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OF

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INDEX

PLATES AND ILLUSTRATIONS.

ERRATUM.

Page 75, line 5 from bottom, for "*Primus*" read "*Prunus.*"

The Irish Naturalist.

VOLUME XVIII.

THE BIOLOGICAL SUBDIVISION OF IRELAND:

Supplementary Note.

BY JOHN ADAMS, M.A.

While no adverse criticisms seem to have been made respecting the twelve-fold division of Ireland which I proposed in the *Irish Naturalist* for August, 1908, in regard to its applicability to the distribution of land and fresh-water species, it has been suggested to me that it is not well adapted for indicating the distribution of marine species, as the boundary line between two adjacent sub-provinces in most cases lies along the middle of a bay. There is, it must be admitted, much force in this objection. It would certainly be preferable that any given Bay or Lough should belong to one division only, and in order to meet the views of marine zoologists and botanists, I have attempted to recast slightly the divisions of the coast-line, thus getting over the difficulty mentioned.

Strictly speaking, the area under water is not, I suppose, a part of Ireland, and, in consequence, a certain amount of liberty may be claimed in fixing the boundary between two sub-provinces—provided that it does not deviate too far from the actual county limits. At the same time I have tried to preserve the same proportion between the actual length of coast line belonging to each division as existed in the former scheme. It might be as well to add that where a boundary line runs along the shore of a bay before turning out to sea, low-water mark is the line which it follows; in other words, species obtained by shore-collecting belong (naturally enough) to the county on whose shores they are collected.

The new limits of the sub-provinces are as follows :—

M 1.—Extending from Preghane Point at the east side of the entrance of Kinsale Harbour to Kerry Head; including therefore Kinsale Harbour.

M 3.—From Kerry Head to Black Head; including the whole estuary of the Shannon.

C 1.—From Black Head to the northern entrance of Killary Bay, opposite Inishbarna and therefore including Galway Bay and Killary Bay.

C 2.—From the northern entrance of Killary to Lenadoon Point in Sligo, and including Killala Bay.

C 3—From Lenadoon Point to Carrickgarve at northern end of Mullaghmore peninsula.

U 3.—From Carrickgarve to Inishowen Head; including Donegal Bay.

U 2.—From Inishowen Head to Black Head; including Lough Foyle.

U 1.—From Black Head to Ballagan Point in Louth; including Belfast Lough and Carlingford Lough.

L 3.—From Ballagan Point to boundary line between Counties Dublin and Meath.

L 2.—From boundary line between Counties Dublin and Meath to boundary line between Counties Wicklow and Wexford.

L 1.—From boundary line between Counties Wicklow and Wexford to Hook Head.

M. 2.—From Hook Head to Preghane Point; including Waterford Harbour.

It would, I think, be advisable to have some limit seawards to the above divisions, as they are apt to have little meaning when one gets out of sight of land.

With regard to the order adopted in writing the provinces, it has been mentioned that Connaught has most affinity with Munster as regards its flora and fauna, and consequently, I think, M C L U is therefore preferable to M L C U, and in the former method of writing them the sub-provinces follow each other in a more natural sequence, first up the west side and then up the east.

Royal College of Science, Dublin.

THE CHAR OF IRELAND.

BY C. TATE REGAN, M.A.

Assistant in the British Museum (Natural History).

In September last[1] I gave an account of the Irish Char, and it has been suggested to me that a short paper on the same subject might have some interest for readers of the *Irish Naturalist.*

Char are salmonoid fishes of the genus Salvelinus, which differs from Salmo[2] (Salmon and Trout) in having the vomerine teeth present only as a group on the head of the bone, which is raised and has a boat-shaped depression behind it. Within the Arctic Circle and a little to the south of it migratory char are found, which descend to the sea in the spring and towards the winter enter the rivers to spawn. Further south all the char are non-migratory and are principally restricted to deep cold lakes; on the Continent they are found in Scandinavia and the alpine region of Central Europe, and in the British Isles they occur in the lakes of Scotland, the Lake District, North Wales, and Ireland. There can be little doubt that when the temperature of the Northern Hemisphere was lower, as during the glacial epoch, migratory char were to be found much further south than at the present day, and that the char of the British Isles, Scandinavia, and Central Europe represent a number of lacustrine colonies of one or a few migratory ancestral forms. The char of each lake or each system of lakes have been isolated for a considerable time and have become differentiated to a greater or less extent; it seems best for the present to term the different forms which are recognisable and definable "species," although it is quite clear that they are not species in the same sense as is the Pike (*Esox lucius*) or the Roach (*Leuciscus rutilus*), which have probably persisted unchanged during the whole of the time that the evolution of the Salvelini has been taking place.

[1] *Annals and Magazine of Natural History* (dec. 8), vol. ii., pp. 225-234.

[2] Some authors include Salvelinus in Salmo, but the convenience of having distinct generic names for two natural groups so rich in species as char and trout is obvious.

