microscopical Club, which originated in the year 1849. It was founded by a few students fond of natural history, who met at each other’s houses; their names were Eugene O’Meara, William Archer, E. P. Wright, Wm. Frazer, and Geo. Porte. Some others became associated with them, and a Club was formed—composed of twelve regular members—to meet monthly in the evening for social and microscopic purposes. A limited number of visitors attended by invitation, and, subsequently, some distinguished scientists accepted the position of honorary members. Mr. Archer was Secretary, and preserved accurate records of all the proceedings for many years. The Club continues to flourish. Dr. Frazer, and Mr. Arthur Andrews who was early co-opted into its ranks, still attend the stated meetings. Professor E. P. Wright and Mr. Archer retired some time since, and were nominated honorary members. It now embraces workers in those branches of science to the advance of which microscopic investigation has so much contributed—botany, geology, mineralogy, and the various departments of natural history—whose names we do not mention; but we can point to a goodly list of former members, such as the late Dr. David Moore, Director of the Glasnevin Botanic Gardens; Dr. John Barker, Curator of the Museum of the Royal College of Surgeons, Ireland; Admiral Jones, an indefatigable lichenologist, who perished in the sad railway accident at Abergele; Dr. M. H. Colles, Captain Hutton, now in New Zealand, and Professor Hull, late Director of the Geological Survey of Ireland, with others, whose contributions are recorded in the *Proceedings*.

From the year 1864 the stated minutes of the Club were

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published in the *Quarterly Journal of Microscopical Science*, reprints being furnished to the members, of which a few copies were bound, and are now much valued: they form three goodly volumes, and in these pages will be found preserved much of Mr. Archer's life-work from 1864 to 1879. When following out his favourite investigations, which related in greater part to the Desmidiaceæ and allied groups, he made long journeys to distant parts of Ireland, wherever he considered there was promising ground for their discovery. He also obtained exceptional acquaintance with German, as well as with Danish and other Scandinavian languages, and developed decided artistic talent for making accurate drawings of these minute and interesting forms, the life-history of which he devoted himself to work out and place on record. The writer is aware that many sleepless nights were spent in ceaseless observations of the conjugation and development of these objects; he thought himself well repaid if he could add something new to science, or contribute to clear up a dubious point respecting their growth.

He was an active contributor to the meetings of the Dublin Natural History Society, which, we regret to say, ceased to exist after publishing six volumes of *Proceedings*. On June 5, 1859, he described a new species of *Staurastrum*; this was succeeded by other important papers, one of which established the presence of zoospores in Desmids (vol. iii., p. 21); also one relating to abnormal growth in Desmids (vol. iii., p. 37); descriptions of new species of *Cosmarium* and *Zanthidium* (vol. iii., p. 49); on *Micrasterias* (vol. iii., p. 69); on several new species of *Closterium* (vol. iii., p. 78); and on *Ankistrodesmus* (vol. iii., p. 85). In the succeeding volume iv. he contributed the discovery of *Cystopteris fragilis* near Dublin (p. 2), on *Palmoglæa* (p. 12); new species of *Cosmarium* and *Penium* (p. 49); on the occurrence of *Polypodium Phegopteris* near Dublin (p. 60); new species of *Cosmarium* and *Arthrodesmus* (p. 66); observations on species of *Micrasterias* and *Docidium* (pp. 78-84); record of *Stephanosphaera pluvialis*, new to Ireland (p. 151), and on the genera of *Palmoglæa* (p. 261). In volume v. he described a new species of *Bulbochetæ* (p. 9); on the genus *Zygonium* of De Bary and Kützing (p. 114); a new species of *Saprolegnia* (p. 136); Asteridia in *Penium digitus* (p. 144); on the conjugation of

*Spirotania* (p. 147); on a new cyst-like structure enclosing minute Algæ (p. 192), and an elaborate essay on Rhizopoda (p. 231), with numerous illustrations drawn by himself. Mr. Archer and Professor E. P. Wright were joint Honorary Secretaries of this Society for some time. When Professor Harvey retired from the chair of Botany in Trinity College, Mr. Archer would have been appointed his successor, but declined the post, owing to his over modest distrust of his ability to address a class of students on botanical subjects.

He was elected member of Royal Irish Academy in 1870, and subsequently served on its Council, and as Secretary for Foreign Correspondence from 1875 to 1880. On November 29, 1879, he was awarded the Cunningham Gold Medal, which was presented to him through the President, the late Sir Robert Kane, being the year when a similar medal was given to Sir Robert Ball, then Astronomer Royal, for his scientific attainments. Sir R. Kane in his address mentioned some of Mr. Archer's claims to that valued distinction. Amongst these he stated that in 1855 Mr. Archer had prepared a list of Desmids obtained in Co. Dublin, illustrated with drawings, for the Zoological and Botanical Association of Trinity College (vol. i., p. 94), to which he afterwards added a supplemental list containing additional species. He had edited for the second edition of Pritchard's work on Infusoria, the article "Desmidiaceæ," was the discoverer and describer of several new genera and families belonging to the Rhizopods, and had published a special communication on *Ballia callitriche* in the *Transactions* of the Linnæan Society.

To the *Proceedings* of the Royal Irish Academy he contributed, in December, 1874, a Paper on "Apothecia occurring in some Scytonematous and Sirosyphonaceous Algæ," and, in February, 1875, another on "*Chlamydomyxa labarynthuloides*, a new species and genus of Freshwater Sarcodic Organism." In June, 1875, he was elected Fellow of the Royal Society. It deserves to be specially mentioned that this distinction and the membership of the Royal Irish Academy were conferred on him without his knowledge by the application of personal friends who were acquainted with his scientific worth, and who also contributed to defray the usual expenses, in testimony of their esteem for him.

In 1876 he was appointed Librarian to the Royal Dublin Society, and when occupying this new sphere he displayed unusual and exceptional ability and energy. By agreement with the Government a large portion of this valuable library was afterwards transferred to form the present National Library of Ireland, and a special building had to be erected for its reception and for the accommodation of the public in a fine reading-room. This was designed by Sir Thomas Deane along with its companion building for a National Museum, to which the Royal Irish Academy's priceless collection of Irish antiquities was removed, filling a special department in that institution. Mr. Archer, in his zeal to secure proper accommodation for the books committed to his charge, opened correspondence with the leading librarians in England, on the Continent, and in America, and published a number of suggestions which he embodied in a pamphlet on buildings intended for holding Public Libraries in 1881; many of these he succeeded in carrying into effect. The transference was accomplished in August, 1890, without damage or loss, and the large collection of books arranged in order on shelving specially prepared after his wishes. In the meantime he had devoted his thoughts to the best mode of cataloguing books in large libraries intended for constant reference by public readers, to secure their rapid supply to those requiring them, and also to enable constant additions to be shelved and catalogued without delay, without undue disarrangement of the different subsections. To carry this out effectively, he himself entered all increments as they were made—no trifling work—as it entailed incessant supervision, the yearly entries amounting to between 2,000 and 3,000 volumes. The "Dewey" system of classification which he adopted has obtained the approval of many who are practically engaged in superintending public libraries and require to carry out similar details. When the Library Association held its Annual Meeting in Dublin in 1884, Mr. Archer was one of its Honorary Secretaries, and to his exertions may be attributed in great part the success of that meeting. He always took much interest in the working of this Association, and attended its annual assemblies so long as his health permitted his doing so.

His incessant labours gradually impaired his strength, and

obliged him to relinquish an occupation so congenial to his wishes. He retired in 1895, being superannuated, his health broken down, and from that time he was, we regret to say, an invalid. His early life was unselfishly devoted to scientific research by which he secured a widespread reputation little understood beyond the abstract world of science. When fulfilling, later in life, the duties of his public appointment as Librarian to the National Library of Ireland, he was brought more prominently before a wider circle, who soon recognised his kindly character and unceasing energy. He was, as head of a great library, eminently successful in discharging his duties and securing the esteem of his subordinates and of the public at large; those especially who profited by his assistance in forwarding their literary researches will gratefully acknowledge their indebtedness to his patient and untiring desires to meet their wishes and advance their interests.

WILLIAM FRAZER.

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## THE COLLEMBOLA OF MITCHELSTOWN CAVE.

Supplementary Note.

BY GEORGE H. CARPENTER, B.SC.

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IN my paper on the Mitchelstown cave springtails in last month's *Irish Naturalist* (p. 228), I called attention to the apparently close relationship between the species which I described as new, under the name of *Cyphoderus Martelii*, and the species *Seira cavernarum*, discovered by Prof. Moniez, in the cave of Dargilan, France. Prof. Moniez has since been so good as to compare some of the Mitchelstown insects with his type; and he informs me that he considers them referable to the same species. The specific name *Martelii*, Carpenter, must therefore be regarded as a synonym of *cavernarum*, Moniez. Whether the species is to be reckoned as a *Cyphoderus* or a *Seira*, must remain a matter of opinion, as it seems, in several respects, intermediate between those two genera. The feet resemble those of a *Cyphoderus*, the spring rather that of a *Seira*; perhaps the absence of eyes should be allowed to turn the scale in favour of the former genus.

The cave of Dargilan is situated in the barren limestone "Causses" region of the department of Lozere in southern France. Its mouth is stated by M. Martel, who explored it in 1888, to be situated 1140 feet above the bed of the Joute and three miles west of Meyrueis. "It is," he writes,<sup>1</sup> "one of the most imposing caverns known. The full length of its ramifications reaches the total of more than a mile and a half. It has no less than twenty halls . . . a river 400 feet long, and three little lakes. Its longest branch nearly a mile long, penetrates to the depth of 420 feet below the entrance." It was in this deepest part of the cave that Prof. Moniez found the specimen of *Seira cavernarum*, with which he has now identified the springtails which abound in our cavern of Mitchelstown.

It is gratifying to have the identity of these Irish and French cave-species certified by so good an authority on the Collem-bola as Prof. Moniez. Strong confirmation is thus afforded to the suggestion, which I made in my first paper on the Mitchelstown cave-fauna, that the same species might be independently developed in two widely separated caves. As I mentioned in my recent paper, very little modification would be required to make the Mitchelstown *Lipura Wrightii* indistinguishable from the Adelsberg *L. stilicidii*. That identical species may exist in two caves separated by hundreds or even thousands of miles may now, therefore, be regarded as an established fact. There is, however, an alternative to my theory that such a species has developed independently under similar conditions, in the two localities. Some naturalists would prefer to regard it as an exceedingly ancient race, which, exterminated or almost so, over the wide tract of country which it once occupied, has found a refuge in the depths of the caves, where, degenerate and blind, it still survives. Further research into the structure and distribution of springtails both above ground and under ground, may help us to choose more definitely between these two views.

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<sup>1</sup> E. A. Martel, "The Land of the Causses." *Appalachia*, vol. vii., p. 133.

GALIUM ERECTUM, HUDS., AND *G. MOLLUGO*,  
LINN., IN THE NORTH-EAST OF IRELAND.

BY J. H. DAVIES.

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IN the *Irish Naturalist*, vol. v., p. 309, there are some notes of mine, in which mention is made of *Galium Mollugo* having been found in a meadow at Glenmore, County Antrim, and in which there is allusion to the fact of the habitat differing from that in which the plant is usually, if not always, met with in England; and it was conjectured that, at some remote period, it might have been introduced with grass-seed.

Immediately after reading my notes, my good friend, Mr. William Foggitt, with characteristic kindness, wrote to me stating that he had never known *G. Mollugo* to grow in a grass field. Certainly, in the sister country, it seems to be distinctly a septal plant, occurring only in hedges and thickets, and *G. erectum* to be as distinctly a pascual species. In two localities in North Yorkshire, in which my friend had met with the latter, the habitat in both places is "fields laid down to grass," and in both, the fields had been pasture for many years before the plant had been detected. All the literature of the subject to which I have access is confirmatory as regards the English habitats of the two plants. To cite from county Floras only two examples, out of numerous others which might be adduced, Mr. Druce, in his "Flora of Oxfordshire," has:—

"*G. Mollugo*—Septal. Hedges, etc. Common.

"*G. erectum*—Pascual. Dry pastures, etc. Rare or otherwise overlooked."

And Mr. Townsend, in his "Flora of Hampshire," says:—

"*G. Mollugo*—Hedges, thickets, borders of woods, etc. Common.

"*G. erectum*—Pastures and banks. Very rare."

Mr. Foggitt expressed to me a very confident belief that my Glenmore plant would prove to be *G. erectum*, and recommended a further and thoroughly critical examination; and by way of giving emphasis to his view, he adds: "We find *G. Mollugo* only in hedgerows, never in pastures."<sup>1</sup>

Fortunately my friend Mr. Stewart had preserved specimens of the Glenmore plant (July, 1895), which he obligingly placed at my service, and willingly assisted at the needful re-examination; and, on comparing the plants, and also his own, gathered at Whitewell (Co. Antrim) in 1896, with the series of excellent authenticated English examples of the two species, contained in his herbarium, there remains no doubt that the specimens from both stations must be referred to *G. erectum*, and Mr. Foggitt, to whom specimens have been submitted, is in entire agreement.

The earliest record for *G. Mollugo* in the North seems to be Templeton's—"In Mr. Tennant's Lawn at Mount Vernon" [Belfast], 1797, but there are no specimens for reference.<sup>2</sup> It would, however, now seem very probable that his plant must also be assigned to *G. erectum*. It is conceivable that he might not have known Hudson's plant as a species distinct from *G. Mollugo* of Linnæus, but it was described as such thirty-five years prior to the date of his record.<sup>3</sup>

Specimens of the Aghaderg, Co. Down, *Galium* (1886), supposed to be *G. Mollugo*, which have lately been received from my friend Rev. H. W. Ilett, do not, in any respect, differ from the authenticated examples of *G. erectum* with which they have been compared.

<sup>1</sup> Mr. Foggitt, who has devoted much attention to the study of these two closely allied species, has favoured me with very fine examples of his North Yorkshire *G. erectum*, which, he informs me, have been seen and verified by my friend Mr. J. G. Baker, F.R.S.

<sup>2</sup> It is not known what has become of that part of Templeton's herbarium, containing his flowering plants. A fragment only of his collection of Cryptogams, mainly Mosses and Hepatics; also numerous elaborate MS. notes, some of them accompanied by specimens, and many illustrated by his own carefully executed and exquisitely coloured drawings, done for an intended descriptive Flora, are preserved in the Belfast Natural History and Philosophical Society's Museum.

<sup>3</sup> In Hudson's *Flora Anglica*, 1762, in which the habitat is given as "In pascuis montosis humidiusculis."

Of the plant discovered at Glenarm (Co. Antrim) close on half a century ago by Dr. Holden, and found there independently by the late Professor Dickie, believed to be *G. Mollugo*,<sup>1</sup> we are without specimens; but my friend Mr. Praeger informs me that he has such, gathered by himself, and these he will, no doubt, re-examine. That they also will prove to be *G. erectum*, seeing that the situation in which the plant occurs there is the same as those of the other northern localities which have been mentioned, seems now not to be an unreasonable assumption. The only examples of the Saintfield (Co. Down) plant at present available are not sufficiently mature to enable us to refer them with certainty.<sup>2</sup>

Both the specific name, *erectum*, and the "common name" which has been bestowed upon it, "The Upright Bedstraw," the latter, it may be supposed, suggested by the former, seem rather inappropriate and may have been misleading. The habit of the plant is not erect, but sub-decumbent, only the fruiting branches of the panicle being ascending, and altogether it is much more slender than *G. Mollugo* and its leaves narrower. The lower part of the plant puts forth an abundance of spreading and conspicuously leafy branches, which give a somewhat matted appearance to the patches. The species has not been well understood, but the growing plant having been once seen and identified, a careful observer would not readily fail to recognise it again.

Though the mistake, perhaps not wholly unpardonable, into which I had fallen, in common with other North of Ireland observers, may be deplored; it is a matter for some exultation that the rectification of the error gives an exceedingly interesting addition, not only to the flora of the North-eastern district, but to that of the entire North of Ireland, because so far as can be ascertained *G. erectum*, as an Irish plant, is on record as occurring only in the southern half of

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<sup>1</sup> Dr. Dickie's "Flora of Ulster," 1864.

<sup>2</sup> It must be explained here that this part of my notes was written at the end of last year, and that the suggested examination has since been made, as is afterwards stated.



the country, in II., IV., V., and VI. of the *Cybele* Districts. It is due to Mr. Foggitt to state that the correct identification of this critical species is to be ascribed to his sagacious suggestion.

The meadow at Glenmore in which the *Galium* grows is botanically, rather remarkable. It is that in which *Poterium Sanguisorba* was noticed some years ago, and which still remains to be the only station for this plant in the north. It is in such abundance that it is certain it must have been there for very many years; but whether this plant (and the *Galium* also) may be indigenous there, or may have been introduced by human agency, it is difficult to determine. The soil in which it grows is of a more loamy character than that of the remainder of the field, which is drier, yielding plants, to enumerate only a few taken at random, such as *Ancmona nemorosa*, *Vicia cracca*, and *V. sepium* (some plants of *V. sepium* with white flowers); *Lathyrus pratensis*, *L. macrorrhizus* and *Bunium flexuosum*. The Centaury (*Erythraea centaureum*), ever one of the most charming of summer flowering plants, is not unfrequently to be met with; and the Eyebright, and the Fairy Flax (*Linum catharticum*) are here and there associated. The Bluebell (*Endymion nutans*), the Hairbell (*Campanula rotundifolia*), and Lady's Bedstraw (*Galium verum*) are in plenty; there is much profusion of St. John's worts, of which three species may be mentioned, *Hypericum perforatum*, *H. pulchrum*, and *H. quadrangulum (dubium)*, the last named being so plentiful and luxuriant as to have the appearance, when seen from a distance, of a mass of golden-flowered Ragweed. Ox-eye Daisies (*Chrysanthemum leucanthemum*) give pleasing variety; *Briza media* is everywhere in the field; and on a bank overlooking a mill-race, which flows from the river Lagan, there is enormous quantity of one of the rarer Horsetails, *Equisetum hyemale*, growing amongst thickets of Hazel and Guelder-Rose; and nowhere in the neighbourhood, although it grows in most of the grass fields round about, is the curious little Adder's-tongue (*Ophioglossum vulgatum*) to be found finer or in greater abundance. This is a digression, but may, however, serve to give some notion of the botanical features of the meadow in which grows *Galium erectum*.

The foregoing, with the exception of a few added words, relative mainly to the Irish distribution of *G. erectum*, was written for the January number of the *Irish Naturalist*. Mr. Nathaniel Colgan, M.R.I.A., whose critical knowledge of Irish plants renders his judgment of the highest value, saw the MS., and without giving a positive opinion was inclined to question the correctness of the views expressed. The general description in my notes was thought by him to indicate a plant, which corresponded to one growing in his lawn at Rathmines, and found also in the garden of the late Mr. More; both known to have been introduced with grass-seed, and named as *G. Mollugo* var. *insubricum*, Gaudin. Mr. Colgan has since favoured me with specimens of the Dublin plant, which differs from that at Glenmore in that it is much more robust, the branches more numerous and more spreading, the inflorescence more profuse, and the leaves relatively broader and slightly obovate; and differing as it does from *G. Mollugo* growing in hedges, the question arises, under which species should it be placed? That it should occur in situations such as mentioned above, is, nevertheless, a deviation from what seems to be the general rule. The determination of our northern plant, however, was not based upon a consideration of habitat, nor was it intended to use that as an argument to fortify a position as to which there might have been some lingering doubt. Still, such considerations have their value, and in this instance they led to the re-examination of supposed *G. Mollugo* growing in open grassy places. Mr. Stewart, after reading over Mr. Colgan's observations, wrote to me: "I have again gone over the specimens with the help of Mr. Foggitt's well-selected and beautifully prepared examples of *G. erectum*. I still hold to the correctness of the name, but a few months will settle the question effectually."