Char may be distinguished from trout by the coloration ; the back is usually bluish grey or bluish black, although in some forms it has been described as lilac, lead-colored, greenish, or brownish; this colour descends on to the sides and shades below into a silvery white, or into an orange or crimson of greater or less intensity, according to the locality, sex, and season ; pink, orange, or red spots are often present on the sides and sometimes on the back also ; the dorsal and caudal fins are greyish or blackish, and the lower fins partake of the hue of the adjacent parts of the body. Char usually differ from trout in having the scales smaller and more numerous, but in the case of some examples of the Lough Melvin Char this difference is not very apparent.

Probably the most generalised of the Irish char is *Salvelinus Colii*, described by Dr. Günther in 1863. This is known from Loughs Eask and Derg in Donegal, Conn in Mayo, and Mask and Inagh in Galway. It has the body moderately elongate (the greatest depth contained four to five times in the length of the fish, without the caudal fin) ; the snout sub-conical, decurved, with the jaws equal anteriorly; the teeth feeble or moderately strong ; the interorbital region a little convex and broad (its width $\frac{1}{3}$ the length of the head in the adult fish), the pectoral fins of moderate length, extending $\frac{1}{2}$ to $\frac{3}{4}$ of the distance from their base to the origin of the pelvic fins, and the scales comparatively large, 138 to 168 in a longitudinal series. In Donegal and Connemara *Salvelinus Colii* grows to a length of about eight inches, but in the larger lakes of Galway specimens a foot long are to be met with.

The "fresh-water herring" of Lough Melvin, in Fermanagh, *Salvelinus Gravi* of Günther, has an average length of 10 or 11 inches, and differs from *S. Colii* in having the body usually deeper (depth $3\frac{1}{3}$ to 4 in the length), the pectoral fin usually longer (extending $\frac{2}{3}$ to $\frac{9}{10}$ of the distance from its base to the pelvics), the scales often larger (128 to 162 in a longitudinal series), and the vertebræ fewer (59 or 60 instead of 62 or 63).

In many species of char the females are distinguished from the males by the less brilliant coloration, the smaller head, blunter snout, shorter maxillary and weaker lower jaw, and by the lesser development of the fins ; in some of the English and Scotch char these sexual differences are very marked. In

the Lough Melvin char, however, it is almost impossible to distinguish the sexes from external characters,[1] as was recognised so long ago as 1841 by Thompson, who wrote "some of the largest-finned are females." Thompson also noted that this form differed from other char in its dull coloration, pale flesh and insipid taste.

A single specimen, eight inches in length, from Lough Finn, in Donegal, differs so notably from *S. Colii* as to warrant me in describing it as a new species, which I have named after the donor, Major H. Trevelyan. *Salvelinus Trevelyani* is especially distinguished from *S. Colii* by the produced pointed snout and strong dentition.

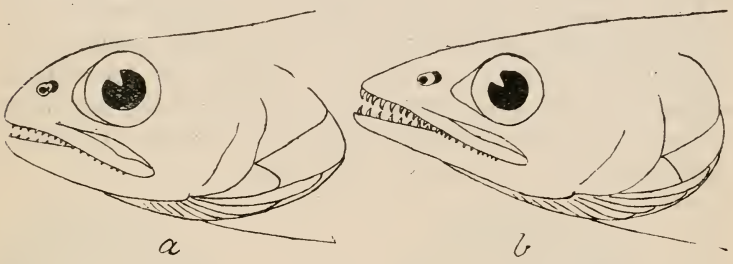

FIGURE 1.

Heads of *Salvelinus obtusus* (*a*) and *S. Trevelyani* (*b*), natural size, from male specimens measuring eight inches in total length.

A second new species from Lough Owel, in Westmeath, named after Dr. R. F. Scharff, is known from a single specimen, nearly a foot long, in the collection of the Dublin Museum. The scales, which number 186 in a longitudinal series, are considerably smaller than in *S. Colii*, from which *Salvelinus Scharffi* differs also in the conical snout, oblique mouth, &c.

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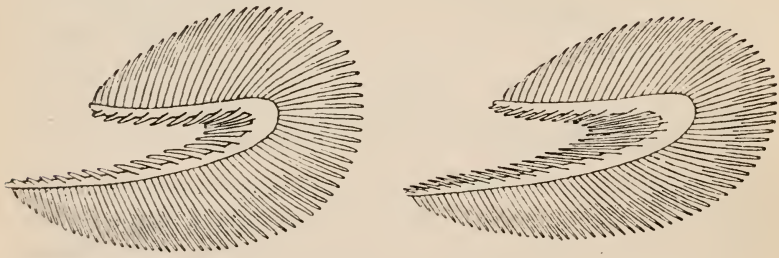
[1] In a recent article on Irish char in the *Field*, Mr. G. A. Boulenger states that in *S. Grayi* the males have the pectoral fins longer than the females. This is contrary to the observations of Thompson (1841) and Günther (*P.Z.S.*, 1863, p.12); the female specimen mentioned by the latter is still the only one of that sex in the British Museum collection, and has a longer pectoral fin than several of the males. The measurements given by Mr. Boulenger, in order to show the supposed difference between the sexes, appear actually to be taken from Günther's two type specimens, both of which are males.

Another new species described from a single specimen, only six inches long, inhabits Lough Coomasaharn, in Kerry. It agrees in most respects with *S. Colii*, but has the interorbital space flatter and narrower (width $3\frac{3}{4}$ in the length of head instead of $3\frac{1}{3}$ in *S. Colii* of this size) and the gill-rakers longer and more numerous, the latter feature suggesting the specific name *fimbriatus*. In other Irish char I count from 12 to 16 gill-rakers on the lower limb of the anterior branchial arch, but in *Salvelinus fimbriatus* there are 18 or 19.

A fourth new species, *Salvelinus obtusus*, is known from Loughs Luggala and Dan in Wicklow, and Killarney and Acoose in Kerry. It is distinguished by the short, blunt snout and the rounded lower jaw, which is included within the upper when the mouth is closed. In most other characters it resembles *S. Colii*, but it has the narrow, flat interorbital region of *S. fimbriatus*, the interorbital width being contained $3\frac{1}{3}$ times (adult) to $3\frac{3}{4}$ times (young) in the length of the head. This form attains a length of eight inches.



a FIGURE 2. *b*

Anterior branchial arches of *Salvelinus Colii* (*a*) and *S. fimbriatus* (*b*) showing the gill-rakers.

Our knowledge of the Irish char is very incomplete, and no satisfactory account will be possible until several examples from each lake which contains these fish are available for description. I have examined good series of specimens from only three lakes, viz., Eask, Melvin, and Luggala, and I have seen none at all from several lakes in which char are known to occur, so the provisional character of my revision will be evident. It was thought worth while, however, to publish a preliminary account, in the hope that interest might be aroused and further material for study result.

British Museum (Natural History), London, S.W.

THE LOWER PALÆOZOIC ROCKS AROUND KILLARY HARBOUR.[1]

BY R. G. CARRUTHERS AND H. B. MUFF.

THE Lower Palæozoic rocks of the Killary Harbour region, which comprises some of the most mountainous country in the West of Ireland, are of interest for several reasons. Far removed from the typical areas of Shropshire and North Wales, these rocks present the most westerly development of the Ordovician and Silurian Systems to be found in Europe. They lie widely apart from the rocks of similar age to be found in the north and east of Ireland, from which they differ greatly in lithological character. Moreover, they furnish definite evidence of the relation of the Lower Palæozoic rocks to the Crystalline Schists, information which is difficult to obtain in any other portion of the British Isles.

Although the geological structure is simple, and is clearly seen in such a hilly tract, the scarcity of fossils only permitted former observers to lay down various broad divisions of the strata, and a true comparison of the fauna with those of other areas was hardly practicable. In the maps and memoirs of the Geological Survey, published between 1874 and 1878, the main divisions of the strata and their structural relations were laid down. These divisions were distinct lithologically, and on palæontological evidence, were assigned to various members of the Silurian and Ordovician Systems (grouped at that time as Upper Silurian and Lower Silurian respectively).

They were, in descending order :—

Upper Silurian	Salrock Slates (Ludlow)
	Mweelrea Beds (including Leenane Grits) (Wenlock)
	Owenduff Series (Llandovery)
Lower Silurian.	Doolough Series (including Rossroe Grits) (Bala and ? Llandeilo).

[1] Read before the British Association, Section C (Geology), Dublin, September, 1908.

In 1893–4 the district was revised for the Geological Survey by Mr. Kilroe. Save that he correlated the Leenane Grits with those of Rossroe, and removed the lower third of the Mweelrea Beds to the Doolough Series, the old grouping was retained by him, but important alterations were made regarding the geological age of the various divisions.

The table of strata, as revised by him,[1] is given below.

Upper Silurian	Salrock Slates (Ludlow)
	Owenduff Series (Wenlock)
	Mweelrea Grits (restricted) (Llandovery)
Lower Silurian	Doolough Series (Bala)
	Leenane Grits and Rossroe Grits (Llandeilo)
	Black Slate at Bencraff (Arenig).

An important discovery of a band of black slates and cherts at the base of the Leenane grits was made by him. These yielded graptolites regarded as of probably Arenig age.

We agree with the separation of these divisions according to lithological characters, but the palæontological evidence on which the several ages of the rock-groups was originally determined was in more than one case too scanty to justify the inferences drawn. This, and the incorrect determination of fossils, appears to have misled the field-men, and been the chief cause of the anomalies in the published map, pointed out by Mr. Kilroe in the paper already referred to.

Structurally the strata are arranged in a gentle east and west syncline, with its axis running a short distance north of Killary Harbour. The highest beds, however, do not lie in the centre of the syncline, as a great reversed fault runs along the south side of the Harbour, hading to the north, and bringing up Ordovician rocks on to the Silurian. The axis of the main syncline is shifted at the east end of Killary Harbour a mile or more to the south by an important wrench-fault, coming from the Maam valley and running in a north-westerly direction.

All the rocks are more or less cleaved, but the folding is on the whole quite gentle, although in the northern part of the district the Doolough Slates show a considerable compression and packing from the north against the great mass of the

[1] *Proc. Royal Irish Academy*, vol. xxvi, sect. B., pp. 129-160, 1907.

Mweelrea Grits. At the same time the slates show an appreciable development of sericitic mica, and sometimes their cleavage is crossed by a later strain-slip-cleavage.