*Galium insubricum*, Gaud., seems to me a somewhat shadowy creation. In Nyman's *Conspectus* (1854), it is not even mentioned, and Sir J. D. Hooker in *Student's Flora* (1884), cites the name as a synonym of *G. Mollugo*. Is there room for a distinct variety between that species and *G. erectum*? Mr. Stewart thinks not. In this connection it is to be noted that Hooker places the latter in the rank of a sub-species;

howbeit, by a process of excessive nicety of refinement, perhaps more to be disparaged than approved, at least two varieties of each species have been more or less fancifully described; and some continental botanists, taking still higher flights of fancy, have evolved no fewer than four species.<sup>1</sup> The variety *insubricum* seems delusive, but if it must be taken into account its proper place would appear to be under *G. erectum* rather than under *G. Mollugo*. Seeing that Mr. Colgan had not before him any specimens of our northern plant, his remarks did not go beyond what was warranted by a reasonable, scientific scepticism; but in face of the expression of doubt, by so careful a botanist, as to our plant being *G. erectum*, and notwithstanding Mr. Stewart's strong conviction of our being right, it was considered better to delay the publication of my notes. The postponement is not to be regretted, because in the interval there has been opportunity, not only for extended observation of the growing plant, but to gather together examples from all the localities of the district, with the exception of Templeton's old station near Belfast, and those at "Riverside near Cullybackey" and Ballymena. On the banks of the Main River at Cullybackey (where there is abundance of *G. boreale*), search has been made in vain by Miss Knowles and by myself for *G. Mollugo*, which is said to be there; and, unfortunately, Rev. S. A. Brenan, who is the authority for the record of the plant at that place, has not any specimens. It may possibly yet be found, though the situation is not one in which it is very likely to occur. In a field not very far away from the place, an interesting form has this year been noticed by Miss Knowles and Rev. Dr. Buick, and through their kindness I have had the pleasure of collecting it there. A *Galium*, supposed to be *G. Mollugo*, discovered by Miss Knowles between Ballymena and Broughshane, cannot this year be found, but the situation, as I have had the opportunity of seeing, is one in which it might very likely have been eaten by cattle, as has been the case in other places, and it will probably reappear. The plants, therefore,

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<sup>1</sup> *G. dumetorum*, Jordan.  
*G. viridulum*, Jordan.

*G. album*, Lamarck.  
*G. rigidum*, Villars.

from these three localities cannot be taken into consideration in the present inquiry. The result of the most careful and painstaking scrutiny of specimens from other stations in the district, and comparison with authenticated examples of the two species, is to establish satisfactorily, I think, the accuracy of my former conclusions, and in this I may say Mr. Stewart concurs.

Several of the *Galia* are known to be very precocious. *G. Aparine*, annual though it be, in the first week of January of the present year, was observed with stems six inches long, and *G. verum* and *G. palustre*, in sheltered places, were seen in February. *G. Mollugo* is also very early. In its North Yorkshire localities, where Mr. Foggitt has had it under close observation for me, he informs me that it was above ground early in January, and he has sent me stems, some of them fully twelve inches long, gathered in the early part of February of this year. Though it might have been supposed that its near ally, *G. erectum*, might have been looked for about the same time, it is relatively much belated, and, as a matter of fact, in none of its Yorkshire stations, where my friend sought for it, was it visible until the 20th of April, more than three months later than *G. Mollugo*. It may be of interest to state in this connection the approximate times of the up-springing of our northern plants in those localities of which I have information. At Aghaderg, Co. Down, 30th March (Rev. H. W. Lett); Saintfield, Co. Down, 24th April (Rev. C. H. Waddell); Cullybackey, Co. Antrim, 21st May (Miss Knowles); Whitewell, Co. Antrim, 1st May (Mr. Stewart); and Glenmore, Co. Antrim, where the situation is much exposed, 17th May in one patch, and the 24th May in others. The variation in the times of its first showing, in these places, it may be assumed is to be set down to difference in soil and situation. The great disparity in time of the springing up of the two species, which, roughly speaking, is about three to four months, is remarkable, and may be regarded as a distinctive feature not without value. This was unknown to me until after my first notes were written, or it might alone have been sufficient to have justified a strong suspicion that our plants were different from *G. Mollugo*. In the meadow at Glenmore there have been

counted at least eight patches of the plant, some of them very large, the largest covering an area of upwards of twelve square yards. In three of these plots the general aspect of the plant differs from that of the others in that the stems are less decumbent, the form of leaf narrower and more linear, and the internodes of the primary flowering stems longer. In all, there is some dissimilarity in the leaves, not only in the same stem, but to some extent even in the same whorl. Only in the lower whorls of some stems has the form of leaf any appreciable tendency towards being obovate, a tendency which may be noticed also in those of the lowest whorl of other species of the same genus, but these leaves are evanescent. The variation in form of leaf in plants in different parts of the field, ranging from linear oblong to comparatively broad lanceolate, cannot be held to constitute any specific or even varietal distinction, and is probably to be attributed to the nature of the soil and other local conditions. In all, the fruiting branches of the panicle are erect, or sub-erect, with trichotomously branched umbels. The leaves of all in the early stage of growth are erect, afterwards spreading or erecto-patent, and it has been noticed that in some of the main flowering stems, especially in those of the less slender forms, they become reflexed. In the plant which I regard as normal *G. erectum*, as also in the more robust forms, the corolla is pure white and the leaves grass-green; in some others the flower is slightly creamy, and the foliage a yellowish green. The short growth, which was at first supposed to be from the base of the main stems, giving a tufted and matted appearance to the patch, is for the most part an independent growth of short, weak, sterile stems, many of which fade about the time the flower-buds of the primary stems begin to expand, which, in the case of the Glenmore plant, did not occur this year until late in July, though at Whitewell and Cullybackey it was observed in flower in the latter part of June. The inflorescence has a pleasant fragrance, resembling that of dried Woodruff. The number of leaves in a whorl being very variable, is not to be depended upon as a distinctive mark of any importance. In the Glenmore plant there are as few as five, and as many as nine, and in the Whitewell plant there are many whorls with ten, and some with twelve leaves, but

the prevailing number is six. A set of specimens from five of the patches in the Glenmore meadow was sent to Mr. Colgan, to whom I am beholden for much kind assistance. Three of these he considered to be *G. erectum*, but the other two, in which the form of leaf is less narrow, he would hesitate to refer to that species. To my mind they seem to be forms of the same, and are certainly unlike any of the many typical examples of *G. Mollugo* which have come before me; and if they must be regarded as varieties, then I think they ought to be associated with *G. erectum* rather than with the other species. It is, however, satisfactory that, to use his own words, Mr. Colgan is "now quite convinced of the occurrence of *G. erectum* at Lisburn."

At the Saintfield station Mr. Waddell has discovered the plant growing in a second place, which he describes as "practically a meadow."

Between the plants in the two places here, there is also some slight difference, the leaves in one being rather narrower than those in the other, but that both are to be set down to *G. erectum* there cannot be any doubt. Freshly gathered examples have not been obtained from Glenarm and Aghaderg, but good specimens, collected some ten years ago, have been supplied from the former place by Mr. Praeger, and from the latter by Rev. H. W. Lett, and in both cases the plant previously recorded as *G. Mollugo* must be referred to *G. erectum*.

Of all the plants that have been under examination, the two extremes appear in the examples from Derry and Cullybackey. Of the Derry plant, which grows very luxuriantly on the landward side of an embankment along the shore of Lough Foyle at Eglinton, Mrs. Leebody very kindly sent me immature specimens gathered 11th May, but no doubt the plant was above ground very much earlier, because the stems were of considerable length, and the flower buds beginning to show. The characters, save in the remarkable robustness of the plant, resembled more closely those of *G. erectum* than those of *G. Mollugo*.

The mature plants with which Mrs. Leebody afterwards favoured me, were fully four feet in length, very much branched, and the leaves broad lanceolate. The profuseness of the inflorescence, nearly all the branches producing flowers,

is scarcely exceeded by that of any *G. Mollugo* that has come before me, but, at the same time, the cyme-branches are upright. I am informed that in the place where the plant occurs "everything grows very luxuriantly, and the Burdocks are magnificent," and some stems of *G. verum* sent me as illustrative of this, are nearly four feet long. There would seem to be scarcely a plant more variable, or one in which the extremes are more closely connected by a gradation of intermediate links than that under consideration.

On some of the stems of the immature plant sent by Mrs. Leebody there were roots with soil attached. These were planted under an espalier in my garden, and though the stems died, a vigorous growth shortly afterwards sprang up, four of the new stems being fertile, but none of them exceeding some sixteen inches in length, the plant being quite prostrate in habit, and showing no tendency to find support amongst the branches under which it was placed. Save that some of the leaves are more gradually narrowed and the flowering branches very few, short and inconspicuous, the characters are identical with those of the robust form growing by Lough Foyle. If the plant is to be considered a variety rather than a form, there would seem to be as much justification for uniting it with *G. erectum* as with *G. Mollugo*. Possibly the plant under cultivation may have altered characters when more fully established in the soil where it is planted. Mr. Stewart originally assigned it to *G. Mollugo*,<sup>1</sup> and pending further observations it would seem better that this should not be disturbed.

In the Cullybackey plant the leaves are very attenuate, linear, and suddenly narrowed above, the forward-pointing marginal prickles numerous and prominent, and the mucronate points longer than in any other specimens of *G. erectum* with which it has been compared. According to the descriptions, this plant might indeed, with equal fitness, be referred either to *G. Mollugo* var. *Bakeri* or to *G. erectum* var. *aristatum*, but no sufficient reason appears for regarding it as other than a casual state of *G. erectum*.<sup>2</sup>

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<sup>1</sup> *Journ. Bot.*, vol. xxx, p. 281.

<sup>2</sup> See an interesting paper "On a Yorkshire *Galium* allied to *G. erectum*," by Mr. J. O. Baker, in *Journ. Bot.* i., p. 290 (1862).

Shortly, whereas in *G. Mollugo*, which Mr. Foggitt informs me is hardly at all variable, the leaves are obovate, the flowering branches many and divaricate, the stems very robust, and so long as to appear above the tops of the hedgerows; the leaves of our plant, though varying in form, are not obovate, but lanceolate, oblong, or linear-oblong, the flowering branches of the panicle erect or sub-erect, the stems for the most part decumbent, creeping amongst the grass in which it grows, and are generally short; or sub-decumbent where the grass is long, as a rule hardly, if at all, exceeding two feet in length.

The outcome, then, of the investigation is that, in my judgment, the records for *G. Mollugo* in the north-east of Ireland, leaving out the questionable case of the Derry station, are erroneous, the plant being *G. erectum* or a form of that species. The standing of the latter in District XII., though owing to the absence of specimens from some localities, it is difficult to tabulate with the precision to be desired, may briefly be stated thus:—

***G. erectum*, Hudson.**

First recognised 1896. *Hab.* Meadows, lawns, and grassy places

Fl. end of June till end of August.

**DOWN.**—Lawn at Aghaderg Glebe, near Loughbrickland, Rev. H. W. Lett, 1886. "Rowallane Lawn," near Saintfield, D. Redmond and Rev. C. H. Waddell.

**ANTRIM.**—Park at Glenarm Castle, Dr. Holden and Dr. Dickie. Very abundant in an old meadow at Glenmore, near Lisburn, 1895, J. H. D. On débris overgrown with grass at base of the cliffs at Whitewell, 1896, S. A. S. In a meadow behind the Manse at Cullybackey, Miss Knowles and Dr. Buick, 1897.

Mr. Stewart and myself wish to express sincere thanks to those friends and correspondents whose names have been mentioned, who, with much kindness, have supplied notes and specimens.



## AMONG THE WILD FLOWERS.

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**Open-Air Studies in Botany: Sketches of British Wild-Flowers in their Homes.** By R. LLOYD PRAEGER, B.A., B.E. M.R.I.A. Illustrated by Drawings from Nature by S. Rosamond Praeger, and Photographs from Nature by R. Welch. 8vo, pp. xiii., 266. London: Charles Griffin & Co., Ltd., 1897. [Price 7s. 6d.; with gilt top, &c., 8s. 6d.]

One of the most hopeful signs in the present outlook of biological science is the increasing amount of attention that is being paid to outdoor work. It is no longer so necessary as it was to insist upon the—one would think—obvious fact that the study of natural history is the study of *life*, and cannot be successfully prosecuted without close and continuous observation of *living* organisms among their natural surroundings. We want to know all that can be known of their life-histories, how they grow and are nourished, their care for their offspring, their dealings with one another, and their relations with their surroundings, and a thousand other particulars which cannot be ascertained by examining the dried mummies in a museum, or cutting microscopic slices of bits of tissue.

As a result of this awakening interest in the doings of the lower organisms, several admirable works on "live" natural history have recently appeared, and Mr. Praeger's charming little volume is a notable addition to the list. In a series of eleven chapters, or 'scenes,' the author conducts his audience to some selected spot by mountain and bog, sea-shore and meadow, river and hedge-row, and discourses pleasantly on the strongly-contrasting assemblages of plants growing in the several situations. Mr. Praeger is thoroughly in sympathy with Nature in all her moods, and his vivid and picturesque descriptions of the natural features of his selected spots afford delightful reading. Some idea of the character of the book may be gathered from the following summary of the subjects treated under the several headings.

"Scene I." is "A Daisy-starred Pasture" at Ballycastle, Co. Antrim. The various plants in flower are gathered and utilized as material for a very brief outline of the leading facts in the external morphology, physiology, and classification of plants. That these pages are the driest in the book is saying much for the readable character of the rest. No details of minute structure are given, and this omission affords us almost our only opportunity of a mild grumble at the author's expense. We are told that a leaf is made up of *cells*, but what a cell is we are left to conjecture; indeed the author uses the term for several totally different structures. For example, on p. 9, the two-chambered ovary of the Hazel is described as *two-celled*: on p. 47 the huge intercellular spaces in the stems of Reeds are termed "*air-filled cells*": and on p. 194 we are told

that the unilocular anthers of Malvaceæ have "only one cell." In a book intended exclusively for the outdoor worker it would be ungenerous to criticise these small matters too closely but the work of the young field naturalist will be none the worse if he knows something of the marvellous structure of the framework of the plants he studies.

Scene II., "Under the Hawthorns" at Dundonald Glen, Co. Down deals with an assemblage of shade-loving plants; the species noted serving as texts for an account of the phenomena of sleep-movements, parasitism, &c. It is a pity that, in describing the habits of the parasitic *Scrophulariaceæ*, Mr. Praeger should have perpetuated the fanciful account given by Kerner of the function of the scale-leaves in *Lathraea*. The researches of Groom and others have shown that the glands on the epidermal lining of the pocket-shaped cavities are not absorptive organs at all. Their function is the excretion of water, which is given off in considerable quantity into the cavity of the pocket, and escapes thence into the surrounding soil. The concave form of the leaves is not assumed with the object of forming a trap for the capture of minute animals, but simply for the protection of the delicate water-excreting hairs lining the cavity.

Scene III., "By the River," is an interesting description of the aquatic and semi-aquatic plants growing by, and in, the Boyne at Bective, Co. Meath; and in Scene IV. we have a charming description of the Murrough of Wicklow, and the characteristics of the maritime plants growing on its shingle-beach. The formidable armature of the Sea-Holly leads up to a short account of plant-defences.

The next Scene, "A Fragrant Hedgerow," treats chiefly of climbing-plants and the object and mechanism of climbing, followed by a brief discussion of plant-movements in general.

A delightful chapter is that descriptive of Scene VI., "A Connemara Bog," with its rare and beautiful Heaths, its numerous insectivorous plants—Sundews, Butterworts, and Bladderworts, and many another striking species. The distributional problems suggested by the peculiar flora of the West of Ireland are dealt with in a very interesting manner.

In Scene VII. we are conducted once more to the sea-shore "where the Samphire grows" (Howth, Co. Dublin), and are introduced to many maritime plants that love to grow in the crevices of the cliffs on that rock-bound coast, where they are exposed to the dash of the salt spray. The presence of *Geranium sanguineum* among the more truly maritime species leads to a consideration of the various devices adopted by plants for the dispersal of their fruits and seeds.

Scene VIII. is "A Flowery Meadow," "waist-deep in flowers," and ablaze with the glorious spikes of the Purple Loosestrife and the creamy masses of Meadow-sweet blossom, mingled with orchids and many other plants. Here comes in very appropriately a clear and most readable account of the numerous contrivances adopted by plants for ensuring cross-fertilisation by the aid of wind and insects.

Next follows "A Study in Weeds" in a cornfield, and a description, based on the occurrence there of two or three species of Catchfly, of the

protective devices whereby the entry into the flower, and spoliation of the honey, by insects incapable of rendering assistance in cross-fertilisation is prevented. Here, too, in connection with the Trefoils, we learn something of the extraordinary symbiotic relationship between Leguminous plants and nitrogen-fixing bacteria.

Scene X. is laid "In the Home of the Alpines" in the English Lake District, and treats of the characteristics of the plants of the high mountains. The size and brilliancy of alpine flowers brings up the general question of the colours of flowers, which is clearly summarised, and references given to other, fuller, sources of information.

The final Scene of this interesting book transports us into the heart of a great city, to a bare cheerless spot amidst squalid buildings, where the flotsam and jetsam of the city have been shot down in unsightly rubbish-heaps. Truly a strange place to select for a study in wild-flowers! Yet, under the guidance of our enthusiastic leader, even in this forbidding spot our interest never flags for a moment, and we come away with a fuller comprehension of the reality of that great "struggle for existence" which is always going on among plants, as among animals, than we could obtain from a visit to fairer and more favoured scenes.

The volume closes with a useful glossary of technical terms, and a very full index. The proof-reading has been carefully done, only two errors, as far as we have noticed, having escaped correction. In fig. 24 (page 83), the reference numbers of the fruiting spikes of the two species of *Ranunculus* have unfortunately been transposed; and on page 234, line 5, the Black Nightshade is, correctly, designated *Solanum nigrum*, but a few lines further on it is referred to as *S. nigra*. We may remark, in passing, that 'calyxes' as the plural of 'calyx' is scarcely preferable to the more usual *calices*.

The work is illustrated by numerous excellent drawings from nature by Miss Præger, and the seven beautiful plates of "wild-flowers at home," from photographs by Mr. R. Welch, are a particularly attractive and valuable feature. In general 'get up' the book leaves nothing to be desired, but we fear that the high price—and 7s. 6d. is high for a popularly-written volume of 266 pages, even when the admirable illustrations are taken into account—will seriously interfere with the wide circulation which it so thoroughly deserves.

J. W. CARR.

## NOTES FROM A TRIP TO LAMBAY ISLAND.

BY ERNEST BLAKE KNOX.

ON the 8th of August last, at the request of the Royal Zoological Society of Ireland, I left Amiens-street railway station by the morning train, accompanied by Dr. Carton, to get some diving birds for the new tanks in the Gardens. The train rattling past the slob-lands of Clontarf and Malahide gave us glimpses of motley congregations of various wild-fowl, the wary Curlew, with his hoarse guttural cry of alarm, and the timid Black-headed Gull, fresh in its immature plumage from the heathery inland bogs, being quite a contrast.

Arriving at Lusk railway station we were confronted by a number of jarveys each having his own idea of the fare to the village of Rush, about two and a half miles distant, the nearest point from which a boat can be got to go to Lambay Island. Our jarvey, being of a loquacious nature, pointed out objects of interest on the way. Passing Sir Roger Palmer's demesne he informed us that "it cud only be bate for rale beauty by one place in the three kingdoms;" where that place was he could not remember. A little further on we came to the village of Rush, consisting of a street nearly a mile long lined by cottages, also having a police barrack, national school, coastguard station, cottage hospital, and some shops dispersed at intervals.

Finding an inn, on inquiry as to what provisions we could get to bring with us, we were rather amazed that no such thing as tinned meat could be got in the village, and had to be content with biscuits, bread and butter, until we got back. A coastguard over from the island, who proved to be a very accurate bird observer, gave us a lot of valuable information regarding the breeding-haunts of its visitors. Having found two boatmen less exorbitant in their prices than the rest, we embarked from the harbour in their yawl.

On our passage over, I observed a large number of Razor-bills and Guillemots, either in pairs or as single birds—all very tame. The paired birds, our boatmen informed us, were "mother and daughter," which, indeed, on close inspection, proved to be correct, the adult bird buoyed high in the water with maternal importance, being followed by its small off-

spring, which now and again coming closer to its parent, kept crying for food. We tried to capture several, but in vain, as on close approach the old bird always dived, and the youngster followed. I fancy if we could have separated them we should have been more successful. Gulls, Terns, Cormorants, and Puffins kept crossing us as we neared the island, the Puffins being easily distinguished by their massive bill. Approaching the north side of the island, we could hear the weird calls of the Herring Gulls, interrupted now and then by the almost barking note of the Black-backed Gull.