The oldest fossiliferous rocks of the district are of Arenig age. South of Killary Harbour these comprise the Leenane Grits, coarse conglomeratic grits, with very few shale partings, the whole series being 2,500 feet thick. About 1,000 feet from the base of the grits occurs a curious lenticular bed of brecciated limestone, exposures of which are seen on Derrynaclough Hill and near Dernasliggaun Lodge. Under the grits on the southern flank of Benecraff is found a band of black shales and cherts about 60 feet thick, which yield a rich graptolitic fauna of Middle Arenig age. We found here four species of *Tetragraptus, Dichograptus octobrachiatus, Didymograptus extensus* and other forms, including two species of *Diplograptus* new to the British Isles, but known in N. America. A new species of *Glossograptus* (to be described in the forthcoming part of the Palæontographical Society's Monograph on British Graptolites) was also discovered.

The overlying grits yield few fossils, shale bands being rare. *Diplograptus dentatus* and *Didymograptus extensus*, however, were found. Further to the west, the shale partings increase considerably, as seen on Rossroe peninsula. The same brecciated limestone is found here, and the shaly partings in the grits have yielded a considerable number of graptolites, amongst others *Diplograptus dentatus, Phyllograptus, Didymograptus extensus*, and *D. fasciculatus*.

The Leenane and Rossroe Grits we therefore regard as of similar age, both belonging to the Upper Arenig.

The Upper Arenig conglomerates enclose pebbles of chert, granite, quartz-felsite and quartzose schist, the last named rock being identical with some of the quartzose schists of Connemara. Dr. Callaway[1] has noted the resemblance of the granite and quartz-felsite pebbles to the Galway granite and associated felsites, which are intruded into the crystalline schists. Hence we may conclude that the schists of Connemara were already metamorphosed before Arenig times. General considerations lead to the conclusion that they are actually of Archæan age.

[1] *Quart. Journ. Geol. Soc.*, vol. xliii., pp. 517-524, 1887.

The Arenig grits are replaced north of the harbour by a wide spreading mass of highly cleaved, green slates (the Doolough Slates) with subordinate grit bands. Only where the cleavage coincides with the bedding can identifiable fossils be obtained. These slates, at the north end of Doolough, have yielded *Diplograptus dentatus, Phyllograptus* (4 species), *Loganograptus, Tetragraptus, Trigonograptus,* and other forms, the majority of which are now found in Ireland for the first time. At other localities along the shores of Doolough, *Phyllograptus* and *Didymograptus extensus* were obtained. The Doolough Slate group seems therefore to be of Upper Arenig age, and on the same general horizon as the Leenane and Rossroe Grits.

Following on the Doolough Slates in conformable succession are the Mweelrea Grits. These current-bedded, red, and greyish-green, felspathic grits form a remarkable feature of the district. The lower 3,000 feet contain bands of green shale, yielding abundant fossils locally. Graptolites are absent, but brachiopods are plentiful, and at one spot the characteristic Llandeilo trilobite Ogygia was found. East of Killary Harbour these grits attain an enormous development on the Formnamore plateau. Here they seem to be upwards of 12,000 feet thick, the upper 9,000 feet being one monotonous mass of felspathic grit, without a single parting of shale, and quite destitute of fossils. In view of their thickness, these grits may, perhaps, include strata of Bala age. We have no definite evidence of the existence of Bala beds in the district, since the Silurian rocks do not rest on the Mweelrea Grits, but on the Crystalline Schists.

The suggestion is made that a considerable part of the Mweelrea Grits, containing as they do an abundance of angular grains of fresh, pink felspar, and exhibiting a conspicuous false-bedding and lenticular pebble-beds, were accumulated on a land-surface under arid continental conditions. In any case their deposition was followed by a period of prolonged erosion, during which a great thickness of Ordovician rocks was removed from the Connemara Crystalline Schists, so that the Silurian rocks now rest unconformably on the schists along a line running eastwards from Gowlaun on the coast along the south side of Lough Fee to the head of the Maam valley. At the base is an irregular breccia, consisting of fragments

of schist and angular lumps of vein-quartz, overlain by a small thickness of red mudstones and barren green grits. The latter are succeeded by calcareous shelly grits, which have been traced from the Maam valley westward to a point south of Lough Muck. The fauna is essentially a brachiopod one, *Rhynchonella llandoveriana* being the most abundant species. Although no characteristic Llandovery fossil has been found in the shell-beds of this district, it should be noted that the Survey fossil lists record *Pentamerus oblongus* from this horizon at several points to the eastward, and we have obtained this fossil from another outcrop of these shelly grits near Cregganbaun, some miles N.N.W. of Doolough.

The shell-beds are succeeded by a massive conglomerate composed of large well-rolled boulders of quartzite mixed with a few of igneous rocks, generally porphyrite, but the granite boulders which are so abundant in the Arenig grits are absent here. The overlying beds, completing the Owenduff Series, are a thick series of coarse, greywacke grits, alternating with green, sandy slates. On the north side of Lough Fee a thin dark band in the slates yields numerous specimens of *Monograptus riccartonensis*, and a higher band about 300 feet below the top of the group contains *Monograptus vomerinus*. It is evident therefore that the upper part of the Owenduff Series represents the Wenlock stage.