A boat can approach quite close to the cliffs on this side of the island, the water being very deep even at low tide. The tide being out left a number of rocks covered by sea-weed exposed. These rocks were literally brown with young Herring Gulls, seeming quite tame until nearly within grasp, when they flapped away. Hearing some mysterious sounds issuing from a creek, we determined to explore it. On our entry we disturbed a pair of Sandpipers and a Whimbrel, which we knew could not emit such sounds. The creek was towered over by high cliffs covered with now empty Kittiwakes' nests. Again the mysterious noises began followed by their echoes, seeming at one time like the cries of young hawks, and at another of something grunting and puffing. Dr. Carton first discovered their origin. High up in the cliff on a ledge sat a couple of pairs of Guillemots in a state of great excitement, turning round and round, bobbing their heads, and opening and flapping their wings; on closer inspection we could see all this was caused by their anxiety to hide their solitary offspring, which was needless, as from their impregnable positions they were quite safe from ever getting to the Zoo.

A little further round the island, turning a promontory, we came on a colony of Shags and Cormorants, some of the latter with outstretched wings and open mouths sunning themselves. The reason of this gaping position of the Cormorant is strange, but may be due to the anatomical defect of development as regards size of the nasal apertures and nasal chambers peculiar to this bird, leaving it to rely on chiefly oral and not nasal breathing after a long flight.

These birds on seeing us, gave quite an aquatic display, each having apparently its own way of getting under the

water in the quickest possible time. Reaching "Fresh-water Bay" we landed, leaving the yawl in charge of our two boatmen. The heather on the island was in full bloom, forming a beautiful contrast to the still young bright green Bracken—the happy hunting, if not fighting-ground of Rabbit and Puffin.

We made straight for the "Seals' Cave," the cliffs round which are the headquarters of the gull family of Lambay. Arriving there, we were greeted by an almost babel of cries—the yelping of some old Herring Gull, as he sedately sat with head thrown back to the sky on some rocky pinnacle, the Kittiwake almost calling his own name, the constant whirr of Puffins' wings as they crossed to their nests.

It was chiefly for Puffins that I came to Lambay, so we sat down to watch these birds as they came in from the sea, with fry held transverse in their parrot bills. As most of my readers are aware, these birds build their nests in rabbit-holes, often at a great distance from the inlet. Many are the fierce conflicts that take place between the usurpers and the lawful owners. The Puffins were rather wary about settling near the burrow of their choice and, until we hid in the Bracken, we could not mark any. Presently we saw a bird alight with food in its bill, and after standing some time on the bank outside, it popped into a hole; running up as fast as we could, we saw him coming out and flying away before we got there; putting my arm into the hole he had just quitted, I could touch nothing even with a stick, and thought we should have to dig the young one out, which might have been very heavy work should there be any anastomoses of the burrow.

The duration of the visit of the Puffin being so short it struck me, after watching some more birds visit their nests, that they really had not time to travel any distance in the hole and come out in the short time they did, and that the young bird either sat near the mouth of the hole or came out to meet its parent as it came in. Marking another arrival I hurried with as little noise as possible, and after the old bird came out I ran my arm quickly into the burrow and had the pleasure of capturing a youngster as he hurried away into the passage.

After this we got as many young Puffins as we wanted, only keeping the strong and more mature birds. I found that

tapping gently in the holes, if the young were out of reach, in many cases had the result of making them run out to meet my hand, as they took the noise for the approach of the old bird up the hole. As I wanted an adult Puffin we had to try and hurry up before one left the hole. After some exertion I succeeded in touching him in a pocket burrow, in return for which I got such a bite that I extracted him still holding on to my finger. Leaving the Puffins we got some Kittiwake and Herring Gulls, and as evening was approaching we sailed back to Rush, from which, after a substantial meal, we set off with our living freight to Dublin.

## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Rabbit from Col. Clayton, a Brown Bear from Mr. Berridge, a Razorbill and a tern from Mrs. Tatlow, a pair of Rheas from Master E. T. Weatherill, and a monkey from Miss M. B. Long. A seal has been bought. 17,960 persons visited the Gardens during August.

### DUBLIN MICROSCOPICAL CLUB.

JULY 22.—The Club met at the house of Dr. R. F. Scharff.

Mr. M'ARDLE exhibited the reproductive organs and plants of an *autacious* form of *Riccardia latifrons*, Lindberg, which he collected on decayed wood near the summit of Powerscourt Waterfall, on the May excursion of the Dublin Naturalists' Field Club. It is interesting to note that the same species collected by Mr. M'Arde on Howth, was a *parencious* form, bearing the antheridia beneath the perianth on the same branch. The specimens under the microscopes showed the capsule and spores, and the antheridia on separate branches of the thalus of the same plant. This peculiarity is ably described by Professor Lindberg in his "Hepaticæ in Hibernia, mense Julii, 1873, lectæ" (*Acta Societatis Scientiarum Fennica* x., 1874). "*Riccardia latifrons, autoica rarissima parvica*." It is an interesting addition to the Hepaticæ of the Co. Wicklow.

Mr. G. H. CARPENTER showed *Octhebius Lejolisii*, Mulsant, a small beetle of the family *Hydrophilidae*, which had been found in the rock-pools of Greystones, Co. Wicklow, by Mrs. Carpenter and himself. This insect is a very interesting addition to the Irish fauna, having been only recognised as British two years ago, when specimens were found at Ilfracombe. It occurs on the French coasts both of the Channel and the Mediterranean. The section of *Octhebius* to which it belongs is typical of the coasts of south-western Europe, and the presence of the insect on the Irish shores is another piece of evidence in favour of the old Atlantic continental coast-line.

Mr. J. N. HALBERT exhibited a small clavicorn beetle *Claviger testaceus*, Preyss., usually found in the nests of the Yellow Ant (*Lasius flavus*). Like certain other animals of similar habitat *Claviger* is destitute of eyes, and it has been observed to rely on the ants for sustenance. These in return obtain a fluid by caressing the tufts of hair on the abdomen of *Claviger*. Sir John Lubbock remarks ("Ants, Bees, and Wasps") that this is one of the very few cases of an animal having lost the power of feeding itself. The beetle seems to be very rare in Ireland, but it was taken near Waterford by the late Dr. Power.

Mr. HENRY J. SEYMOUR exhibited specimens of amygdaloidal basalt from the Black Quarry of Squire's Hill, near Belfast. The specimens shown form the lining of some long cylindrical "pipes," which traverse the basalt at several points. These "pipes" are generally about 7 inches in diameter (one is 14 inches by 9 inches), run practically east and west, and dip at various angles from 15° to 80°, sending off numerous small branches which penetrate into the rock in all directions. They are hollow except for a lining of zeolitic material about  $\frac{1}{8}$ -inch thick, the rock for a distance of some 3 inches around being altered to an earthy red colour, and crowded with amygdales. Beyond this zone the rock is unaltered, and of the normal type of black compact basalt of the Antrim plateau. The two varieties shade more or less gradually into one another. These pipes appear to have served as channels for the circulation of probably heated waters containing zeolites in solution; and the presence of branches would seem to point to this water being under a certain amount of pressure. The exhibitor intends to examine and describe their occurrence in detail later on, and mentioned that his attention had first been drawn to them by Mr. M'Lean, of the Belfast Field Club, last June.

Mr. H. LYSTER JAMESON exhibited sections of *Phagocata gracilis*, Leidy, a North American planarian, specimens of which had been sent to him by Dr. W. M. Woodworth, who has described its anatomy in detail (*Bull. Mus. Comp. Zool.*, Cambridge, Mass., xxi.) The most striking feature of this species is that there are numerous pharynges arranged along the entire length of the posterior gut diverticula.

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#### BELFAST NATURALISTS' FIELD CLUB.

August 14.—The Club made a visit to Newry, Warrenpoint, and Rostrevor, journeying by the 8.40 train. On arrival at Newry a short halt was made in order to visit the nursery at Daisy Hill. Here the members were met by Mr. Smith, who in the hurried time at his disposal showed the members some of his rarities in plant life. Another section of the members visited the brickfields, where the Boulder-clay affords numerous specimens of erratics. After an hour spent in Newry the train was resumed for Warrenpoint, where the party was taken in charge by Mr. Mann Harbison, who throughout the rest of the day acted as local guide and host. Warrenpoint was all astir with visitors, but little time was spent here. Mr. Barcroft's new steamer, the Pioneer,



was chartered for Rostrevor, and all were soon on board. It would be hard to imagine a fairer scene than Carlingford Bay, with the great jagged tops of the Carlingford Mountains towering on the right, and Rostrevor nestling amidst the old oak woods of Slieve Ban on the left. The passage to Rostrevor was soon made, when the quarry behind the Mourne Hotel was visited. From here the ascent of the mountains was commenced through the old natural oaks. An agreeable climb soon brought the members to Cloughmore, the great boulder on the summit of the hill overlooking Rostrevor. Here some time was spent enjoying the delightful vistas spread out on every hand. The descent was soon made to the shore, where some time was spent in the demesne of the Honourable A. G. S. Canning, inspecting some rare plants and a valuable and unique collection of foreign cattle and fowl. One field had quite an Asiatic appearance, with a group of the huge shaggy yaks (bull, cow, and calf), and a variety of other animals. Mr. Canning courteously met the members and explained the different characteristics of his extraordinary herd. On arrival at Rostrevor an ample tea was provided by Mr. Mann Harbison and his family. After tea a little time was spent about the village, a number of the members going to the old graveyard of Kilbroney to see the ancient cross there, several photos of which were taken. This cross stands beside the grave of the 8½ feet "Irish giant," to whom a large cross has been erected. A pleasant ride along the shores of the bay brought the members in good time to Warrenpoint to catch the last train to Belfast.

AUGUST 28.—GEOLOGICAL SECTION.—Excursion to Cushendall *via* Retreat. On arriving at Parkmore the road to Retreat was taken and visits paid to many of the numerous cuttings and trial shafts that have been opened in the slopes of the basalt-capped hills in search for bauxite, which occurs in great abundance in this locality. In Ballyemon Glen a very fine exposure of rocks was examined within a small area near the Waterfall. Sections of Old Red Sandstone, Trias, Greensand conglomerate, Chalk, and basalt occur, intersected by a dyke of basalt standing up as a wall about 6 feet above the rocks through which it has cut. The greensand conglomerate is about 3 feet 6 inches thick in this locality, and contains water-worn pebbles of quartz and blocks of schist and red sandstone that have cropped out near the shore-line of Cretaceous times. Many fragments of Greensand fossils were found. Proceeding towards Cushendall the same sequence of rocks was observed on the slopes of Lurigethan. Several quarries of felstone porphyry were visited, and on the walk to Cushendall the characteristic outline of a volcanic neck was observed in the dome of Tiveragh. After tea in the Glens of Antrim Hotel the party drove up the beautiful Glenariff, noting many objects of interest, geological and botanical, on the way. One member pointed out the Rose Bay or Narrow-leaved Willow-Herb growing luxuriantly near the stream above the glen, whilst others had observed the Bladder Fern growing on the sections visited in Ballyemon Glen.

## DUBLIN NATURALISTS' FIELD CLUB.

AUGUST 21.—EXCURSION TO FERNS.—A dozen members only attended this excursion which started from Harcourt-street by the 10 a.m. train. Ferns was reached shortly before one o'clock, and the party received a warm welcome from the Rev. Canon T. B. Gibson and Dr. G. E. T. Greene, who acted as guides for the day. Unfortunately some very heavy showers materially hindered field work, but in the bright intervals collectors were not idle. Going first to the marshy meadows by the banks of the Bann, the party afterwards crossed the high road and explored the plantations and hedgerows on the hills west of the town. Among the beetles collected were *Meligethes erythropus*, *Lema septentrionis*, *Chalcocnema hortensis*, Fourc., and *Ceuthorrhynchus litura*, while *Pentatoma paccarum*, immature *P. prasina*, and *Phytocoris varipes* were noteworthy bugs. The beautiful tubular snares of the large spider *Agelena labyrinthica* were abundant on Furze bushes. Three species of planarian worms—*Rhynchodemus terrestris*, *Polycelis nigra* and *P. cornuta* were collected and identified by Mr. H. L. Jameson. The botanists of the party gathered the following noteworthy plants:—the Round-leaved Sun-dew, *Drosera rotundifolia*, L., the Marsh St. John's wort, *Hypericum elodes*, L., the Three-cleft Bur-Marigold, *Bidens tripartita*, L., the Golden-rod, *Solidago virgaurea*, L., the Ivy-leaved Bellflower, *Campanula hederacea*, L. (in marshy meadow between the Railway and River Bann, a new locality for the plant), the Sea Bindweed, *Convolvulus soldanella*, L., and the Royal Fern, *Osmunda regalis*, L. On trees the curled Bristle-moss, *Ulota crispa*, Bridel., occurred; while the curious Liverwort, *Porella platyphylla*, L., was gathered in some quantity on the stones at the summit of the Castle, to which the party mounted under Mr. Gibson's guidance. The other antiquities of Ferns—the ruined monastery and cathedral, the tomb of S. Egan in the church, and that of King Dermot McMurrugh in the graveyard—were also visited. After being most hospitably entertained at the Rectory, the naturalists returned to town by the evening train.

## CORK NATURALISTS' FIELD CLUB.

AUGUST 7.—A very successful excursion to Youghal was held, at which the Committee decided to give a book prize to the member who collected the largest number of plants during the trip. Nine collections were sent in to Mr. R. A. Phillips. The winner, Mrs. Hughes, being successful with 138 species. The plants of most interest sent in were the Yellow Loosestrife, Lesser Broom-rape, and Common Bladderwort (in flower); a far larger number would have been gathered except for the rain—in consequence of which we had to leave the bog and sea-side plants alone.

SEPTEMBER 11.—The last excursion of the season was made to Ballinhassig Glen. After an interesting climb and ramble through this romantic spot, where some rare liverworts and mosses were found, tea was provided, and the party returned to Cork.

## NOTES.

## BOTANY.

## PHANEROGAMS.

## County Down Plants.

Cycling last month through Co. Down, a few locally uncommon plants were noted. The best was *Typha angustifolia*, which grows with *T. latifolia* in the mill-dam by the shore at Bishop's Mill, three miles north of Portaferry; *Torilis nodosa* grew near by. *Papaver Rhaas* was seen about the railway at Downpatrick, *Raphanus maritimus* about Portavogie and Ballyhalbert. *Sium erectum* was seen near Strangford, and also *Juncus glaucus*; *Rumex Hydrolapathum* at Killough, *Beta maritima* at Portaferry, and *Koeleria cristata* at Ballyhalbert.

R. LLOYD PRAGER.

## Dryas octopetala in Co. Antrim.

In the *Irish Naturalist* for May last there was a brief reference to the re-discovery of *Dryas octopetala* in the County of Antrim; since then I have, through the courtesy of Rev. H. W. Lett, been introduced to the spot where it was found by him in 1884. The occurrence of the Mountain Avens in this county is of much interest to northern botanists. The first discovery of this plant in the North of Ireland was by Templeton, on 17th August, 1796, on the rocks of Benevenagh, County of Derry. Mackay, in his Catalogue of Irish Plants, 1825, and again in *Flora Hibernica*, 1836, ignores Templeton's discovery in Derry. He attributes this find to Dr. Moore, but says "Mr. Templeton finds it in County Antrim" (*Cat. Ir.*), "County Antrim, Mr. Templeton" (*Flor. Hib.*). The compilers of the *Flora of North-east Ireland* on examining the Templeton MSS. could not find any note of his having gathered the *Dryas* in Antrim, and assumed that his record for Derry had, by Mackay, been inadvertently transferred to Antrim; I still remain of this opinion, and thus Mr. Lett's discovery came as a surprise.

The plant does not grow on Sallagh Braes, properly so called, but on the cliffs north of Knock Dhu, a hill of small extent which is interposed between Sallagh Braes in the townland of Sallagh and the cliffs which face the north in the townland of Drain's Bog. Knock Dhu has a considerable elevation, rising from 1,100 feet at the top of the cliffs to 1,260 at the summit, the botanical interest being centred in the crags both north and south. On turning the shoulder of Knock Dhu *Dryas* soon appears scattered over the precipitous rocks from near their base

p to near the summit, and is fairly plentiful, bearing on 5th August both flowers and fruit. The occurrence of the plant is very similar to that we find in Derry. There it grows at an elevation of about 1,100 feet on basaltic rocks which have a northern exposure. It is singular that a plant so easily recognised should remain unseen so long. Did Templeton inform Mackay of its occurrence on Knock Dhu and yet neglect to note it in his journal or his MS. Flora?

S. A. STEWART.

[Mr. Stewart's note is of much interest, and supplies what has been wanted with regard to the occurrence of this plant in Co. Antrim—definite particulars as to its habitat and distribution; and the correction which he makes as to its station—Knock Dhu, not Sallagh Braes—is timely. To ourselves, Mr. Stewart's note is satisfactory as justifying our remark that it was unlikely that so conspicuous a plant could have so long escaped notice at Sallagh Braes, in spite of very positive statements to the contrary. Sallagh Braes is well-known ground and our local flora is full of references to the plants which grow there. Knock Dhu, on the other hand, is almost unworked, and hardly a plant is recorded from it.—EDS.]

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## ZOOLOGY.

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### MOLLUSCA

#### ***Hyalinia excavata* In County Fermanagh.**

Mr. Langham and I recently discovered this rare British species under vine bark in the extensive demesne of Tempo Manor. The wide umbilicus distinguishes it at once from its nearest relative *Hyalinia nitida*. It has never been found in any inland county in Ireland before, having only been met with in about half a dozen places on the west and south coasts. In Great Britain it occurs in the extreme south and north and in the south of Scotland. Outside the British Islands it has only been found in a single locality, viz., at Fleusburg in Northern Germany.

R. F. SCHARFF.

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### CRUSTACEA.

#### ***Cyllisticus convexus* In Co. Fermanagh.**

This extremely rare British woodlouse, the discovery of which in Ireland I announced in the *Irish Naturalist*, vol. iii., 1894, occurs in Mr. Langham's demesne of Tempo Manor, near Lisbellaw. I have stated on a former occasion that it had once been taken in England and once in Scotland. It runs with great agility, and when disturbed partially rolls itself up into a ball. It may be recognized by the tip of the tail being of a light yellow colour, whilst the rest of the body is grey. No other species of *Cyllisticus* has such a wide distribution, for it has been taken in Scandinavia, Germany, France, Austria, Turkey; and it ranges even into Boreal North America. Almost all the other species of this genus are confined to South-eastern Europe.

R. F. SCHARFF.

## INSECTS.

**Wasps in Co. Waterford.**

I have observed the same scarcity of Wasps this year about Portlaw, as Mr. Barrington notes in his neighbourhood. I don't think I have seen half a dozen, and I have not heard of any nests.

This is the more surprising, inasmuch as wasps are usually abundant about here. It seems extraordinary that this year should form an exception, when we remember that the spring was so favourable, and the summer very hot. Can any readers of the *Irish Naturalist* suggest an explanation?

WILLIAM W. FLEMING.

**Autumn Scarcity of Wasps.**

In regard to this district (Blackrock), I can bear out Mr. Barrington's experience as to the scarcity of worker-wasps this autumn. While at Ballybunnion, in Kerry, in August, I noticed numbers of workers of *Vesta sylvestris*, but of no other wasp. Since my return to Dublin I have only seen two males of *V. germanica*, and two workers of *V. vulgaris*. Queens of our six Irish species were not rare in the spring and early summer.

Mr. Percy Freke has noticed the same circumstance at Borris, in Co. Carlow. In a letter, dated 19th August, he writes:—"There has been a most remarkable scarcity of worker *Vespa* and *Bombi* this season that I ever remember. The females were exceedingly numerous in spring and early summer, and I thought we would have a flood of workers presently. I have not yet seen a single wasps' nest this season. Last year I could probably have found a hundred within a mile or so of my house."

It is possible that the very wet autumn of last year may have prevented the impregnation of the queens. I can suggest no other explanation of the present happy scarcity.

H. G. CUTHBERT.

***Ctenistis quadra* in Co. Waterford.**

I see Mr. Bonaparte-Wyse's note about this rare moth (ante p. 252), and write to say that I took a specimen in Curraghmore on the 16th of August, 1895.

WILLIAM W. FLEMING.

***Colias edusa* in Co. Cork.**

Mr. R. A. Phillips wrote to me that he saw a single *Colias edusa* near Skibbereen on August 3rd. I have accordingly been hoping for its reappearance, and was pleased to see two on Sept. 12th, four on Sept. 14th, nine or ten on Sep. 15th, and a few more on the 16th, so if fine weather continues I expect they will become more common, and, as in 1888, continue with us till the middle of October or longer. All I have yet seen distinctly enough to distinguish sex, including four captured, were males.