The overlying group, the Salrock Slates, is the highest in the district. It presents throughout a monotonous succession of dull Indian-red and pale green slates upwards of 3,000 feet in thickness. Fossils are extremely scarce, but those found are characteristic of the Ludlow group—*Lingula Davisi*, *L. Symondsi*, and *Modiolopsis complanata*.

The succession of the various rock groups is summarised in descending order, in the following table:—

Silurian.	Salrock Slates. (Ludlow).
	Owenduff Series. (Wenlock and Upper Llandovery).
Ordovician.	Mweelrea Grits (*sensu originale*). (Bala (?) and Llandeilo).
	Doolough Slates, Leenane and Rossroe Grits. (Upper Arenig).
	Black slates and cherts at Bencraff. (Middle Arenig).

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BRYOLOGICAL NOTES FROM COUNTIES DOWN AND LOUTH.

BY J. H. DAVIES.

In the expectation that the names and localities of some mosses which have come under observation during recent months, will not be without interest to Irish bryophilists, they are hereto subjoined. A few of them, by reason of their rarity in Ireland, and other considerations, seem to merit special mention. Of those from County Down, one of the most interesting (taking them in order of classification) is *Ditrichum tenuifolium*, which had been met with in Ireland only once before, and that so long ago as 1830, when it was discovered by T. Drummond at Belfast, that being the first notice of its occurrence in the British Isles. The plant, which may easily be overlooked, has not since been seen there. At Lenaderg, where it has now been found, only very little of it could be detected, but having been once recognized in the field, it may be expected that on further close scrutiny more will be revealed.

The finding of *Fissidens crassipes* in the River Bann is also not without interest, inasmuch as this seems to be the only definite Irish locality for this pretty aquatic Fissidens. Previously its only claim for admission to the Irish list appears to rest on a note in Dr. Braithwaite's *British Moss Flora* (vol i. p. 71), "Ireland (Turner 1809)," without indication of any special locality; and no mention of the moss can be found in Irish botanical writings,

Another species, singularly rare in Ireland, is *Aulacomnium androgynum*, which it was exceedingly gratifying to meet with in the valley of the Bann. Once before the moss was found in County Down by Drummond, as mentioned by Templeton, but since its name is not recorded in Moore's *Synopsis* it was not admitted in the *Flora af the North-east of Ireland.*

In the near neighbourhood was gathered a little Philonotis, slender, with bright red stems, and leaves of vivid green, narrowly lanceolate-subulate, which can be referred only to *P. capillaris*—a moss which has not been reported as Irish—but being without male inflorescence, which affords a mark

of some value, a slight doubt attaches to the identification. Mr. Dixon, to whom specimens were sent, says "*P. capillaris* in all probability," and Mr. W. E. Nicholson, who has also obligingly examined specimens, while finding it somewhat difficult, in the absence of male flowers, to pronounce a positive judgment, writes :—" Probably *P. capillaris*. Your specimens are slightly more robust than I find in Sussex, on damp sandy earth, but it agrees substantially in other respects."

In August a brief sojourn was made at Greenore in County Louth. Though any attempt at extended walks or hill-climbing had then been forbidden me, yet in rambling about here and there, a few noteworthy mosses were observed. Perhaps the most interesting, and that the gathering of which afforded keenest pleasure, is *Amblyodon dealbatus*. It occurs in a damp sandy hollow near the shore of Carlingford Lough, not far from Greenore. My attention was drawn to the spot by a growth of *Eleocharis uniglumis*, *Lepturus filiformis*, and other plants, and it was when gathering some of these for interested friends, that the distinctive form of the capsules of our moss caught my eye. In County Down, one of the five Irish counties for which it has been recorded, it is believed to be now extinct. Discovered there by Templeton more than a century ago, it has frequently been sought by subsequent botanists, but has never been refound. *Bryum intermedium*, which seems to be equally rare with us, was also gathered in close proximity to the Amblyodon.

It was not until my return that it was ascertained from the serviceable and ably edited *Census Catalogue of British Mosses*, recently published, that some of the commonest species have not been recorded for Louth (31), such, for example, as *Bryum capillare* and *B. argenteum*. Being unprovided with a list, unrecorded common species were not sought, else the few in number that were observed might, doubtless, have been increased. Other species more or less infrequent were also noticed, but only those which are first records for the county are here specified. New records for either county are indicated by an asterisk.

To Mr. H. N. Dixon, Mr. W. E. Nicholson, and Mr. W. Ingham best thanks are rendered for their kind examination of specimens submitted and for much valued information.

Co. Down.

***Ditrichum tenuifolium,** Lindb.—Very sparingly amongst *Weisia viridula*, at Lenaderg. Extremely rare in Ireland.

***Fissidens crassipes,** Wils.—On stump in an overfall in the River Bann at Lenaderg. The only localised Irish station.

***Tortula marginata,** Spruce.—Shady brick wall, Lenaderg. Reported elsewhere in Ireland only from Co. Antrim.

Barbula lurida, Lindb.—On brick by a stream, Lenaderg. Rare.