JOHN J. WOLFE.

### Lepidoptera in Cos. Wicklow and Mayo.

On the 7th June last, at Glendalough, County Wicklow, I found *Bupalus (Fidonia) piniaria* abundant. Only one larva of *Tamiocampa miniosa* turned up where it had been fairly numerous in 1896. A larva of *Geometra papilionaria* was beaten out of birch. On the 2nd August I found *Gonepteryx rhamni* plentiful among thickets on the shores of Lough Mask, County Mayo.

GEORGE V. HART.

### Caterpillars of *Hemaris tityus (bombyliiformis)*.

I had, on July 28th, five larvæ of this moth full-grown, and six or seven about half grown or less. Of the five, three were light-coloured, one had no brown or red marks whatever when viewed from above, and only a mere trace of red about each spiracle. From the first moult to the last one all are green on the back. Some, towards the end, show a little red at the spiracles; all, however, are always dark red or brown underneath (the green one included). As the season advances, a good many of the Scabious leaves on which it feeds, turn a dull red, and doubtless the colour assumed by the large larva helps it to escape observation. Unlike the other *Sphingidæ* which I have reared from the egg (*Smerinthus ocellatus* and *S. populi*), while small it drops readily when disturbed, as all our *Satyridæ* do, a useful accomplishment where cattle graze.

J. J. WOLFE.

### *Bupalus piniaria*, L., in Ireland.

In reference to Mr. Bonaparte-Wyse's "Entomological Notes from S. E. Ireland" (*Irish Naturalist* for August, p. 221), I may mention that *Bupalus piniaria* is quite a common moth in fir-plantations at Ballyhyland, Co. Wexford; and it seems to me very likely that its range has been much extended since Birchall, in 1866, was unable to name an Irish locality for it. It should be borne in mind that the Scotch Fir, on which the larva of *piniaria* feeds, is, for practical purposes, scarcely to be counted an indigenous Irish plant, but rather a species which was re-introduced after having reached the verge of total extinction: so that it is almost necessary to regard the moth as a recent settler in this island. A parallel case in England of a beetle (*Asemum striatum*), likewise attached to Pine and Fir, is mentioned in *Science-Gossip* for August (p. 72). Until 1893 this was a strictly northern insect in Britain, found only in Scotland and Cumberland, but during the past four years it would appear to have established itself in Surrey and Hampshire, where, as in the east of Ireland, the Pine is an introduced species. The great Pine Saw-Fly (*Sirex gigas*), which is thought to be on the increase in Ireland, is a somewhat analogous instance among the hymenoptera, to say nothing of the Squirrel, among mammals, and the Crossbill among birds.

C. B. MOFFAT.

**Bupalus piniaria in Co. Kildare.**

In the August number of the *Entomologists' Monthly Magazine* Mr. G. V. Hart mentions having taken this moth at Glendalough during Whitsuntide, I presume of this year. It may be worth mentioning that I took it in Co. Kildare in May, 1896.

PERCY E. FREKE.

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**BIRDS.**


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**Montagu's Harrier Breeding in Ireland.**

On the 24th August last I received a letter from a cousin of mine in Co. Kerry, enclosing in the flesh what I identified as a young female Montagu's Harrier. He had shot it on the 20th August, and says:—"I have seen six birds of this kind (four young and two old) constantly about in a rocky ravine near here and the one I enclose is a young bird . . . "The old hawks make a strange clucking noise and the young a kind of whistling scream." I have skinned the bird, and Dr. Bowdler Sharpe on inspection kindly confirmed my identification. The exact spot where the specimen was killed has been given me, but I refrain from disclosing it in case any of the birds should nest there again next year. According to Mr. Howard Saunders' "Manual of British Birds," *Circus cineraceus* has only occurred three times in Ireland, and has never before been reported as having nested, so that the above facts seem well worth recording.

JOHN H. TERSDALE.

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**A Marked Pigeon.**

On August 9th, Mr. Welch and I were climbing round the base of the great cliff at the eastern end of Ireland's Eye, when he picked up, on a bare rock near tide-level, a pigeon's leg, encircled by an aluminium ring. We had just flushed a fine Peregrine Falcon off the cliff over our heads, and no doubt the pigeon had been killed and eaten by him. The leg was picked clean, nothing but the claw, bone, and ring remaining; and it was evident that the pigeon had been recently killed. On the ring, in raised letters, was the legend "65 L, 18 F 97 C."

The daily press has been full of notices of pigeons during the last several weeks, but the information is somewhat contradictory, and I cannot match this pigeon with any of which notice has been taken. 100 pigeons were liberated near Heligoland on July 13 (June 13 according to another account) by the Altona Club or other German pigeon-flying societies. It would appear that these pigeons bore an aluminium ring with the word "Nordpoh" on it. 2,000 German pigeons were liberated at Dover about the middle of July, but these are stated to have been marked by a rubber band. Herr Andrée's pigeons, it is stated were marked "Andrée Expedition, A.D. 1897."

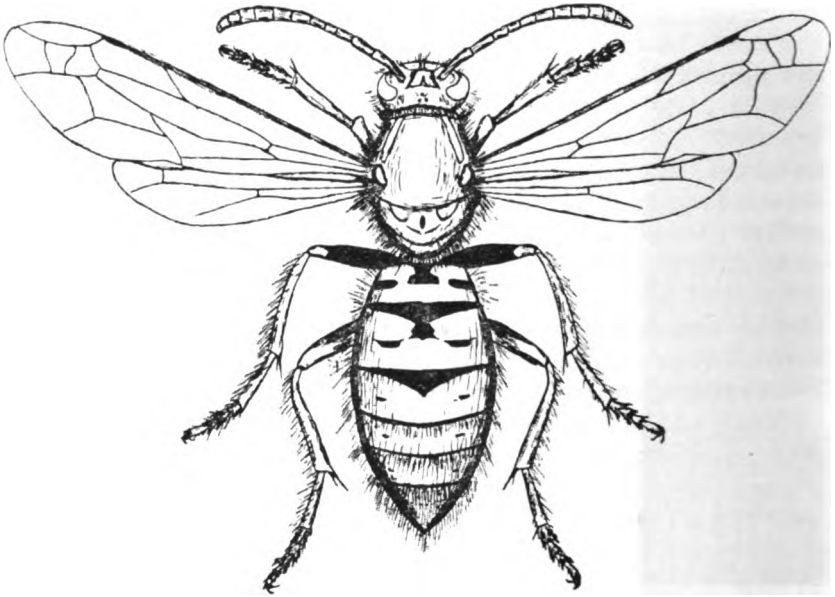
R. LLOYD PRÆGER.

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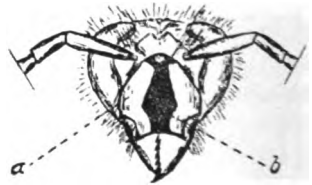
I.



II.



III.



IV.



VESPA AUSTRIACA, Panz. (I., II., IV.)

V. RUFA. L. (III.)

## A MYSTERIOUS IRISH WASP.

VESPA AUSTRIACA, PANZ. (ARBOREA, SMITH).

BY H. K. GORE CUTHBERT.

THIS species was first described as a British wasp by Mr. Frederick Smith in 1837, in the first volume of the *Zoologist*, then edited by Edward Newman. Since that date the insect has been taken in different parts of England and Wales, ranging as far north as Yorkshire. I believe it has once been recorded from Scotland. It was first placed upon the Irish list by Mr. Carpenter in 1893, on the occurrence of three specimens at Passaroe, near Bray, in North Wicklow; and has since been recorded from County Dublin by Messrs. Halbert, Low, Rathborne, and myself. One example has been taken by Mr. Freke at Borris in County Carlow.

My captures of the insect have been by far the most numerous, amongst those who have collected it in Ireland. In 1894 I took four specimens, in 1895 seven, in 1896 three, and this year (1897) ten. About half of these were taken in my own garden at Blackrock, and the rest in the grounds of the Nursery at Monkstown.

I have always found the wasp in most abundance about the end of June, and never far from the vicinity of bee-hives.

M. André, in his "Hymenoptères d'Europe," states that the species known to British collectors as *Vespa arborea*, Smith, is identical with the Continental *Vespa austriaca*, first described in the last century by Panzer, a wasp which has a rather restricted range in Central Europe, occurring in Switzerland and the Tyrol.

Both males and females of *V. austriaca* are known to collectors, but it differs from all the social wasps to which it structurally belongs, in the non-occurrence of workers, or neuters. Hence it is believed by Continental entomologists to be an inquiline, or resident in the nest of some of the social species; a view supported by Mr. R. Newstead in the *Entomologists' Monthly Magazine* for 1894.

No collector of Aculeate Hymenoptera in Great Britain or Ireland has yet met with the male of *V. arborea*, although the males of all our other indigenous *Vespa* are well known.

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Our foremost authority on the Order, Mr. Edward Saunders in a letter to Mr. Carpenter in 1893, stated that *V. arborea*, Sm., will be most probably found to be merely a modified female or queen of some of the social wasps; but in his "Hymenoptera-Aculeata of the British Islands," since published, he adopts M. André's view as to its identity with *V. austriaca*, Panz.

The social species it most closely resembles is *Vespa rufa*, Linn., from which it differs principally in the shape of the black marks upon the yellow clypeus, or portion of the face between the jaws and antennæ, the yellow line on the first antennal joint, and some other minor, but not always constant, particulars.

The plate, drawn from one of my specimens taken last July, shows the typical markings of the insect, and the clypeal differences which distinguish it, in the main, from *V. rufa*.

That there may be something more than accidental resemblance between these two species I am led to surmise from the fact that this year (1897), I have almost always taken both together. *V. rufa*, although it has been taken in the North, appears to be a somewhat southern species in Ireland, and makes its nest in the ground, like our two commonest social wasps, *V. vulgaris* and *V. germanica*. Smith first named the insect which supplies the title of this paper, *arborea*, because he took it, as he believed, in the act of building a nest in a fir-tree, but no subsequent collector or student of the Order, since that date, 1836, has confirmed his observations.

The question of the true identity of *V. arborea*, as it stands, is a very pretty entomological puzzle, which can only be properly solved by a careful examination of the nests of the various species.

Bearing in view Smith's statement in the *Zoologist*, I have during the past three years thoroughly examined every nest of our tree-building wasps, *Vespa sylvestris* and *V. norvegica*, that I could obtain, but without finding anything unusual.

Nests of *V. vulgaris* and *V. germanica*, ground-nesting species, have also yielded no results; but I have unfortunately never had an opportunity of finding the nest of *V. rufa*, which

also, as stated, builds in the ground, by preference at or between the roots of trees.

From the scarcity of wasps' nests I have been unable to carry on these researches in the season of 1897, but hope to do so in the future with the co-operation, as I trust, of some of the entomological readers and correspondents of the *Irish Naturalist*.

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"Catalogue of the Hymenopterous Insects in the British Museum Collection." By F. SMITH.

*Entom. Monthly Mag.*, July, 1894.

"Hymenoptera-aculeata of the British Islands." By E. SAUNDERS.

#### EXPLANATION OF PLATE 3.

Fig. I.—*Vespa austriaca*, Panz. (*arborea*, Smith)—female. Mag. 3 diam.

„ II.—Face of *V. austriaca* showing, (a) clypeus, (b) black marking on same. (Mag. 4 diam.)

„ III.—Face of *V. rufa*, reference as in Fig. II.

„ IV.—Variations of the clypeal marks of *V. austriaca*.

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### THE PORTRUSH RAISED BEACH.

BY SAMUEL ALEXANDER STEWART, F.B.S. EDINB.

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MR. W. H. PATTERSON, of Belfast, has favoured me with a quantity of gravelly material collected by him from a raised beach close to Portrush. It may almost be said to be in Portrush, being a very short distance from the principal street and just above the harbour for small boats. On examination this material proves to have considerable interest in connection with our Post-tertiary fauna. Mr. Patterson informs me that the beach in question is situated a very short distance north of the site of the celebrated raised beach at Portrush, discovered long since by James Smith of Jordan Hill, the pioneer of British glacial geology. A street has been run across, and houses now cover the spot where Smith and others obtained so many fossil specimens. The principal interest attaching to Mr. Patterson's discovery lies in the fact

that his gravel-bed is without doubt a fragment of the ancient Post-tertiary beach which up to the present has not been obliterated by extension of the town, though recent observers have referred to it as now inaccessible. The exposure at present available is described by Mr. Patterson as being some 30 feet long by about 3 feet thick,\* and lies a few feet above high-water mark. It marks the northward extension of the old beach, or raised sea-bottom. It is not a beach in the true sense, many of the shells being such as live at a considerable depth, and the grouping is such as not likely to be found on an ordinary beach.

Portlock, in 1843, first called attention to this accumulation at Portrush of sand and gravel so highly charged with shells. He enumerated, on the authority of Smith, 79 species of Mollusca as found therein, together with some Annelids and *Balani*. Grainger subsequently examined these gravels, and published a list of 54 species of fossils found by him, a number of which being additional to those previously recorded. Considerable attention was paid to this beach later on, and in the British Association *Report* for 1890, Mr. Alfred Bell, of London, who himself has added considerably to the list, gives 113 species of Mollusca as having been found in the Portrush beach up to that date.

By the list which follows it will be seen that 48 species of marine Mollusca are represented in the small quantity of material handed me by Mr. Patterson. A considerable proportion of these are shells which may be found between high and low-water marks, a good many do not come up to low-water mark, but the largest portion consists of species which range from low-water to many fathoms below it, shells of the Laminarian and Coralline zones. The geographical facies is slightly northern. The northern aspect is not emphatic, but nevertheless, taking Jeffreys's *British Conchology* as our guide, it appears that not one is characterized as southern, while four species are considered as having a northern range. These, however, are only mildly northern.

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\* These dimensions apply only to the section seen by Mr. Patterson, as the gravels, in their further extension, are covered by soil.

The previously published lists of the shells of the Portrush gravels when compared with those of the fossil bed known as the Turbot Bank, off Belfast Bay, show an intimate relation. This is manifest also in the present list, all the species here enumerated being common to both, save only four, namely *Mactra solida*, *Rissoa cancellata*, *Odostomia lactea*, and *Melampus bidentatus*. Three species are now, for the first time recorded as occurring in the Portrush beach: these are *Mactra solida*, *Odostomia indistincta*, and *O. interstincta*.

Former enumerations have been swelled by land-shells found intermixed, but as these are purely accidental they are not included in the present list of raised beach fossils. It may, however, be mentioned that the following species were found:—*Balea perversa*, *Hyalinia radiatula*, *H. alliaris*; and *Helix pulchella*, which was in abundance. Specimens of a *Vertigo* occurred, but were lost before examination.

A portion of the gravels was washed and examined by Mr. Joseph Wright, F.G.S., who kindly undertook to determine the Foraminifera. Mr. Wright has furnished a list of 27 species which he identified from the small amount of material at his disposal, and says that there is not much to remark on this list, the species being such as occur in similar deposits, and might be expected here.

*Polymorphina lanceolata* is now for the first time recorded for the north-east of Ireland, either in the recent or fossil state, and so also *Nonionina pauperata*, but the latter is a new species only recently described. Three others are additions to the previous list of Portrush Foraminifera,\* namely *Miliolina secans*, *Bolivina punctata*, and *Discorbina rosacea*; and lastly, *Textularia gramen* appeared in former list under the synonym of *T. sagittula*, *Bolivina difformis* of present list was *Textularia difformis*, and *Discorbina nitida* was *Rotalia nitida*.

Appended is the systematic list of shells found in the recently exposed section of the Portrush raised beach.

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\* Wright—"The Post-Tertiary Foraminifera of the North East of Ireland," *Proc. Belf. Nat. Field Club*, Appendix, 1879-80.

## MOLLUSCA.

(The nomenclature and sequence is that of Jeffreys' "Conchology.")

<i>Anomia ephippium.</i>	<i>Rissoa striata.</i>
<i>Mytilus edulis.</i>	<i>R. semistriata.</i>
<i>Lasaea rubra.</i>	<i>R. cingillus.</i>
<i>Cardium norvegicum.</i>	<i>Odostomia acuta.</i>
<i>Mactra solida.</i>	<i>O. unidentata.</i>
<i>Saxicava arctica.</i>	<i>O. plicata.</i>
<i>Patella vulgata.</i>	<i>O. indistincta.</i>
<i>Helcion pellucidum</i> var. <i>lævis.</i>	<i>O. interstincta.</i>
<i>Tectura virginea.</i>	<i>O. lactea.</i>
<i>Emarginula fissura.</i>	<i>Natica Alderi.</i>
<i>Fissurella græca.</i>	<i>Adeorbis subcarinatus.</i>
<i>Trochus tumidus.</i>	<i>Cerithium reticulatum.</i>
<i>T. cinerarius.</i>	<i>Cerithiopsis tubercularis.</i>
<i>T. umbilicatus.</i>	<i>Purpura lapillus.</i>
<i>T. sisyphinus.</i>	<i>Buccinum undatum.</i>
<i>Phasianella pulla.</i>	<i>Murex erinaceus</i>
<i>Lacuna divaricata.</i>	<i>Trophon muricatus.</i>
<i>L. puteolus.</i>	<i>Nassa reticulata.</i>
<i>Littorina obtusata.</i>	<i>N. pygmaea.</i>
<i>L. rudis.</i>	<i>Defrancia linearis.</i>
<i>Rissoa cancellata.</i>	<i>Pleurotoma rufa.</i>
<i>R. reticulata.</i>	<i>Cypræa europæa.</i>
<i>R. punctura.</i>	<i>Utriculus truncatulus.</i>
<i>R. costata.</i>	<i>Melampus bidentatus.</i>
<i>R. parva.</i>	

## FORAMINIFERA.

<i>Miliolina seminulum.</i>	<i>Uvigerina angulosa.</i>
<i>M. subrotunda.</i>	<i>Globigerina bulloides.</i>
<i>M. secans.</i>	<i>G. inflata.</i>
<i>Textularia gramen.</i>	<i>Patellina corrugata.</i>
<i>Bulimina pupoides.</i>	<i>Discorbina globularis.</i>
<i>Bolivina punctata.</i>	<i>D. rosacea.</i>
<i>B. plicata.</i>	<i>D. nitida.</i>
<i>B. difformis.</i>	<i>Planorbulina mediterraneensis.</i>
<i>Cassidulina levigata.</i>	<i>Truncatulina lobatula.</i>
<i>C. crassa.</i>	<i>Rotalia Beccarii.</i>
<i>Lagena sulcata.</i>	<i>Nonionina depressula.</i>
<i>L. Williamsoni.</i>	<i>N. pauperata.</i>
<i>L. Orbignyana.</i>	<i>Polystomella striato-punctata.</i>
<i>Polymorphina lanceolata.</i>	

## THE POSSIBLE ORGANIC ORIGIN OF QUARTZ-ROCK.

BY G. H. KINAHAN, M.R.I.A.

IN the *Proceedings R. I. A.*, 3rd ser., vol. iii., no. 4, is published a paper on Quartz, Quartz-rock, and Quartzite. In it is reiterated my previous conviction that the protrudes of quartz-rock had an analogous genesis to that of the silicious adjuncts of the modern hot springs. Not being ocularly acquainted with such springs, but only with their products, information in connection therewith was asked for in America, and kindly offered by Walter Harvey Weed, U.S. Geol. Survey, who sent a copy of the *Bulletin* containing his report on the "Formation of the Travertine and Silicious sinter by the Vegetation of Hot Springs" (*Extract, 9th Annual Report of the Director, 1887-88*), with specimens. They, however, through some vagary of the American postal arrangements, did not arrive till six months after date, and consequently not till after the above-mentioned paper had been published. This, to me, was unfortunate, as Prof. Weed's researches exemplify the probable correctness of my suggestion.

In his report on the accumulation of the hot springs of Yellowstone National Park, Weed mainly confines himself to the effect due to organisms; but in his letters he states—"The Yellowstone deposits are extremely variable in character, accordingly as they are produced by the action of organic life (*Algæ*), or by evaporation from true geyserites, or by the precipitation of the silica due to cooling and relief of pressure, or due to the cementation of comminuted fragments of sinter formed by other agencies."

The specimens sent were solely to illustrate the action of organic life, but he further writes:—

"I have, of course, a great variety of sinters from the Yellowstone, embracing everything from those formed by evaporation purely, those formed by the solidification of particles which have separated from the highly charged waters and formed a deposit, to those which are in part argillaceous, and which are so largely formed in this manner."

Although in the Yellowstone the secreting organism is principally an alga, in the report he mentions other agents,



such as rushes, worms, &c. He also mentions that although the springs are principally silicious, there are also calcareous or ferriferous, and other springs, accumulating their special rocks or minerals: he largely describes the travertines. Among other facts recorded, is this interesting one, that the late William Archer has in cold springs in Ireland found an alga identical with one in the hot springs of Yellowstone.

Although Weed's report has been published nearly ten years, it seems to be generally unknown, even to those who have visited the Yellowstone. This is to be regretted, as some of the characters of quartz-rock would seem to suggest an organic origin. This communication, however, is not controversial, but suggestive, and is written in the hopes that it may induce some of our numerous microscopists to examine the quartz-rocks for organisms.

Considering that the quartz-rocks are of such great age, and have been subjected to so many vicissitudes, it is not surprising that algal remains or such like, may have gone undetected, more especially when we remember that it is only quite recently they have been authoritatively recognised in the modern accumulation. In 1874, Dr. C. C. Parry noticed the presence of Algæ in the hot springs of Yellowstone, and said they would reward special research; but in 1878 Dr. A. C. Peale scouts the idea of organic aid of the hot water accumulation; and it was not till after Prof. Weed's researches were published (1890) that we learned how animal and vegetable life were such important agents in the accumulating of the rock-masses—the adjuncts of the springs.

The limit of heat at the Yellowstone in which Algæ grow is 185° F., but such plants are immature and poorly developed; it is not till the temperature is lowered to 140° F. that they attain their full development. Those grown in excessive temperature are often so indistinct as to be nearly undistinguishable under the microscope, but in the rock they form riband-like stripes, or concentric rings of colour. Such lines or "dirt bands," as they have been called, are very characteristic of quartz-rock, but as in the latter they are so mineralized, it seems hard to expect to be able to prove skeletons of plants in them, except possibly on the surface of the layers of depositions, where there are serpentine lines and pinholes

respectively, very like those due to the upper edges of the layers and to the spikes of the Algæ in the silicious sinter of the the Yellowstone. These can be seen in the specimens sent by Weed, which have been presented, through Prof. O'Reilly, to the Royal College of Science, Stephen's Green.

In examining quartz-rocks it should be remembered that in many places they have been considerably altered by shearing, and consequently metamorphosis; as is so conspicuous in the County Donegal. Here the older quartz-rocks (Archæan) have been changed into a highly quartzose gneiss; while the newer ones, possibly Cambrian or Ordovician (Caradoc), have been subjected to considerable up-thrusting which has sheared the rock over each thrust plane, into flags. In south-east Ireland, however, it is not so; as those associated with the Oldhamians in the Forth Mountain and westward to Bannow, County Wexford, exhibit remarkable markings on the surfaces of the different planes, also distinct changes of colour in the different shelves of rock; which changes of colour, in the modern sinter, are due to the growth of plants in zones of different temperature. Worm-tubes have not been recorded in any Irish rocks except those of the barony of Kilmacrenan, County Donegal, near the Bloody Foreland, and in the hills northward of Ramelton; some of the beds in the latter are sheared and the pipes now appear as elongated compressed tubes. In the "Pipe quartzites" of Sutherland, Scotland, there are remarkable assemblies of worm-tubes; hard to be accounted for, until Prof. Weed's researches have suggested their origin. They seem to have been extensive colonies that flourished in large exposures due to hot springs, similar to the silicious sinter plains of the Upper Geyser of the Firehole River, but of larger dimensions, each worm segregating the siliceous matter and thereby forming a pipe. Various features in different places in the different quartz-rock areas suggest analogies with those of the modern rocks; such as the Eagle's Nest, Mulroy Waters, County Donegal, which, on view, has a character similar to the sketch, fig. 53, in Weed's *Bulletin*. Any microscopist who may take this subject in hand I will aid, as far as possible, with information as to the best localities for research.

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## THE TUBE-FORMING WORMS.

BY THE REV. HILDERIC FRIEND.

TOWARDS the end of September last, I received from Mr. Robert J. Kirwan, Gardenfield, Tuam, County Galway, a splendid consignment of annelids in a living condition. They were accompanied by the following note. "Mud containing small red worms from a pond at Gardenfield. The worms occurred in such numbers as to give the water the appearance of blood. They, however, disappeared like magic when I approached them closely. They protruded part of their bodies from the mud, and kept them in continual motion. I send these in response to your appeal in *The Irish Naturalist*." This interesting communication supplies me with a text for some notes on the tube-worms in general, with special reference to the Irish species. This group of annelids has been the subject of remark from very early times. The old writers on natural history were familiar with them under such titles as blood-worms or summer-worms, but they often confounded them with the larvæ which abound in similar situations in summer, and are of a bright blood-red colour. They were long ago regarded by the common folk as portents of dire calamity; were observed to be very gregarious; and had even been observed constructing and inhabiting tubes. This latter fact is of value. We know that *Serpula* and other marine creatures, including *Northia* and various tubicolous worms, form abodes either of a calcareous or arenaceous nature, in which their bodies are partially or wholly, temporarily or constantly, to be found. There is room for research here, especially among the freshwater annelids; for we at present know little of the processes involved in tube-forming, or the extent to which it is practised. The tubes are usually of so fragile a nature that they collapse with the slightest touch, and in many ways the conditions for their study are inimical to the investigator.

It does not follow that all the genera now classed as tube-formers live in tubes. So far as I can gather, Müller (*Zool. Dan. Prod.* 2605), was the first to employ the term *tubifex*, and with him it is specific. All worms in olden times were

*Lumbricus*, so the worm which made a tube was naturally *Lumbricus tubifex*. In time the various worms came to be distinguished not only as species, but as genera; then the old specific term *tubifex* became generic. For a long time, just as every earthworm came to be known as *Lumbricus terrestris*, so all the blood-worms found in ditch and stream, pond or river, were denominated *Tubifex rivulorum*. Eventually it appeared that there were many forms of *Tubifex*, and that they differed so widely the one from the other that they must be separated into different genera under the family name of *Tubificidæ*. Now this family is both large and interesting. Its members are found in many parts of the world, and numerous students of the front rank in this branch of zoology have during the last twenty years given them attention. Foremost among these I may mention our English authorities Beddard and Benham. In America we have the infatigable Swedish worker Eisen. Vejdovsky, Stolc, and others are the Continental representatives. By their combined labours nearly twenty different genera have been discovered and described, and it would require a considerable volume to reproduce all that is now known on the subject.

The family is distinguished from most others by certain well-defined characteristics, while in some particulars the affinities with the other families are equally clear. Thus the genus *Ilyodrilus*, which is unmistakably tubificid in character, is in many respects closely allied to the *Naidomorpha* (Beddard, "Monograph of Oligochaeta," p. 227) These connecting links are of the greatest value in relation to the question of evolution.

Speaking generally, the members of this family may be distinguished by their delicate and slender build; their transparent integument, through which the blood-vessels and vital organs may as a rule be readily distinguished; and especially by the shape, number and variety of their setæ. These vary greatly. In one or two genera the setæ are of one kind only: in others there are two different kinds, while yet other genera have three and even four different forms. Sometimes one kind is uniformly distributed over the whole body, at other times one kind occurs on the dorsal, and another on the ventral, or one on the anterior, and another on

the posterior regions of the body. Dr. Benham did a good deal six years ago by the publication of "Some Notes on Aquatic Oligochaeta" (*Micr. Jour.*, vol. xxxiii. n.s., p. 187 *et seq.*) towards clearing up difficulties, and making this subject more lucid; and since then our knowledge has yearly been growing more definite and satisfactory.

In addition to these external characteristics we have also the arrangement of the blood-vessels; the nature and position of various organs concerned in the processes of reproduction; and the presence, in certain members, of peculiar chitinous tubes, varying in length and shape with the genus or species, and affording in some cases the readiest means of identification or distinction.

Of the various genera belonging to the family *Tubificida*, the following are all which are at present known to occur in Ireland:—*Tubifex*, *Limnodrilus*, *Heterochaeta*, *Psammoryctes* and *Hemitubifex*. Respecting some of these I have already written in these pages from time to time, but I think it will be well in this paper to bring our present knowledge of the Irish Tubificids to a focus, in order that future work may be facilitated. As the genuine *Tubifex* has not, so far as I am aware, been placed on record for Ireland since the Annelids have been systematically studied, it may be advisable to give in the first place a brief diagnosis of this typical form. I may take this opportunity of warning collectors who make a study of fresh-water worms against the idea that because one worm in a given collection happens to be the genuine *Tubifex*, therefore the whole of the gathering is made up of that species. It will be frequently found that three or four different species, representing in some cases as many genera, are collected together in one spot.

#### ***Tubifex rivulorum*, Lamarck.**

A slender aquatic worm frequently extending to an inch in length, of a bright-red colour. Very gregarious, living in mud, which it usually makes into tubes into which a portion of the body is thrust. Active, often associated with other species or genera belonging to the same family. Integument very delicate and transparent, enabling the blood-vessels and organs to be clearly seen. Possessed of three kinds of setæ, viz. (1) long, capilliform, or hair-like setæ, usually two or more in the dorsal bundles (intermixed with others), from the second segment to the twentieth or thirtieth. The number of segments in which these

setæ are found seems not to be definite; in one worm they appear to extend further back than in another of the same species. Sometimes they seem to be present in the hinder segments; but this is a delusion arising from a curious hair-like parasite. The longest setæ are about equal to the average diameter of the worm's body. (2) Forked or uncinæ setæ, found in all the ventral and some of the dorsal bundles. They vary in number, but three or four seems to be the average. The lower fork is the lesser; a point of distinction which should be remembered. (3) Pectinate setæ intermixed with the capilliform in certain segments in the neighbourhood of the vital organs. I do not think the teeth can be made out with any lower power than a good one-quarter inch objective. To be seen to advantage a one-sixth or one-eighth should be employed (fig. 1). This nicety is the more important because such a genus as *Ilyodrilus*, for example, in many respects resembles *Tubifex* so closely that the utmost care is necessary in the study of this

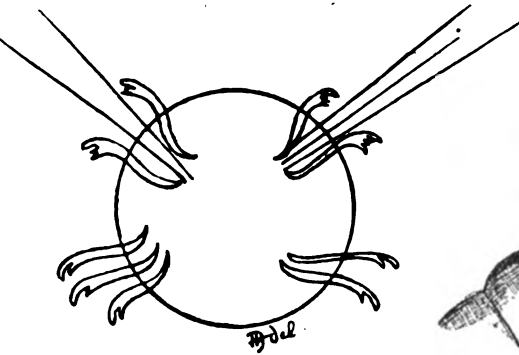


FIG. 1. Setal System of *Tubifex* (segment 10).

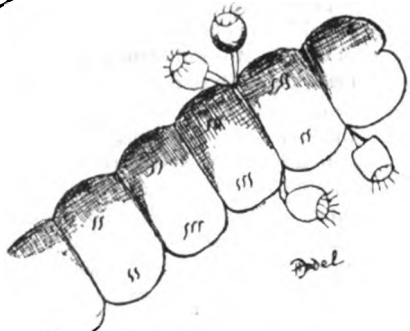


FIG. 2. Parasitic Rotifer on tail of *Tubifex*.

form of seta. There is no chitinous penis as in *Limnodrilus* and some other genera. In the eighth segment the blood-vessels are enlarged so as to form dilated hearts which are very conspicuous, and supply one ready means of diagnosing the genus. Locality—Gardenfield, Tuam.

***Limnodrilus Udekemianus*, Clap.**

Locality—Ballintoy, July 7th, 1897. See p. 207.

***Heterochaeta costata*, Clap.**

Collected in the Connswater, Belfast, June, 1896. See p. 63.

***Psammoryctes*, sp.**

Antrim, June, 1896. Awaiting further examination. See page 102.

***Hemitubifex Benedii* (d'Uden).**

From Dr. Trumbull, Malahide, 1896. (*I. Nat.*, vol. v., p. 128).

The material which I still have on hand will, I doubt not, yield a few additions to this meagre list, but my time for these

pursuits is sadly limited, and the best results can only be obtained by the study of fresh materials, for supplies of which I am dependent upon the kindness of my readers. It may interest the microscopist to know that these worms often supply pleasing objects owing to the presence on their extremities of certain species of rotifera. One such is represented in the accompanying diagram (fig. 2).

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## REPTILES AS PETS.

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**The Vivarium, being a practical guide to the construction, arrangement and management of Vivaria.** By Rev. GREGORY C. BATEMAN, A.K.C. pp. 424, illustrated. London: L. Upcott Gill, 1897. Price, 7s. 6d.

Though this work purports to give full information as to all Reptiles suitable as pets, how and where to obtain them and how to keep them in health, it is doubtful whether many readers of the *Irish Naturalist* will avail themselves of the opportunity thus afforded to add a few of these somewhat despised Vertebrates to their stock of household pets. Nevertheless, they will find in this book much to interest them. The construction of a vivarium in itself is of importance not only to the zoologist, but also to the botanist, and what may have been merely intended by the author for Reptiles, might very well be utilised for the rearing and observation of Insects, Spiders and other Invertebrate animals, of the habits of which we have still a good deal to learn.

This work is replete with the most interesting information concerning the habits of Lizards, Snakes, Tortoises, Crocodiles and Amphibians. The distinctive characters of the various species are clearly set forth. No one would have the slightest difficulty, for instance, in distinguishing at a glance the two common English Snakes, *Tropidonotus natrix* and *Pelias berus* after reading the description. Among the many interesting passages, I may mention this statement—and this will be news to many readers of the *Irish Naturalist*—that we possess in Ireland an as yet unused source of wealth in our native frog. For Mr. Bateman tells us, that in the markets of Paris, Brussels and Geneva, the species almost invariably offered for sale is not the Edible Frog (*Rana esculenta*), but our Common Frog (*Rana temporaria*).

No work of the kind has before been published in the English language. Reliable information on the management of Reptiles and Amphibians in confinement could only be gathered from Fischers' German work "Das Terrarium." To managers of Zoological gardens especially, Mr. Bateman's treatise will be invaluable, but it is well worthy of a place in every zoological library.

R. F. SCHARFF.

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NOTES.

BOTANY.

Notices of Irish Plants.

In the *Journal of Botany* for September, Mr. H. C. Hart publishes some "Notes on Co. Dublin Plants," which contain some new stations for local phanerogams. In the October number of the same Journal, Rev. H. W. Lett records *Fossombronina cristata* from "Lough Bridan, Co. Down"; we believe Lough Briclan is intended. Mr. Townsend's "Monograph of the British species of *Euphrasia*," now in course of publication in the same Journal, contains a number of Irish stations for these critical forms.

PHANEROGAMS.

***Trifolium agrarium* (Linn.) a casual in Ireland.**

This beautiful yellow-flowered Trefoil has been found, this year, at Drumbo, Co. Down. Naturalized for many years in England, I believe it has not previously been noticed in this country, but it may be predicted that, having once gained a foothold here, it will soon be found elsewhere. From *T. procumbens* it may easily be distinguished by its erect habit. The flowers are not only more brilliantly coloured, but are also larger and more conspicuous.

J. H. DAVIES.

***Silene noctiflora* and *Chenopodium murale* in Co. Antrim.**

In September last I found *Silene noctiflora* in some abundance on gravelly waste ground in several spots near Larne Harbour. This seems to be a plant of uncertain appearance, and a doubtful native of Ireland. I think it may be safely asserted that it is a recent immigrant at Larne—the neighbourhood of its present habitat has been frequently botanized. The plant has not been previously recorded from Co. Antrim. With less claim to a place in the local flora is *Chenopodium murale*, which I found at the same time growing in the famous gravel-pit at Ballyrudder. Fowl are kept there, and the seed may have come with their food. This species is very rare in Ireland, and usually hangs about ruins and old towns. It is on record as having been found more than half a century ago on a ruined cottage near Belfast—the only note of its presence in District XII.

R. LLOYD PRAEGER.



### A Hybrid Groundsel.

*Senecio squalidus*, "Wall Ragwort," "Oxford Groundsel," or "Cork Ragweed," is not mentioned as a native plant in "Flora Hibernica" (Mackay), and is supposed to be an immigrant to our shores from Greece and other parts of S. Europe. It abounds on garden and town walls in Oxford, and also at Cork (and elsewhere, as at Kinsale and Bandon), and in both cases has been spoken of as an escape from the respective Botanical Gardens of each of these cities.

Some years ago Mr. Carroll sent to More and Moore an intermediate plant presumably a hybrid, as mentioned in "Cybele Hibernica," p. 158. While in Cork the other day I saw in the shunting or goods yard of the Bandon station, a showy group of *S. squalidus* with flowers nearly as large and bright yellow as those of *Chrysanthemum segetum* (Corn Marigold), now very handsome amongst potatoes, etc., in the South. On going to examine it more closely I found it to be *S. squalidus* in a very variable state, there being a sliding scale, or series of forms, from the largest to the smallest rayed form, closely resembling in foliage the Common Groundsel (*S. vulgaris*). I collected a series for preservation but unfortunately lost the bundle in the hurry and bustle of travelling. I have, however, written to a botanical friend in Cork to collect me fresh specimens, as the plants are very numerous in one spot, growing amongst a lot of old iron rails—at first I thought that *S. vulgaris* (the other parent of the presumed hybrid) was absent, but I afterwards found a few odd plants here and there at some distance from *S. squalidus* and its seedlings, but in the same yard or enclosure. Personally, I have no doubt but that this variable series of varieties has resulted from the hybridising of *S. squalidus* as a garden escape with our native *S. vulgaris*, and it gives me great pleasure to add my testimony to the present existence to-day of these intermediates as collected by Mr. Carroll in or near Cork some years ago. According to the "Cybele Hibernica (Lc.) *S. squalidus* " was not known 'as wild' to Mr. Drummond in 1820."

It would be very interesting to know of these or similar hybrids or intermediate forms have been observed at Oxford or other places where *S. squalidus* is known to grow together with or near to *S. vulgaris*.

While on the subject of *Senecio*, I may add that I saw a strong colony of *S. saracenicus* at Bantry, quite close to the town, on the roadside facing the harbour. It was growing on the side opposite the sea at the foot of a wall, and in a wet position.

Drummond originally discovered it in this habitat—but in the woods. The plant is cultivated also by farmers and peasants as a styptic, and so is apt to appear anywhere as an escape.

I am especially interested in wild hybrid plants of all kinds, and am always glad to hear of their occurrence in our native flora.

F. W. BURBIDGE.

### Ballycastle (Co. Antrim) Plants.

During the Field Club excursion to Ballycastle, Prof. Carr and I spent a few hours on the moors west of Ballycastle; and this not being portion of the excursion proper, one or two plants found there were not reported in the account of the excursion (*ante*, pp. 216-18). For *Carum verticillatum* we discovered a third station in the North of Ireland. It grows abundantly over a limited area of wet moor a hundred yards on the north side of the Bushmills road at Carnsampson, 400 feet elevation. At the same place grew *Listera cordata*, and we noted the enormous profusion of *Habenaria bifolia* as compared with *H. chloroleuca*—this feature was noted over all the ground visited during the three days of the excursion. A few other plants collected on the excursion escaped record. *Potentilla procumbens* was noted in several places east, west, and south of Ballycastle. *Atriplex laciniata* was gathered at Whitepark Bay; *Myosotis repens* at Murlough; and climbing down a chasm on the summit of Fair Head, to escape a heavy shower, I found *Hymenophyllum Wilsoni* growing at the bottom of it.

R. LLOYD PRAEGER.

### "Open-Air Studies in Botany."

As a constant reader of the *Irish Naturalist*, I desire to say two words on Prof. Carr's review of Praeger's "Open-Air Studies in Botany." The reviewer remarks, "in passing, that 'calyxes' as the plural of 'calyx' is scarcely preferable to the more usual 'calices.'" This is hypercritical, and, moreover, inaccurate; if Mr. Carr will pledge himself to speak of *stamina* and *corolla*, he may invite authors to use *calices* also; but then he must use *calix*, with an *i*, not *calyx* with a *y*, for the outer whorl; the *y* is due to the early printers misunderstanding the tailed *r*'s of the mediæval scribes, and has no place in a Latin word; if he wants to go to the Greek he must write *cylix*.