Aulacomnium androgynum, Schwæg.—Damp earth on rock by side of stream flowing into Bann, Lenaderg. Very rare in Ireland.

***Philonotis capillaris,** Lindb.—On garden soil and at side of a roadway, Lenaderg. Male flowers not found, as stated above.

Amblystegium Juratzkanum, Schp.—Previously reported from Lenaderg, has since been found in other places in the neighbourhood. The specimens which Mr. Dixon considers well marked and characteristic of the type are those which were gathered in a distinctly wet situation—on stones under dripping water. Very rare in Ireland, but likely overlooked.

A. fluviatile, B. & S.—Rocks in River Lagan below Dromore. Also a rare plant in Ireland. In this county reported only from River Bann, in which it is found to be very abundant.

A. filicinum, trichodes, Brid.—By a disused water-wheel on the River Lagan below Dromore.

Hypnum exannulatum, Gümb.—A form which Mr. Ingham, who has given much study to the harpidivid Hypna, refers to var. *pinnatum.*

H. ochraceum, Turn.—A curious form with short, very obtusely pointed leaves, not, or hardly at all secund, approaching var. *flaccidum.* On wood, mostly under water on weir, R. Bann, Lenaderg.

H. stramineum, Dicks.—Drumnagalley Bog.

H. Patientiæ, Lindb.—Side of field-roadway, Lenaderg.

Co. Louth.

***Barbula convoluta,** Hedw.—Frequent.

***B. unguiculata,** Hedw.—Common.

***Amblyodon dealbatus,** P. Beauv.—Damp sandy hollow, Mullaghtee near Greenore. Very rare in Ireland.

***Bryum pendulum,** Schp.—Top of wall by the sea near Greenore.

***B. intermedium,** Brid.—Damp sandy places by the sea, Mullaghtee, near Greenore.

***B. capillare,** L.—Common.

***B. argenteum,** L.—Common.

***Mnium undulatum,** L.—Frequent.

***Eurhynchium prælongum,** Hobk.—Common.

***E. tenellum,** Milde.—Walls at Carlingford.

***Hypnum polygamum,** Schp.—Damp sandy places, Mullaghtee, near Greenore. Rare in Ireland.

Lenaderg, Co. Down.

REVIEWS.

A NATURE FAIRY STORY.

The Changeling. What a Boy, whose eyes had been opened, saw of the real Life of the Wild Creatures round his Home. By Sir DIGBY PIGOTT, C.B., M.B.O.U., with many illustrations by the author and Charles Tresidder. Pp. 187. London: Witherby and Co., 1908 Price, 2*s.* 6*d.* net.

This little book is a charming mixture of natural history and fairy fancies; it is worthy of comparison with Charles Kingsley's immortal "Water Babies." The hero, a delicate little boy named Tommy, makes the acquaintance of a "Johnny Fairy," who successively changes both himself and Tommy into a long series of different wild creatures, considerately sending another fairy to take Tommy's place in nursery or schoolroom. Thus Tommy learns by experience the ways of insect, beast and bird. As a Dormouse, he is pursued by Owl and Weasel; as a Weasel he himself hunts and kills Rabbits; as a Fox he is hunted by a Leicestershire pack; as a Wild Goose he migrates to the Siberian tundras; narrowly escapes slaughter in a samoyed "goose-drive," and being conveniently changed into a Short-eared Owl, survives to see foxes and bears feed on mammoth flesh and to return to England once again.

If space permitted we should like to quote extensively; perhaps the following from the story of Tommy's experience as a young Weasel will give as true an impression of the tone and spirit of the book as would lengthy extracts:—

"The old weasel came up only just in time to prevent him running headlong into one of old Bates' steel traps. . . Later in the run he actually did put his head into a wire noose, and it was not until the others had bitten through the string to which it was fastened, and cleverly loosened the slip-knot, that he could even squeak. Old Footy [the nurse] next morning could not think how he had chafed his neck, which was quite red. She had looked at the collar of his shirt, she told his mother, and had found nothing wrong with it.

". . Tommy had never enjoyed his morning bread and milk so much as he enjoyed the long drink he had when at last he sprang on to the neck of a young rabbit, which gave one shriek and lay dead on the grass before it had time even to feel frightened.

"He felt a little queer next day when he thought what it was he must have been drinking. He had always afterwards a sneaking fondness for weasels; but none the less when he grew up, and would not allow an owl or a kestrel to be touched, he told his keeper there was not to be one weasel left about the place."

In such manner is nature study blended with imagination and humour throughout the book. All parents should get it for their children and rejoice in it themselves.

G. H. C.

THE SCIENTIFIC PROTECTION OF BIRDS.

How to Attract and Protect Wild Birds. By MARTIN HIESEMANN. Translated by Emma S. Buchheim. Pp. 86. With many illustrations. London: Witherby & Co., 1908. Price 1*s.* 6*d.* net.