Again, he writes, "it is a pity that . . . . Mr. Praeger should have perpetuated the fanciful account given by Kerner of the function of the scale-leaves in *Lathraea*. The researches of Groom and others have shown that the glands on the epidermal lining of the pocket-shaped cavities are not absorptive organs at all." Now these researches of Groom were published in the "Annals of Botany," for September, 1897; the "others" referred to I find from the *postscript* to Groom's paper, published in the *Jahrbücher f. wiss. Bot.* (heft 4), and *Flora* (heft 3), both of the present year. Mr. Praeger's book was published in August, 1897; and it is hardly worth while for a critic to express such regret. Did he wish that the author, instead of following the best existing authority, should play the part of prophet, or delay indefinitely what, on the very face of the review (I have not read the book) appears to be an excellent and timely publication, until every fact in Botany is placed above doubt.

MARCUS HARTOG.

## ZOOLOGY.

## CRUSTACEA.

**Some new Irish Crustacea.**

A "Further Report upon the Free-swimming Copepoda of the West Coast of Ireland," by Mr. Isaac C. Thompson, F.L.S., has been recently published in the *Trans. Biological Soc. Liverpool* (vol. xi., pp. 127-131 and table). The material dealt with in this paper was collected off Valentia Island, Co. Kerry, by Messrs. Browne, Walker, and Gamble, and the Misses Delap in 1896 and 1897. Several interesting forms are recorded, including *Rhincalanus cornutus*, hitherto only known in British waters from off the Shetlands. A careful table gives the exact localities and depths where specimens of each species named, and indicates their comparative abundance.

The Linnean Society's *Journal (Zoology)* for the current year (vol. xxvi., pp. 226-232, pl. 17, 18) contains an important paper by Mr. Alfred O. Walker, F.L.S.. "On some new species of Edriophthalma from the Irish Seas." Of the two Irish forms described as new to science; one, *Aspodes hibernicus*, was taken by Mr. Gamble at Valentia Harbour, while the other, *Parapleustes megacheir*, was dredged at a depth of 750 fathoms off our south-west coast by the Royal Irish Academy Expedition of 1888.

## INSECTS.

**Collas edusa In Ireland.**

There seems to have been quite an immigration of the Clouded-Yellow Butterfly into the South of Ireland this year. When staying at Tramore, Co. Waterford, in August and part of September, I found it not uncommon. The weather was very bad, but on the few fine sunny days with which we were favoured, if the wind were not too strong, I generally saw one or more individuals daily. They seemed to prefer keeping to the coast-line, chiefly the sand-hills, and the cliffs by the sea. I met with but two individuals at even a very short distance inland. The great majority of those I saw were males, and many of them were in very poor condition, sometimes, indeed, being so rubbed and denuded of scales as to be reduced almost to the condition of clear wings. I only succeeded in taking a few, being generally armed with a bee-net, too small for capturing butterflies. On returning to Borris, Co. Carlow, I saw one there on 15th September, and another on 23rd September. On both occasions I was riding and unprovided with a net, but the last individual I succeeded in capturing with my cap.

PERCY E. FREKE.

### Entomological Notes from Poyntzpass.

LEPIDOPTERA.—In the latter part of June and earlier part of July, sugar was fairly productive, among my captures were:—*Hadena oleracea*, *H. pisi*, *H. thalassina*, *H. dentina*, *Eurois adusta*, a fine series, several very dark; *Rusina tenebrosa* quite plentiful; *Euplexia lucipara*, a nice series in beautiful condition, *Acronycta psi*, and *A. rumicis*; *Grammesia trilinea*; *Leucania comma*, and *L. lithargyria*; *Gonophora derasa*, a fair number, in good order; *Thyatira batis*, only one occurred; *Phlogophora meticolosa*, also only a single specimen; *Axylia putris*, *Noctua festiva*, *N. plectu*, *N. c-nigrum*, plentiful, *N. triangulum*, only a solitary specimen; *N. rubi*, *Miana strigilis* and *M. fasciuncula*, as usual of varied colouring; *Habrostola triplasia* with *Agrotis segetum* and *A. exclamationis*. Since the middle of July sugar has been quite useless, nothing coming to it but the ubiquitous *X. monoglypha* and *T. pronuba*, and even they not in numbers. Besides the above I met with *Crocallis elinguaris* and *Boarmia repandata* on the wing, and when driving between this and Tanderagee observed and captured *Eubolia palumbaria* in the hedge on roadside. At Loughgilly, in some marshy ground, I took *Hydrocampa nymphaelis*. August was almost a blank. On the few sunny days that we had, *Pararge egeria* and *P. megara* along with *Vanessa urtica* were to be seen in my flower-garden, the first-named is remarkably abundant in my flower-garden, and seems to be about from May till the present time (Sept.) I also took *Pseudoterpua pruinata*, *Tortrix fosterana*, and a *Peronea* which seems to be *P. sponsana*. The weather is improving now (Sept.), but the nights are cold and moths despise sugar. I observed *Chrysophanus phlaeas*, *Vanessa atalanta*, and *Plusia gamma* flying in the bright sunshine.

COLEOPTERA.—Since my last note (p. 171 supra), I have had but little success with this Order. I made an expedition to Camlough Lake to obtain *Pelophila borealis*, and was successful in obtaining both larva and imago. but as the day turned out wet I left the lake as soon as I had obtained sufficient specimens of these and hurried back to shelter in Bessbrook. Also I have taken *Hister neglectus*, *Rhynchites minimus*, *Anthonomus pedicularius*. In turning out a pantry where meal and oats had been kept I found a specimen of *Cyckrus rostratus*: what it could have been doing in such a place I cannot imagine. In my hen-house I met with *Pristonychus terricola* which escaped the gallinaceous beak only to fall a victim to the cyanide bottle.

HYMENOPTERA.—In July I was given a female specimen of *Sirex gigas* which had flown into a gentleman's house in Newry, and caused much consternation by its ferocious appearance. *Bombus smithianus* again occurred in my lawn as well as in one of my fields. There was no great difficulty in finding their nests for as soon as one was disturbed they made a most ferocious onslaught on any person at hand. They showed a particular dislike to me, and one bee more active and cunning than the rest came up from behind and stung my hand. I found several nests, and was able to send a good example to the Science and Art Museum.

I also forwarded a specimen of the nest to Mr. E. Saunders, who submitted it to Mr. Sladen; he remarked that the nest was similar to that of other surface builders, but that the only other nest of *B. smithianus* which he had seen, and which came from Shetland, was built on twigs of heather of moss and lichen. As regards wasps, my experience agrees with that of Mr. R. M. Barrington (*J. N.*, Sept., '97.) I have seen scarcely any, and even when Mrs. Johnson was making jam they failed to put in an appearance. Several friends have remarked to me on the absence of wasps this year. I should be disposed to blame the excessive rainfall of the first six months for this scarcity. I suspect queens and all were drowned.

W. F. JOHNSON.

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MOLLUSCS.

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**Land and Freshwater Mollusca from Great Killary and Westport.**

During a short visit with some friends to Leenane, at Easter, I collected the following species in the mountain glens north and south of Killary Harbour, which here separates Mayo from Galway, and at Aasleagh Waterfall, where the head of the fiord runs up into the Erriff Valley. The greater part of the district being mountain and bog, these little *Alis* are about the only good collecting ground I saw, but there are many of them on the steep mountain slopes of both Great and Little Killary, in the Erriff Valley, and at Delphi. Several rivers and lakes within easy reach of Leenane looked promising in better weather; during our stay, however, the heavy rain each night rendered them unworkable. Aasleagh and Delphi are in Mayo, while Dernasliggan Lodge is near Leenane, in Co. Galway:—

*Vitriina pellucida*, a few at Dernasliggan and Delphi. *Arion ater*, mainly var. *brunnea*, at Dernasliggan, the black form at Leenane and Delphi. *A. circumscriptus* and *A. hortensis*, Dernasliggan. *Limax maximus*, at latter and Aasleagh. *Agriolimax lavis*, a few at Dernasliggan. *A. agrestis*, common everywhere. *Amalia Sowerbyi*, at Leenane and Dernasliggan. *Hyalinia cellaria*, *H. alliaria* and var. *viridula*, *H. excavata*, *H. nitidula* and var. *Helmii* (latter fairly common) with *H. fulva*, all at Dernasliggan. *H. excavata* and var. *vitriina*, *H. nitidula*, *H. fulva*, *H. pura* var. *nitidosa*, *H. crystallina*, *H. radiatula* and var. *viridescens-alba* with *H. nitida* also at Delphi, beside little stream running into Fin Lough. *Helix pygmaea*, common at Delphi in moss. *H. rotundata*, at Aasleagh, Dernasliggan and Delphi, but not at all plentiful; it rarely if ever is, in the west, unless on limestone. *H. rufescens*, fairly common at Dernasliggan, where one or two *H. aspersa* were also collected, both at base of old garden wall. *Cochlicopa lubrica* and *Pupa cylindracea* at Dernasliggan and Delphi, *P. anglica* at latter only with *Vertigo edentula*, and *V. substriata*, while *V. pygmaea* was collected at the former, where *Clausilia bidentata* was also

noticed on wall near the Lodge. *Ancylus fluviatilis*, a few small specimens at the falls below the Blue Bridge. Mr. R. H. M'Keown, of Leenane, informs me that the Pearl Mussel, *Unio margaritifera*, is found in the Bundorragha river, when it is low in dry weather.

On way home via Westport (a limestone district) I collected the following alive in plantations in the demesne near the river, or in flood material on the banks of latter, dead:—*Hyalinia cellaria*, *H. alliaria*, *H. nitidula*, *H. crystallina*, *H. fulva*; *Helix pygmaea*, *H. rotundata*, *H. pulchella*, *H. rufescens*, latter fine large specimens, many collected in little pockets in dry corners under stones, with the spire eaten away, evidently by mice to get at the animal. *Cochlicopa lubrica*, *Pupa anglica*, *P. cylindracea*, *Vertigo pygmaea*, *Carychium minimum*, *Limnaea truncatula*, fairly large specimens in little limestone quarry near falls. *Planorbis spirorbis*, *P. contortus*, *P. albus*, *Bythinia tentaculata*, *Valvata piscinalis*, *Pisidium pusillum*.

The majority of the slugs I sent as collected to Dr. Scharff, who kindly named them for me. Messrs. Adams and Standen looked over the troublesome *Zonitida* family when we were at Ballycastle, in May, as a number were not fully grown, and required critical determination. In the case of *Hyalinia cellaria* a number of the specimens looked like the much rarer *H. Draparnaudi*, but the shells are not adult enough for certainty on this point.

R. WELCH.

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BIRDS.  
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**The Birds of Rathlin and Ballycastle District.**

The brief and cursory remarks on birds, in my "Observations on the Fauna of Rathlin Island and Ballycastle District," in the July number of *The Irish Naturalist*, apply more especially to the "district"—i.e., Ballycastle and neighbourhood—and not to Rathlin Island in particular. The sentence, "The Chiffchaff and many other warblers abound" is quite correct when applied, as intended, to the "district"; and, in the sentence immediately preceding, Rathlin is specially named for certain birds we saw there, and these, although not specified, also occur in the "district." I am sorry that Mr. Warren has somewhat misinterpreted my remarks, and must apologise to him, and any others interested, for not writing more explicitly. With the exception of the Cushendun list supplied by Rev. S. A. Brennan, the few birds mentioned in my notes were seen by me and others of the party, and are not quoted from "information received." It would be very interesting to ascertain whether there has been any substantial increase in the "warbler" population of Rathlin since the "sixties." I am rather inclined to think so, but my time on the island was, unfortunately, too limited to allow of more than a glimpse of its smaller birds.

R. STANDEN.

## GEOLOGY.

**Post-Tertiary beds at Ballyhalbert, Co. Down.**

Seven or eight years ago, when I was working at the marine post-glacial deposits of the north-east, Mr. W. Swanston told me of having observed many years before a bed apparently of the "estuarine clays," so extensively developed at Belfast, on the outer shore of the Ards peninsula, between Millisle and Ballywalter, and I searched the shore between those two places for this bed without success. Last September, when cycling along the coast of the Ards, I saw on the shore between Ballywalter and Ballyhalbert a deposit which, from Mr. Swanston's description, I at once recognised as that which he had seen; but I could devote only a few minutes to its examination. The shore here is stony. A slope of large pebbles occupies the upper portion of the shore to about half-tide level; below that level the boulder-strewn shore stretches with a very slight slope to low-water mark. The highest zone of the post-glacial beds here exposed consists of a few inches of bluish clay, running in under the steep shingle-beach some feet below high-water mark. The clay contains *Zostera*, but I saw no shells; it resembled in every respect the Lower or *Scrobicularia* clay which occurs at so many places in the north-east. Below this zone was a bed about six inches thick of solid peat. It contained numerous stumps of trees with roots spreading horizontally in all directions, and trunks and branches of trees. I measured one trunk twenty-seven feet in length. The stumps appeared to belong to the Scotch Fir, though I found no cones. The peat is only seen close to the edge of the shingle-beach. Lower down it has been worn off the top of the underlying beds, which consist of very fine pink and grey laminated clays, three feet at least in thickness. Their base is not seen. They cover an area of perhaps an acre along the beach, and it is their horizontal beds that attract the eye from the road. These clays contained no fossils so far as I could see; and they looked identical with the clays which underlie the salt-marsh behind Killough in Co. Down, and out of which bricks are now made. The exact spot where these interesting beds may be seen is one and a quarter mile north of Ballyhalbert, and just south of the spot marked "Rodden's Port" on the one-inch O.S. map.

R. LLOYD PRAEGER.

## PROCEEDINGS OF IRISH SOCIETIES.

## ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Guillemot from Mr. B. N. Blood, an eagle from Dr. P. Garland, and a monkey from Mrs. St. George. Three Lion-cubs have been born in the Gardens, and six monkeys and two Lion-cubs have been bought.

10,200 persons visited the Gardens in September.

## BELFAST NATURALISTS' FIELD CLUB.

**BOTANICAL SECTION — OCTOBER 16.**—The winter session of the Botanical Section was inaugurated by a meeting held in the Museum on the evening of the 16th October. After tea, kindly prepared and presided over by two lady members of the Section, Mr. J. H. Davies, of Glenmore, was called on to preside. Mr. Davies stated that the first business would be to present the Chairman of the Section, Rev. C. H. Waddell, with a small token of their appreciation of his kindly interest in the work of the Section, and their sense of the value of his teaching. Kerner's *Natural History of Plants* was the volume selected, a work which presents the latest results of botanical investigation in the happiest manner. After a few genial remarks from Mr. Davies the presentation was made to Mr. Waddell, who expressed the pleasure which it gave him to receive from them such a token of their regard, and his willingness to further as much as possible their progress in botanical knowledge. The meeting concluded with suggestions for the winter work, and how botany could be best represented at the approaching *Conversazione* of the Club.

## DUBLIN NATURALISTS' FIELD CLUB.

**SEPTEMBER 18**—A party of twenty-four took part in the annual Fungus Foray. The party took train from Harcourt-street Station, arriving at Rathdrum at 11.31. A walk of one and a half miles brought them to the entrance of the Avondale Demesne which was kindly thrown open to the Club for the day's collecting by Mr. J. H. Parnell, M.P.; a field to the right of the entrance gate proved very rich in the larger fungi, nearly thirty species being found. After a visit to the house, and lunch beside a fallen tree, the party dispersed for collecting purposes to meet at 4 o'clock for a refreshing tea at the Meeting of the Waters. The mail train for Dublin was caught at Rathdrum at 6.5. Mr. Greenwood Pim, M.A., and Dr. McWeeney took part in the excursion and undertook the identification of the fungi collected. Want of time and of a larger number of workers prevented identification of many of the smaller forms.



Amongst the fungi collected were:—*Amanita rubescens* (large and abundant), *A. phalloides*, *A. vaginata*, *A. muscaria* (one small specimen), *Lepiota procera* (very large), *Armillaria mellea*, *A. mucida* (on dead Beech), *Collybia confuens*, *C. radicata*, *Mycena galericulata*, *M. sanguinolenta* (new to the county), *Hebeloma crustuliniformis*, *Lactarius blennius*, *L. subdulcis*, *L. exsuccus*, *Russula adusta*, *R. rubra*, *R. nigricans* (and several other species), *Boletus edulis* (very large and abundant), *B. luridus*, *B. satanos*, *B. chryseuteron*, *B. laricinus*, *Polyporus perennis*, *Peziza onotica*, *P. cinerea*, *Chlorosplenium aruginosum*, *Calloria chrysostigma*, *Ramularia urtica*, one or two undetermined Myxomycetes and a minute discrete *Nectria*, *Puccinia viola*, *Melampsora hypericorum*, *M. betulina*, *Lycoperdon gemmatum*, *L. pyriforme*, *Icpedonium chrysospermum*. Mr. Halbert collected the following Coleoptera:—*Halysia xiv-punctata* (congobata) off Hazel, *Chatocnema hortensis* and *Baptophila rubi* by beating brambles. The handsome green Shield-bug *Pentatoma prasina* occurred in the larvæ, nymph, and imago stages by sweeping the under-growth in the woods along the bank of the Avonbeg. Homoptera (Frog-hoppers) abounded, one of the best captures being *Allygus mixtus*. Both sexes of the pretty little spider *Pachygnatha Listeri* were found; this species had been taken the previous week for the first time in Ireland by Mr. G. H. Carpenter at Clonbrock, Co. Galway.

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#### LIMERICK NATURALISTS' FIELD CLUB.

The Limerick Field Club have recently issued the first number of their *Journal*—a well printed pamphlet of 48 pages, prefaced by some introductory matter. Four papers are published, "Limerick during the Reign of Queen Elizabeth," by James Greene Barry (2 plates); "the Shannon Legends," by Rev. J. F. Lynch; "Eugene O'Curry," by Rev. T. Lee; and "Adare and some of its Ancient Buildings," by George J. Hewson. There is no title-page or index. but a half-title bears the legend "Vol. 1."

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## NOTES ON AN EXPEDITION TO ROCKALL.

BY R. LLOYD PRAEGER, B.E.

[The following brief diary of ten days spent in twice visiting the oceanic islet of Rockall, may, perhaps, be of interest, as furnishing a day-by-day account of the experiences of the party sent out in June, 1896, by the Royal Irish Academy to investigate the natural history of this little-known and inaccessible rock, and of its vicinity. The official narrative of the cruise, and the scientific reports, have been recently issued by the Academy,<sup>1</sup> and to these the reader is referred for full information on the results of the cruise. The present notes possess, perhaps, a touch of human interest, as being taken at the time and on the spot. It only remains to add that no "editing" has been done; the notes are now printed just as they were jotted down, without alteration of any kind. Any addition required for explanation is inserted as a footnote. The delay in the appearance of these notes is due to the fact that the official account of the expedition, which had to take precedence of any paper by a member of the Committee, came into the hands of members only last month.]

TUESDAY, JUNE 2, 10.0 A.M. ON BOARD SS. GRANUAILE.—Off Salthill, with Galway gleaming in the sunlight a couple of miles behind us. A beautiful sunny morning, with slight haze, and gentle S.E. wind. The "Granuaile" is a fine boat, 400 tons, 150 feet long, with a very pretty little saloon amidships, and three good 2-berth state-rooms—very different from the "Lord Bandon,"<sup>2</sup> where we had to sleep on the narrow hard seat that ran round the dingy cabin, with a damp pilot-coat for a pillow, and one man's heels hovering round the next man's head.

I came down from Dublin by the night mail last night, having been summoned by telegram from Green<sup>3</sup> at 2.0 in the afternoon. He and I slept at the Railway Hotel, made some necessary purchases in Galway—spirit, oilskins, &c.—and got on board at 9.0, and were off immediately. Green, junior<sup>4</sup>, on board already, and Father Colgan, of Inishmore, is a passenger. The work of the expedition does not begin till

<sup>1</sup> *Trans. R.I.A.*, vol. xxxi., part 3, 1897.

<sup>2</sup> The steamer in which the R.I.A. dredging expeditions of 1885, 1886, and 1888 were carried out.

<sup>3</sup> W. S. Green, M.A., F.R.G.S., H.M. Inspector of Fisheries, in charge of the Expedition.

<sup>4</sup> Charles Green, amateur photographer.

we leave Killybegs on Wednesday night. At present we are still on Congested District Board business, working northward towards the rendezvous.

3.15 P.M. OFF ROUNDSTONE.—Green and Captain Quirk spent the morning checking their sextants. We cast anchor in Kilronan Bay, Aran, at 12.15. Green, jun., and I rowed Father Colgan ashore in the dinghy, and he entertained us in his neat little cottage. Then called on Mrs. O'Brien, where Fitzgerald,<sup>1</sup> Christen,<sup>2</sup> and I stayed during our delightful visit to Aran last July. Got a supply of coarse brown paper, in case I collect any plants. Then to the police station next door, to enquire for the tame Choughs. A constable brought us into the yard, where they have a lovely clutch of five young ones, three weeks old, which made deafening demands for food in a manner the reverse of shy. We found that all the birds they had last year, which caused us such amusement by their antics and perfect tameness, are gone—some of them to the Dublin Zoo—with the exception of Polly, an old bird who is quite a local celebrity. She makes little tours on her own account, as far even as the South Island, especially when the police go there, and makes herself at home in the cabin or engine-room of every ship that calls at Kilronan. The siren soon summoned us aboard again, where we found that a cargo of salted ling had been taken aboard, for conveyance to the curing station at Teelin. Off again, and had lunch—our first meal on board. Company—Captain Quirk, Green, sen. and jun., Mr. Shimmin, Congested District Board fishery manager, and self. Soon we passed under the old watchtower on Golam Head, and threaded our way among the islands and rocks that lie between that and Roundstone. Wind gone altogether, and only a gentle long roll—so calm that the peasants were out in their boats by dozens, cutting weed for kelp-burning from the many sunken reefs. We passed within a couple of hundred yards of Inismacdara, and had a pretty view of the primitive little church which we visited two months ago. The serrated ridge of Urrisbeg lay eight miles to the northward, and we could see the houses of Roundstone nestling at its base. Next we passed close to the seaward face of Croaghnaekeela or Deer Island. It was a pretty

<sup>1</sup> Prof. G. F. Fitzgerald, D.Sc., F.R.S.

<sup>2</sup> Rodolphe Christen, Artist.

picture—the dark rugged line of Urrisbeg on the left, with a bright gleam on the sands of Port-na-fedog and another on Roundstone church; the grey jagged Twelve Bens in the centre, and in the right foreground the brown and green patchwork of Deer Island. Away on each hand, a long stretch of the low rocky coast of Connemara.

6.30 P.M. CLEGGAN BAY, CONNEMARA.—We passed the twin lighthouses of Slyne Head at 4.30, and got into the long roll of a glassy sea. The afternoon brightened again, and became beautifully clear. A flock of 30 Manx Shearwaters at Slyne Head, and this bird now became frequent. Now our course lay N.N.E., and at 5.15 we passed the beautifully rugged and cliff-bound High Island, and down a channel with horrid rocks just showing on either hand. Inishark and Inishbofin gave welcome shelter from the westerly swell, which was becoming heavier, and we glided into the pretty bay of Cleggan. A deep inlet, with a quay and a straggling hamlet on one side, and on the other a high steep green rocky hill, crowned by an old watch-tower. At the head of the bay the Twelve Bens form a lovely background to a long gravel-beach. There we left Mr. Shimmin on an old hulk on which fish-packing in ice was going on busily.

6.0 A.M., WEDNESDAY, JUNE 3. BROAD HAVEN, CO. MAYO.—Leaving Cleggan immediately we kept northward, out between the grand rugged cliffs of Inishturk and the lower hills of Inishbofin. Dinner luckily was served while we were still under the shelter of Bofin. The weather changed again, and the sun set red and threatening, in a sky of torn thick cloud, with a fresh N.E. breeze, and a heavy swell setting in from N.N.W. We passed Clare Island, with its grand hill rising 1,450 feet steeply from the water. Achil now loomed ahead, but it was 9.30 ere we passed its dark savage cliffs, edged with gleaming foam, with Croaghaun towering up in a grand cone 2,192 feet into the sky. Two Grampuses of some sort passed us off Clare Island—large animals, with white bodies, and a large high triangular somewhat sickle-shaped black fin. At 10.30, off Black Rock light-house, I turned in. At 1.30 a.m. we finished our day's run of 150 miles, and cast anchor in the shelter of Broad Haven.

On deck this morning at 5.45. A large bay with narrow entrance; a good deal of cultivation, especially on the western

shore. High rounded hills to the eastward. Seaward, the Lights Commissioners' steamer "Tearaght" lies a quarter mile away, and behind her to the right the grand cliffs which fringe the North Mayo coast. The captain is stamping about, consigning to various unpleasant places a certain Spanish jackass that was to have been brought aboard here for conveyance to Killybegs, but which is nowhere to be seen. A dull rainy-looking morning with slight easterly breeze.

1.45 P.M. TEELIN BAY, CO. DONEGAL.—We landed a storming party at Broad Haven—the mate and two seamen, with myself as war correspondent—and with the assistance of a native contingent, captured the jackass, fastened a canvas sling on him, swam him out to the steamer in the wake of the gig, and jerked him on board with the steam winch, to his intense surprise. Then under weigh at 7.0 a.m. A heavy swell outside, and the "Granuaile" rolled badly, and breakfast, which I prudently took on deck, was a duty rather than a pleasure. Our course now lay N.E. Weather dark and rainy, with cold S.E. wind and N.W. swell—generally very uncomfortable, and we were glad when at 11.15 Slieve League was sighted on our port bow. This was the turning point of the day's fortunes. The sky slowly brightened, the sun came out, the roll lessened as we got inshore, and we passed along under the glorious precipices of Slieve League with a cloudless sky and a sparkling blue sea. Close on 2,000 feet the mountain rises in one huge precipice from the water. We passed Carrigan Head within a stone throw of its beautifully contorted rocks, and at 2.0 p.m. cast anchor in the pretty harbour of Teelin. Right above the little pier rises the landward face of Slieve League, its base dotted with cottages. The bell sounded for lunch, and we willingly trooped down. Then there was an interruption as Harvie-Brown<sup>1</sup> appeared and was welcomed. Barrington<sup>2</sup> was with Hart on Slieve League, it appeared, so we left him a message to follow us to Killybegs. The cargo of ling that we brought from Kilronan having been landed, we are off again.

10.0 P.M. KILLYBEGS.—I write by daylight on the bridge. Leaving Teelin an hour's run brought us into the fine harbour

<sup>1</sup> J. A. Harvie-Brown, F.L.S., Larbert, Stirlingshire (ornithology).

<sup>2</sup> R. M. Barrington, LL.B., F.L.S. (ornithology and botany).

of Killybegs, and we had a long afternoon to ourselves. Landed for letters and purchases. Jameson<sup>1</sup> waiting for us on the quay. All met at 5 o'clock tea, and we lounged luxuriously in the saloon, and our talk ran on strange islands and sea-monsters. Green, junior, and I went ashore again. A smart shower had fallen, and now the sky was all bright, the wind gone, and the air wonderfully clear. We rambled to the top of a hill south of the town, and had a lovely and extensive view—the pretty little town and harbour at our feet; east and south the whole of Donegal Bay, with all its headlands and inlets. Beyond, to the south, the range of the limestone mountains of Sligo, shining in the strong sloping sunlight, which brought out every bastion of the huge cliffs of Ben Bulben and its neighbours. Further westward, Inismurray, famous for its early christian antiquities, and far beyond, the dim outline of the Ox Mountains. Westward, the great ridge of Crownarad close at hand, with Slieve League and Croagh-muckros flanking it on the left. The knolls and meadows were gay with Iris and Spotted Orchis, and a little lake below quite yellow with Water-Lilies. The only uncommon plant I saw was *Carex laevigata*. Coming back we found a Greenfinch's nest out of which the young flew when disturbed, and one of them alit on a furze-bush close by, and allowed us to stroke and handle it. After dinner we all went ashore and met Kane<sup>2</sup> at 8.30. Barrington came on board an hour later, and our party was complete. We sat late on the bridge in the twilight and perfect stillness, watching the lights of the town twinkling on the water, and discussing what the morrow may bring forth. We leave for Rockall at midnight.

FRIDAY, JUNE 5, 5.30 P.M. AT SEA.—A suspicious hiatus in my diary, but really very little to note. Yesterday morning was dark and very cold, with rain from N.E. and a nasty high sea from the westward. We were all on deck between 7 and 8. As the morning went on the weather got thicker and the sea worse, and all day we pounded and pitched along north-westward. Too rough for any work, but a little getting ready of trawls and dredges was done in the morning. Harvie-Brown was the only man who appeared to feel perfectly happy all day. Fulmar Petrels after the ship from early morning,

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<sup>1</sup> H. L. Jameson, B.A. (zoology).

<sup>2</sup> W. F. de V. Kane, M.A., F.E.S.

sailing in glorious sweeps up and down and round and round, their white breasts gleaming through the mist. The little dark Stormy Petrels were there too, but did not come so close.

This morning I slipped on deck at 6.0. The sea very rough. Found Green and the mate taking a sounding with the deep-sea sounding machine. The wire stopped at 130 fathoms. In reeling it in we lost the lead and 50 f. of wire. By log we had run 236 miles, and ought to be within four miles of the rock. Weather as thick as ever, raining and blowing from E.N.E., with a high topping sea, and no chance of seeing anything at a greater distance than a mile. Sounded again at 7.0 a.m. in 80 f., and at 8.0 a.m. in 100 f. As we had apparently crossed the Rockall bank, and were going down the other side of it, we stopped, and the greater part of the day we were hove-to, working slowly eastward, and simply waiting for something to turn up, as on account of our not having had a glimpse of the sun for two days no observations could be taken, and we had no idea of our position. We tried trawling, but what with the roughness of the sea the net got foul of the propeller, and was torn to pieces, so we gave it up. Cold, wet, dark, and cheerless, with half a gale of wind and the rain and spray incessantly driving over the vessel—not a pleasant picture! At 3.30 we sighted a sail ahead, and went off in pursuit. Overhauled her about 5.0—the Ketch 885 of Lerwick. By hailing her from windward and running to leeward of her for her answer, we got the direction of the rock—W.S.W. The distance was not so satisfactorily heard, with the roaring of wind and wave. Some thought the skipper said 10 miles, some 20, some 35. “We’ll run down anyway and have a look at it,” said Captain Quirk; so away we went W.S.W. with the sea behind us, rising in mountains over our stern and occasionally sweeping the decks aft. I now write sitting in comparative shelter on the saloon skylight, forward of the bridge, oilskins from head to foot, as is the entire company, steadying myself by my feet, jammed wide apart into the rail in front. We should be nearing the rock at last.

9.30 A.M., SATURDAY, JUNE 6.—Last night after running six miles we heaved the lead—85 fathoms. As we got under weigh again the chain of the steam steering gear broke, and we lay-to for an hour trying to repair it. No use, so we went

ahead another six miles, steering by hand, and sounded again in 70 fathoms—so we were well on the Rockall bank. Fearing to pass the rock in the dark, we hove-to for the night. Until the last moment the mate and one of the hands were in the rigging hoping to sight the rock, but no trace of it was to be seen. The rain over at last, and the sky clearing, but wind as high as ever. About 8.0 a Great Shearwater was seen, and soon half a dozen or more had been sighted; so we tumbled in to dream of getting Great Shearwaters' nests on Rockall.

This morning at 3.45 we were awakened by Green calling out "Rockall at last! The rock is close by." We rushed on deck in all sorts of costume or absence of costume. And there was Rockall at last, half a mile to windward (E.), a solitary speck of rock amid that wilderness of foam-flecked billows, shaped just like a haycock canted over to the right, with a little knob on the top. Dark brown below, black above that, whitish on the upper third. We stared our fill, and went back to bed till breakfast time. This item over, we steamed slowly to windward (E.N.E.) towards the rock, and all assembled on the bridge with cameras, glasses, and note-books, amid some excitement. The top of the rock was seen to be thick with birds, chiefly Guillemots. In the sea to the lee of the rock was an enormous flock of birds—Harvie-Brown guessed them at at least 1,000—chiefly Manx Shearwaters, with a good many Great Shearwaters among them. Also about—Guillemots, Puffins, Gannets, Kittiwakes (immature only), Fulmars, Pomatorrhine and Buffon's Skuas, and one Razorbill. The seas were roaring round the rock, often rising and enveloping it in foam two-thirds way up (close on 50 feet).

10.0 A.M.—We are now passing the rock at a distance of about 400 yards, its bearing being N.E.  $\frac{1}{2}$  N. I have examined it carefully through the glass. It appears to be composed of a coarse granite. In the lower third, where it is washed clean, it is grey with reddish patches, and there are dark brown spots, like the roots of tangle. Below this, where the rock only shows in the trough of the waves, it is thickly clothed with a long bright brown hanging sea-weed, apparently a *Laminaria*. The middle portion of the rock is weathered blackish with greenish patches, apparently of some small alga. Above that, it is whitish with guano. The flat S.E. almost vertical face is pitted all over with rather large shallow pits. We



steam on round the rock. Repassing view No. 1, a little nearer, it is evident that the supposed "roots of tangle" are pittings, and that the reddish patches below are something organic, not colouring of the rock, which is grey only. The Hazlewood rock, which shows a conical point between every sea, is dark brown from growth of sea-weeds.

OUTLINE SKETCHES OF ROCKALL SHOWING JOINTING OF THE ROCK.



1. LOOKING N.E.  $\frac{1}{2}$  N.



2. LOOKING W.



3. LOOKING S.E. BY S.

12.45 P.M., SUNDAY, JUNE 7.—To continue from yesterday. We steamed right round the rock, keeping as close as we safely could—about 400 yards. Numbers of Guillemots on the top, and a few gulls. About half of them rose and dropped down into the water when Barrington fired a shot. I judge the rock to be granite (in a generic sense) from its uniform colour and texture and its massive jointing. A kind of crack runs across the north-westerly face, about one-third way up from the water, and dipping southward—and here the rock looks flaky; otherwise it appears homogeneous, with few straight joints, as shown in my three outline sketches.

Having seen all we could of the rock, we fell away, and presently took a sounding a couple of miles to leeward. Depth 50 fathoms—we lost the sounder as usual. The biggest dredge was sent down. On hauling up, the dredge was gone, completely torn away, and the ropes all frayed from their contact with the rocky bottom. The only specimen obtained

was a fragment of coral, entangled in the swabs. It was clearly no use trying to dredge on such foul ground in so high a sea, so till dark we lay drifting and rolling, simply hanging on on the chance of the wind and sea going down. It was brighter in the afternoon, with patches of sunlight—the first we had since leaving port—which lit up the scene cheerily. The last we saw of Rockall was at 10.0 p.m., a black conical speck against a dark sky, on the edge of the darker water.

This morning the weather was unchanged—very dull, with a strong N.E. wind and heavy sea. We shot the Agassiz trawl at 7.0 a.m., in 150 fathoms with 400 fathoms of wire rope, 16 miles to leeward (S.W.) of the rock. Commenced heaving in at 9.0, and got it aboard at 10.0. The net was all torn to rags, and in it only one very large *Dorocidaris*, with every spine knocked off. Out of the tangles we got about half a dozen corals, half a dozen star-fishes, a small sea-urchin, and a worm with a beautiful transparent tube like a quill—that was our whole haul. This was another disappointment, and still another awaited us when Green came to tell us that coal was running out, and we would not be able to go home by St. Kilda, as we had hoped, but must make for Killybegs forthwith. So off we went S.S.E. full speed, and are now pounding along through a sea which is getting steadily heavier as the wind rises.

2.30 P.M., MONDAY, JUNE 8. OFF SLIEVE LEAGUE.—Last night cleared up a bit after all, and we had a good enough night. The evening was spent trying to catch Fulmars with a line, but unsuccessfully. This morning we awoke in a calmer sea, and at breakfast time Aranmore, off the Donegal coast, was sighted. We bore in for the huge stack of Tormore, under the high ridge of Slieveatooy. A fine morning at last; wind still fresh, N.W., but it dropped as we approached land, and the sun shone out gloriously. We passed close under the grand cliffs of Mullaghtan and Glen Head, between the low island of Rathlin O'Birne and the mainland, and are now gliding in calm blue water under Slieve League, which looks magnificent in the clear air and brilliant sunshine. Being too late to catch train to Dublin to-night, we are running south to have a couple of hours on Inismurray, preparatory to spending the night at Killybegs. A sad accident has just

happened in the saloon. The steward, being in calm water at last, put his best foot foremost, and laid the luncheon table in grand style, with a clean cloth and a bouquet of flowers as a centre-piece, and for the first time since leaving port, fiddles were discarded. But a little farewell lurch from the ocean made havoc of all his efforts, and stew, wine, bread, potatoes, jam, pepper, crockery, and pickles all crashed down in one hideous mess on the floor!

9.0 P.M. KILLYBEGS.—In port once again, just five days, less three hours, since we left. This afternoon we steamed in brilliant sunlight across Donegal Bay, and landed on Bomore, a low rock of Carboniferous sandstone off Inismurray. We had hoped to see seals, but all that the rock yielded was Cormorants and Turnstones, and a Common Gull on her nets with one egg, on a low cliff overhanging the water—a very peculiar situation, which Green promptly photographed and sketched. Then we landed on Inismurray, and had two hours there, which I spent listing the plants of the island.<sup>1</sup> Then steamed again across Donegal Bay in the evening light, and have just now cast anchor off Killybegs, on a night as clear and calm as when we left it. The evening has been spent in discussing the possibility of another dash to Rockall, and it has been decided that if we can have the “Granuaile,” and the weather looks satisfactory, we shall get notice on Thursday next for a start on Saturday.

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10.0 A.M., SUNDAY, JUNE 14. AT SEA.—Here we are again. Since our return on Tuesday last Mr. Green arranged with the London Meteorological Office for daily weather-telegrams from Tory and Shetland. These were favourable, and so on Friday afternoon we were all summoned for a second attempt to explore Rockall. Every one delighted. The whole ship's company, from the captain to the cook's boy, as well as ourselves, were bitterly disappointed over our failure to land, and all were eager for another try. Kane has not been able to rejoin us, and Green, jun., is absent; otherwise our party—now five in number—is the same as before. We left Dublin yesterday morning, purchased some necessaries in Strabane, and reached Killybegs at 8.30. Harvie-Brown, who crossed from Glasgow to Londonderry last night, having had just

<sup>1</sup> For a notice of the plants observed, see *I.N.* for July, 1895, pp. 177-8.

forty-eight hours at home, was on the platform to meet us, with the captain and four sailors. We left Killybegs at 11.0 p.m.—a lovely evening. There was thick fog during the night, and a bit of a roll off Rathlin O' Birne. This morning is cloudy, but clear on the water, and delightfully calm, with just a slight roll coming from the north, and a gentle S.E. wind; and we are all in high hopes of a successful landing to-morrow morning. The first Fulmar was welcomed at breakfast time.

10.0 P.M.—All day we have bowled along N.N.W. in a calm sea. The time has been fully occupied in getting the harpoon gun, sounding machine, trawls and dredges ready, and in making good damage done to gear in the rough weather last week. During the afternoon the sky cleared, and we had a couple of hours of glorious sunshine, but now a fresh S.W. breeze has sprung up, under which the surface of the ocean is already beginning to move, and the sky is dark and rainy. We feel very anxious about our prospects to-morrow. Great Shearwaters have been about all afternoon and evening.

5.30 A.M., MONDAY, JUNE 15.—All awakened by Green at 4.45—the rock in sight; and all soon on deck. A very nasty morning, with high wind and bad sea from W.S.W. The sea is not, however, so bad as the last day we were at the rock, but still it is doubtful if landing could be attempted. We crept up and passed the rock at half a cable's length (100 yards). At this distance it looks distinctly gneissose at one spot low down on the right hand side of the great S.E. face, and we can see that the surface is pitted almost everywhere. Puffins are sitting in some of the pits on the eastern side. Guillemots in numbers, and some Kittiwakes and Gannets, are sitting on the rock as before. The chief joint-plane of the islet dips about 15° E.S.E., and the two sides of the rock at its most "toppled over" view, are pretty much perpendicular to this. The centre of Rockall bears S.S.W. from the centre of the Hazlewood Rock. N.E. by N. is the exact strike of the almost vertical flat south-easterly face.