This is the most elaborate treatise that has yet appeared upon nesting-boxes for birds, and it embodies the result of many years' experience of that well-known German authority, the Baron von Berlepsch, whose experimental station at Seebach promises to be the training-ground for future avi-culturalists. The Baron has discovered that the usual nesting-boxes, sold so largely on the Continent, are made on a wrong plan, and do not attract birds at all. After years of experiment he has now devised a nesting-box which is so natural in shape and size that on the average 50 per cent. of his boxes are occupied at once. But the Baron does more; he has worked out a scheme for growing shelter-woods and making undergrowths for those birds that do not nest in holes, and he has been as successful with them as with his boxes. In addition, there are described many ingenious methods for feeding birds in winter, so that there is no waste in food, and it is always accessible. The Royal Society for the Protection of Birds, 3, Hanover-square, London. W., sells the Berlepsch nesting-boxes, which are quite cheap (from 1*s.* 6*d.* each, or 1*s.* each for 20 or more). We wish this book a large circulation.

R. P.

FOR BIRD LOVERS.

British Birds' Nests: How, Where and When to find and identify them. By RICHARD KEARTON, F.Z.S. Illustrated from photographs by Cherry and Richard Kearton. New Edition. London: Cassell and Co., 1908. Pp. 520. Price, 21*s.* net.

We have received from the publishers the new edition of Mr. Kearton's well-known and valuable work, which they have issued in sixteen fortnightly parts at 1*s.* net each. The result is a volume that must prove a source of delight to all naturalists, and especially to lovers of birds. The species are arranged alphabetically under their English name, so that the work is somewhat of a dictionary. We cannot but think that a systematic arrangement would have been quite as convenient and of more educational value; the "order" and family are, however, mentioned in each case. Under every species Mr. Kearton gives first a short description of the parent birds; then an account of the situation and locality of the nest and the materials of which it is made; then a description of the eggs, and finally some general information which includes a list of local names. The numerous beautiful photographs have been excellently reproduced, and the coloured plates of eggs are admirable.

G. H. C.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Kestrel from Mr. J. C. Gardiner, a Siamese Cat from Lady Constance Butler, a Badger from Sir Anthony Weldon, a Wood Pigeon from Mr. W. W. Despard, and a Red and Yellow Macaw from Mr. R. Casement.

Among animals lately acquired by exchange are a young Llama, a Tibetan Yak, two North American Vulpine Squirrels, and two Canadian Black Bear cubs. The latter are both well-grown, and one is of the "cinnamon" variety. The Yak, a most valuable addition to the collection, is temporarily lodged in the Elephant House. A most interesting feature in the Gardens at present is the new location of the pair of Otters in one end of the large seal pond, where they enjoy a great degree of liberty.

DECEMBER 9.—A public meeting was held in the Lecture Theatre, Leinster House (by kind permission of the Council of the Royal Dublin Society), W. E. PEEBLES (Vice-President) in the chair. Prof. G. H. CARPENTER lectured to a large audience on "Our Friends in the Monkey House," indicating the main divisions of the Primates and their past and present representatives in Phœnix Park. The lecture was illustrated by a large series of lantern slides.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 28.—The annual conversazione was held in the People's Palace, Donegall-road. Over 300 Club members and friends assembled in the large central hall, where tea was served.

In the Patterson Museum and the minor hall was shown a fine display of scientific exhibits, mainly illustrative of the Club's work for the past year. The value of the exhibits was much enhanced by the fact that the exhibitors gave informal lecturettes to groups of visitors during the evening.

In the zoological section, F. BALFOUR BROWNE had a representative collection of British and Irish water beetles; N. H. FOSTER showed some rare Irish woodlice, including four species not known in Ireland till the present year; J. HAMILTON displayed an interesting case of insects, and the Rev. W. F. JOHNSON had a fine exhibit of British insects. N. CARROTHERS showed a clutch of night-jar's eggs, found by him in County Down. JAMES ORR exhibited a collection of the eggs of domestic fowls, showing variation in size, shape, colour, &c. Among the most popular exhibits was W. H. GALLWAY's collection of living marine animals, which were collected by him locally, and included fine specimens of actinia, echinodermata, crustacea, &c.

Three really excellent collections of land and fresh-water shells were shown by J. N. MILNE, R. WELCH, and A. W. STELFOX, the latter exhibit showing fine variation of one of our common land shells. W. F. M'KINNEY'S exhibit included leaf insects from Ceylon, showing protective resemblance. H. L. ORR had an interesting display of local wasps and wild bees. The President of the Club (ROBERT PATTERSON, F.L.S.) showed the eggs and young of the Common Scoter, taken by him in Ireland this year, and a young tern in curious intermediate plumage. Prof. SYMINGTON, F.R.S., excited much interest with his skiagrams of developing teeth, as did also Prof. GREGG WILSON with his illustrations of vertebrate teeth.

In botany the following were among the more noteworthy exhibits:—N. CARROTHERS, plants from the Isle of Wight, &c.: Rev. CANON LETT, some mosses under cultivation; W. H. PHILLIPS, choice varieties of British ferns and some growing specimens of new ferns: W. PORTER, fronds of Athyrium raised from spores, varieties of *Blechnum spicant* from the Mourne Mountains; R. LLOYD PRAEGER, varieties of ferns recently found in Ireland: W. H. ROBINSON, plants from French Guinea; W. J. C. TOMLINSON, flowering plants collected recently in the Folkstone district; Rev. C. H. WADDELL, mosses, lichens, and fungi.