5.0 P.M.—The wind and sea increased, rendering all thought of effecting a landing out of the question, and we hung round the rock, getting some more sketches and photographs. We crept in again to within a half cable's length, and in spite of rain, spray, and roll, Green got some good shots with his half-plate camera. But even at this distance, so great was the back-

wash of the waves that the steamer's stern was sucked in towards the rock, and the captain had to put on full speed ahead to get her clear. We tried dredging, but as usual the dredge was torn clean away—the ground around the rock must be very foul. However, we caught a fine Cole-fish on a "murderer," a welcome addition to our larder, and then steamed away 10 miles, to try to find smooth ground to trawl in. Sounded at 2.0 p.m. in 100 fathoms 10 miles south of Rockall, and sent down the Agassiz trawl. It came on deck at 4.0, with a lot of very old broken shells, and a few fresh valves, but no living specimens. Among them were several examples, including a fine fresh valve, of a very fine *Pecten* 4 inches across, and in shape and sculpture like a young *P. usio*<sup>1</sup>; also *Terebratulula caput-serpentis*, *Crania anomala*, *Pecten tigrinus*, *Lima Loscombi*, *Mytilus modiolus*, *Venus casina*, *V. fasciata*, *Mya*, *Saxicava*, *Buccinum*. Also a number of small pebbles, chiefly black, and apparently composed of basalt, but also one of quartz, and another which bears a marvellous resemblance to the riebeckite-granophyre of Ailsa Craig.<sup>2</sup> A few star-fishes completed the haul. A second haul is just now completed in 110 fathoms 14 miles south of Rockall, and the trawl is coming aboard.

8.0 A.M., TUESDAY, JUNE 16.—Our second haul yesterday yielded a very small quantity of material, but a good variety—starfishes, sponges, corals, polyzoons, &c.; several *Scaphander* alive, and *Saxicava* burrowing in dead coral. The sky cleared in the evening and the welcome sun came out. The wind slackened, and the sea began to go down. After dinner we again steamed up to the rock. Heavy seas breaking on it continuously. Harvie-Brown shot a Great Shearwater for dissection in quest of ova, and also one of the immature Kittiwakes that haunt the rock. The dinghy was lowered without mishap, and Green and one of the men picked up the birds; they got safely on board again with nothing worse than a wetting from spray. We remained near the rock under easy steam all night, in hopes that the weather would at the last moment permit of an attempt to land. This morning we were on deck at 6.0. A gloriously bright morning, but with a strong S.W. wind, and a most outrageous sea. A lot of Great

<sup>1</sup> *P. islandicus*.

<sup>2</sup> This pebble was lost during the working out of the materials.

and Manx Shearwaters about. We wanted to lower the gig, with the harpoon gun on board, and make a final attempt to land by throwing a line over the rock, but the captain would not give his permission, on account of the state of the sea. The dinghy was lowered, with Green and two men, and they went as near the rock as they dared, but even on the lee side they could not approach within twenty yards, on account of the back-wash of the heavy seas. They failed likewise in procuring any seaweeds from Rockall or Hazlewood, and came aboard again with nothing but a good deal of salt water.

1.0 P.M.—Immediately after breakfast we put down the Agassiz trawl in 120 fathoms 16 miles east of Rockall, and while it was down had great fishing for Fulmars over the stern, with baited hooks and twine. But the birds were quite too clever for us, taking the bait off the hooks repeatedly without once being caught. At 10 p.m. we got the trawl aboard, and found that we had at last made a good haul. The pocket was full of the great pink sea-slug *Holothuria tremula*, and of two sponges—a large cup-shaped one, and a cylindrical one. There was a large variety of other things, including *Dorocidaris*, *Spatangus purpureus*, and other echinoids, *Anomia*, *Buccinum*, *Fusus*,<sup>1</sup> *Scaphander*, and a pretty little transparent *Pecten*<sup>2</sup> among molluscs, *Crania* and numerous Polyzoa on a couple of large black stones, and many other things. As soon as the trawl was aboard (11.30) we started full speed eastward for St. Kilda, with a rising wind singing in the rigging, and Jameson and I are now busy on the fore-castle bottling and labelling the specimens.

1.0 P.M., WEDNESDAY, JUNE 17. ST. KILDA.—All day yesterday we bowled along with a merry S.W. wind behind us, and a sparkling heaving blue sea. We were tired enough after our morning's work, and sprawled about the deck luxuriously in the sunshine, spinning yarns, and watching for birds. A large cetacean, probably a Rorqual, was seen in the evening, but did not come near the ship. We had a gorgeous sunset, and at 9.30—still broad daylight in these northern latitudes—I turned in, but was speedily roused by a commotion on deck,

<sup>1</sup> *Buccinopsis Dalei*.

<sup>2</sup> *P. similis*.

and turned out in a robe-de-nuit and an oilskin to find several Dolphins playing round the bows of the ship. It was grand to watch them away down in the blue water, dashing to and fro under the ship's nose, now plunging deep, now turning over and showing their white under-side, now rising and cutting the surface with a whiz with their sharp dorsal fin. Great efforts were made to harpoon one, but without result.

This morning I came on deck at 6.0, roused by the unaccustomed absence of motion, to find the "Granuaile" lying at anchor in the Bay at St. Kilda.

[My notes of our brief visit to St. Kilda are omitted here; a short notice of some of the plants I observed will be found in *Annals of Scottish Nat. Hist.* for October, 1896.]

We weighed anchor again at 1.0, and are now slipping out of the bay and setting our course south for Lough Foyle. The mist hangs so low on the cliffs that it is no use going round the island—a great disappointment, as we had been eagerly looking forward to seeing the glorious cliff-scenery of this group.

9.30. P.M. **BERNERA ANCHORAGE, BARRA.**—A sudden interruption of our homeward voyage. On leaving St. Kilda we found a heavy ground swell from W. setting in, which steadily got heavier. The wind shifted back and forward, the western sky darkened, and it was evident that a blow was coming on. It was fresh when we went down to dinner at 7.0, and when we came up again it was blowing a whole gale, and increasing every minute, and the sea was high and breaking, and flying over our decks. The steamer rolled very heavily in the beam sea.

At 8.30 we sighted Barra Head, the southerly extremity of the Hebrides, looming dimly through the mist and rain; north of it high hills and great headlands. Our course was altered, and we stood in towards the land with a wild following sea, and passed under Barra lighthouse, standing solitary on the summit of an immense basaltic cliff 630 feet high. Then our helm was put hard to port, and we slid through calmer water, and have just cast anchor in Bernera anchorage, between the islands of Bernera and Mingulay, with a tidal rock just in front to break the force of the western sea as it comes through the narrow channel.

8.30 A.M., THURSDAY, JULY 18. AT SEA.—The storm was of short duration, though severe while it lasted. Before 4.0 a.m. I was awakened by the crashing of the seas against her plates (our berths were all on the weather side), and the hissing thump of the water as it crashed down on the deck overhead—we had put to sea again. On deck at 7.0. A bright morning, with great green seas shimmering and flashing in the sunlight. No land in sight. A solitary Fulmar keeps us company, and a crowd of Common Gulls are clamouring at our stern.

2.30 P.M., OFF INISHOWEN HEAD.—We sighted the Irish coast at 10.0, and slowly it rose into view. Raghtin first, with Dunaff Head at its western end. Then Slieve Snaght, and away to the west the long ridge of Muckish, and Horn Head with its huge cliff. Next the long ridges behind Malin Head, and further east the dim line of the Inishowen headlands. Then the low outline of Inistrahull, and Malin Head. The Fulmars followed us to within 20 miles of shore, and the Stormy Petrels were much further in. A heavy shower hid our view of Inistrahull as we passed, and when we came on deck after lunch we were gliding along the high picturesque Inishowen coast, beautifully bright after the rain. Ahead is the distant coast of Co. Derry; further eastward lies Knocklayd, and we can discern the bold cliff of Fair Head, and the mountains of Cantire.

5.30 P.M. OFF DERRY QUAYS.—We had a fast and pleasant run along the Inishowen coast and up Lough Foyle, past the grand ruin of Greencastle, and Merville, and the sharp bend of Culmore, and sat down in the saloon to a committee meeting, when the distribution of specimens for determination, and the drawing up of our preliminary and general report, were considered. Now we are alongside the quay at Londonderry. I am hurrying off to catch the 6.0 p.m. train to Belfast. Green, Barrington, and Jameson follow by the 9.30 p.m. to Dublin; Harvie-Brown crosses by to-night's boat to Glasgow; and so our little party breaks up. The two trips have furnished one of the most interesting and pleasantest times I have ever had, despite the continuance of atrocious weather, and the failure to effect the particular object of the expedition—a landing on Rockall.

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## ADDITIONS TO THE LIST OF IRISH ACULEATE HYMENOPTERA DURING 1897.

BY PERCY E. FREKE AND H. K. GORE CUTHBERT.

**Formica fusca cunicularia** (Latr.)—Ballybunion, Co. Kerry—Cuthbert.

**Crabro aphidum** (Lep.)—Borris, Co. Carlow—Freke.

**Odynerus sinuatus** (Fab.)—Borris, Co. Carlow—Freke.

**Nomada jacobseae** (Panz.)—Ballybunion, Co. Kerry—Cuthbert.

Besides these, some insects were taken which were desiderata though not new to our fauna.

**Sallus exaltatus** (Fab.)—Has hitherto remained on our list *cf.* Dr. Foot (*Proc. Dublin Nat. Hist. Soc.*) without locality. It has been taken this season at Tramore, Co. Waterford, by Freke; and at Ballybunion, by Cuthbert.

**Andrena analls** (Panz.)—Is reported as occurring in Ireland, without locality, by Smith (*Cat. Brit. Bees.*, 1871, p. 65). It has been taken at Ballybunion, by Cuthbert.

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### NOTES.

#### BOTANY.

#### PHANEROGAMS.

#### June and December.

On October 24th, riding to Rathdrum, I noticed a Holly-bush by the roadside at Glenealy covered with berries, already bright scarlet, and festooned with a copious garland of Honeysuckle in full blossom, and delightfully fragrant—a pretty combination of mid-summer and mid-winter.

R. LLOYD PRÆGER.

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#### ZOOLOGY.

#### MOLLUSCS.

#### **Helix ericetorum, Müll., reversed.**

In view of the extreme rarity of this monstrosity, it may be worth while to record its occurrence—possibly for the first time—in Ireland. The example belongs to the var. *alba*, and was sent me in October from Bundoran. It is, however, recent, though a dead shell, and not semi-fossil like the sinistral *H. nemoralis* of that locality.

B. TOMLIN.

## ARTHROPODS.

**Battle between Wasp and Spider.**

It must be thirty years ago—and I suppose it was because the housemaid did not do her duty—but at any rate a big spider—the largest of our spiders, I think, with a handsomely marked abdomen—made its web right across the plate-glass panel of the inside door of our entrance hall at Fassaroe. She was a really handsome specimen, and we used to feed her with house flies which were caught instantly, big blue-bottles too were made short work of. This was such a voracious spider that it occurred to me one day to catch a live wasp and throw it into the web.

The wasp was unhurt, and the spider was as usual at "attention" in the centre of the web. The wasp hit the upper outside margin, and I will never forget what happened; it buzzed furiously, and one or two threads broke. The spider was agitated, but appeared instantly to realise the situation. She made a dart about an inch sideways, then took a rapid sweep past the wasp, going within an inch and threw out with a jerk a sort of lasso which caught the wasp by the leg or wing (I forget which).

The wasp buzzed and tore and bit the web frantically; the spider returned to the centre, the web again broke, and the wasp was nearly free, but once more the great spider took another sweep past the wasp, going almost within half-an-inch, and threw out another lasso which bothered the wasp greatly, and he fell against one of the mainstays or hawsers which supported the whole fabric.

The spider with body erect appeared to be listening or watching, then with a bound she went right round the wasp without touching it and tangled both wings. For a moment the buzzing ceased, and this symptom of defeat caused the spider to rush directly at the wasp and to tangle him still more. Threads seemed now to be made as if by magic and in less than a minute the wasp was rolled up like a mummy, partly by the spider going round it, but chiefly owing to a rotatory motion given to the wasp by the spider's legs. The spider did not cease until the covering was so thick that the wasp resembled a whitish-grey chrysalis, for not a particle of the original insect could be seen.

The encounter was most exciting, and though it ended in the defeat, and capture of the wasp, I don't think this would have been possible save for the apparent power possessed by the spider of lassoing a dangerous enemy by shooting out its glutinous threads by a sort of centrifugal jerk when sweeping past its victim.

A day or two after I tried a bumble bee in the web, but it was too heavy, and, the meshes giving way, it escaped.

This note is written because it would appear from the *Zoologist* of the current month that the wasp *v.* spider controversy is not yet settled.

RICHARD M. BARRINGTON.

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## PROCEEDINGS OF IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

The Council of the Society desire to express their deep regret at the death of the Rev. S. Haughton, F.R.S., in whom Ireland has lost an illustrious scholar and a distinguished zoologist. They would wish also to put on record their sense of the inestimable services which he rendered to the Society, during the long period in which he acted as its Honorary Secretary and afterwards as its President, and to give expression to the deep sympathy which they feel with Dr. Wm. S. Haughton and Miss Haughton in their heavy bereavement.

Recent gifts include a male Yak from the Hon. A. S. G. Canning, a Barn Owl from Dr. Patton, and a St. Kilda Sheep from Mrs. Dames Longworth. A female Japanese Ape with baby, and an Angolan Vulture have been bought.

9,630 persons visited the Gardens in October.

### DUBLIN MICROSCOPICAL CLUB.

OCTOBER 21.—The Club met at the house of Mr. W. N. Allen, who proposed on behalf of Dr. W. Frazer the following resolution, which was seconded by Mr. A. Andrews, and passed unanimously:—

“The Members of the Dublin Microscopical Club desire to place on record their deep sense of the loss they, in common with all who take an interest in Irish Natural History, have sustained by the death of Mr. William Archer, F.R.S. He was one of the original founders of the Club, and for upwards of forty years acted as its Hon. Sec. He was a constant contributor at the monthly meetings, as well as the author of many important memoirs in the *Proceedings of the Club*.”

Mr. ALLEN showed drawings of Corallinaceæ.

Mr. DAVID MCARDLE exhibited specimens of an interesting liverwort, *Lejeunea Holtii*, Spruce, which he recently collected at Torc Waterfall, Killarney. This rare Hepatic was first found by Mr. Holt, of Manchester, in the same locality in 1885; therefore its rediscovery last month by Mr. McArdle when collecting for the Flora and Fauna Committee of the Royal Irish Academy is interesting, as it has not been found amongst the numerous collections of Hepaticæ made by him in various parts of Ireland. It differs from every European *Lejeunea* in the female flowers being borne on very short branchlets which normally put forth no sub-floral innovations such as exists in all our other species. In size it resembles *S. flava*, Swartz, or luxuriant *L. serpyllifolia*, Libert, but differs from both by the pale reddish tinge of the foliage, which is most remarkable in the leaves of the lower half; this character was well shown in the specimens under the microscope. The large pear-shaped perianth, sharply keeled, so as to appear five-winged, is also a unique character (*Journal of Botany*, vol. 25, p. 35, 1887, excellent description and

figure). Dr. Spruce writes: "of all South American *Lejeunea*, gathered by myself or known to me from other regions, *L. Holtii* seems to stand nearest a small group of which I have described three species under the name *Potamolejeunea*. These all grow in North Brazil, almost on the actual equator."

Rev. H. W. LÉTT sent for exhibition specimens of *Fossombronina cristata*, This hepatic, which does not appear to have been recorded from Ireland, was found by him in October, 1890, growing abundantly on the shore of Lough Bricland, Co. Down, and was mentioned in a paper he read shortly afterwards before the Belfast Naturalists' Field Club, which, however, was not published in their *Proceedings*. The habitat was a bed or flat bank of a whitish stiff clay, which is usually covered by water, but had that season been dry for several months. The tufts were from half an inch to two inches in diameter, in the form of little rosettes of a vivid green colour. The individual plants were densely tufted and taller than *F. pusilla*, which abounds in a wet autumn in all the clover-fields in the neighbourhood. The spores are covered with ridges or crests.

Mr. ALLAN SWAN sent for exhibition *Olpidiopsis Saprolegnia* (Cornu), one of the Chytridiacæ group of aquatic Phycomycetes, cultivated from *Spirogyra* collected at the Bofinna lake, in the mountains near Bantry. This plant is of special interest since its life-history was worked out by Cornu. The exhibitor is not aware of it having been previously recorded in Ireland. It lives as a parasite which develops in the filaments of the Saprolegniacæ, living on the protoplasm of its host. The filaments in which it grows assumes a short clavate shape, and the zoosporangia of the parasite are produced in their enlarged extremities. These zoosporangia are generally oval, but vary somewhat in shape and greatly in size, while their number—as was shown in photographs—may mount to over a dozen, or, as is more general, be restricted to a single one of greater dimensions. The zoospores which are contained, to the number of several hundreds, in each sporangium, are active swimmers, with a single cilium, and unusually small ( $\frac{1}{100}$  of a millimètre—say  $\frac{1}{8000}$  of an inch). Their movement begins before they escape into the surrounding liquid, an outgrowing tube from the zoosporangium serving for their liberation. They are said to have the power of penetrating the walls of the plants in which they live as parasites. Some of these zoospores are, however, liberated into the empty filament of their host, and, with their active movement, can from there easily reach its mycelia, whence they may be able to penetrate to other growing filaments. In the photographs were to be seen zoosporangia in several stages of maturity. Many with their zoospores ready to escape, others empty, after the liberation of the zoospores; the outgrowing tube could also be seen through which they escape from the sporangium. One example of the second mode of reproduction—by means of resting spores which have short outgrowing spines—was also shown.

## DUBLIN NATURALISTS' FIELD CLUB.

OCTOBER 12.—The winter session was opened with the usual conversation, in the Royal Irish Academy Rooms, Dawson-street, which was largely attended by members and their friends. The Belfast Club sent Messrs. J. St. J. Phillips and R. Welch as their representatives, while Cork and Limerick were represented by Professor Hartog and Mr. F. Neale.

The President (Professor Cole, F.G.S.), after a few words of welcome, showed a fine series of lantern slides, illustrating the Fjords and Isles of Western Scotland, Skye itself being specially dwelt upon. Mr. R. Lloyd Praeger, B.A., Vice-President, followed with an equally fine series of slides, made by Mr. R. Welch, illustrating Ballycastle and district (Co. Antrim), visited in July last by the Irish Field Club Union. Professor Haddon, D.Sc., showed a very complete series of slides illustrating adze-making in the Andaman Islands. Mr. F. W. Moore, M.R.I.A., demonstrated a set of slides prepared by Mr. Greenwood Pim, M.A. (who was unable to be present), illustrating the Glasnevin Arizona *Cacti*, &c.; Rev. W. S. Green, F.R.G.S., also sent slides relating to fishery work, &c. Dr. Hurst had charge of the lantern. The natural history exhibits were numerous and interesting, and included the following:—F. W. Burbidge, F.L.S., *Avolla* in fruit, and a series of fragrant plants; G. H. Carpenter, B.Sc., sample insect-cases for the new Museum collection of Irish animals; Rev. M. H. Close, M.A., F.G.S., his map of the glacial drumlins, or parallel ridges of boulder-clay of Ireland; H. K. G. Cuthbert, Treasurer, a handful of shingle from Ballybunion, Co. Kerry; G. P. Farran, some land and fresh-water shells from Westmeath and Sligo; A. H. Foord, Ph.D., F.G.S., Carboniferous fossils from Malahide and Hook Head; Mrs. W. S. Green, fossil corals, Clew Bay islands; Miss R. Hensman and T. Johnson, D.Sc., Hon. Secretary, some Irish Corallinaceæ; A. V. Jennings, F.L.S., F.G.S., two table cases of mosses and liverworts for the Botanical Teaching Collections in the Royal College of Science; D. M'Arde, *Anthoceros* and other rare liverworts, with microscopic illustrations; F. W. Moore, M.R.I.A., a much-admired group of insectivorous and other plants, Royal Botanic Gardens, Glasnevin; A. R. Nichols, B.A., some rare deep-water Echinoderms, &c., from the West Coast of Ireland; J. St. J. Phillips and J. R. Bell, B.N.F.C., Opals and other objects of geological interest; R. Lloyd Praeger, B.A., B.E., Vice-President, characteristic plants of Co. Antrim, visited by the Club on the Ballycastle excursion; J. G. Robertson, some natural history objects; Mrs. J. T. Tatlow, marine shells from Woodstown, Co. Waterford; H. J. Seymour, specimens of Irish rocks; Miss L. Shackleton, a series of beautiful water-colour drawings of flowering plants, prepared in part for the Botanical Collection, Science and Art Museum; R. Welch, B.N.F.C., Irish land and freshwater shells (Ballycastle, &c.) Thanks were expressed to the ladies of the Committee (Mrs. J. T. Tatlow, Misses R. Hensman, and Singleton) and to Mrs. Grenville Cole for their excellent management of the refreshments dispensed during the meeting.









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