The geological section included a very instructive local exhibit on the geology of Cave Hill by WM. GRAY. Among other exhibits might be mentioned:—Miss M. K. ANDREWS, the very rare mineral Andrewsite from Cornwall: microscopic section of dolerite dyke, Scawt Hill: R. BELL, minerals from the basaltic rocks of Antrim and Derry: C. BULLA, fossil fish remains; T. DEWHURST, specimens to illustrate certain physical and optical properties of minerals: the use of heavy liquids for the separation of mineral particles; W. J. FENNELL, fossil plants; Mrs. W. A. GREEN, prize set of Liassic fossils; J. STRACHAN, photomicrographs of dendritic growths of copper oxide in paper; series of quartz specimens showing variety of form, and specimen illustrating the opal deposits of Sandy Braes, County Antrim.

The miscellaneous section was well represented, and included:—W. A. GREEN, natural history photographs mounted as "passe-partouts"; Mrs. HOBSON, rubbings from and drawings and photographs of the great burial mounds, Loughcrew, County Meath; ROBERT MAY, Ulster rushlight-holders and iron-candlesticks, showing evolution of form; A. B. MORRIS, photographs of wild flowers, birds' nests, &c.; GEORGE RAPHAEL, arrowheads (a very fine collection); J. VINYCOMB, framed drawings and photographs of illuminated pages; R. WELCH, photographs of places visited on Club excursions, 1908. Distinctly educative in character were the microscopic demonstrations given by various members. JOSEPH WRIGHT exhibited some recent foraminifera from the coasts of Antrim and Dublin; T. DEWHURST, microscopic sections of some rocks of economic importance; SYLVANUS WEAR, microscopic sections of wheat, brans, &c. Among so much that was excellent it was difficult to particularise, but special mention must be given to J. MAXWELL'S splendid exhibit of microscopic pond life, &c.

At 9.15 the entire company met again in the large central hall, where a short business meeting was held—the President (ROBERT PATTERSON, F.L.S.) in the chair. After welcoming the members, the Chairman referred to the success of the summer excursions, and made special reference to the recent meeting of the British Association in Dublin.

Immediately afterwards a lantern display was given of views mainly taken on the summer excursions of the Club by Messrs. Haddon, Hogg, Gray, Green, Marsh, Welch, and others. This concluded a most successful and enjoyable evening.

NOVEMBER 17.—The President (ROBERT PATTERSON, F.L.S.) lectured on "The Economic Value of Birds to the State." A large audience listened to his discourse, of which we give a full summary:—

Can we arrive at any idea as to the number of birds that live in Ireland for six months of the year—April to September? There are, roughly, 20,500,000 acres in Ireland. If we take the average number of pairs of breeding birds as three to the acre, it will, I think, be below the actual figure. I consulted both ornithologists and farmers on this point, and the estimates varied from three to twenty per acre, but by means of a careful calculation I have come to the conclusion that three per acre is a fair number to take. On the one hand, we have to think of the numberless large colonies of birds, such as Rooks, Jackdaws, Gulls, the Swallow family, &c. where the average number per acre would be immensely higher (at Rashwood, County Tyrone, the rookery has been computed at 10,000 nests), and, on the other hand, we must remember the barren mountain or bog, though even on the barest mountain Curlews, Golden Plover, Snipe, Grouse, and Meadow Pipits will probably make up the low average I have taken. This low figure gives us the number of 61,000,000 pairs of breeding birds in Ireland during the summer months. Each nest will contain on an average four young, and thus we get the enormous number of 246,000,000 bird mouths to be fed in this country. Let us allow liberally for the loss of eggs and young that we know goes on, and let us take 200,000,000 of mouths as our figure. This may be taken roughly as the summer land-bird population of Ireland, without counting at all on the numberless hordes of sea-colonies which take their food from the sea alone. Many of these summer inhabitants leave us in the autumn, but their place is taken by immense numbers of winter birds, which live with us for the other six months of the year. Unless one is a close student of migration, one has little idea of the enormous stream of birds that comes to us every autumn and winter—for if the weather in England and Scotland is very severe we receive large numbers of their starving birds in December and January. Surely such a huge population must require a correspondingly huge amount of food. The activities of birds are immense. Life fevers through their veins, their temperature being from two degrees to fourteen degrees higher than that of mammals. To support this vitality a relatively enormous amount of food is required by the adults, while the nestling young require proportionately more. A pair of tits will consume over

2,000 caterpillars in one day, and a robin has been known to eat fourteen feet of earthworms in a day. Take our 62,000,000 pairs of breeding birds. Say that one-third of them have young at any one time; let the parents visit the nest with food every five minutes, for only ten hours per day, and this low basis means that over 2,500,000,000 meals are furnished to our infant birds each day during the breeding season. We may therefore reasonably ask how do these birds affect us? Do they cost us anything or save us anything? Speaking in general terms, and of our birds as a whole, the mortifying confession must be made that we do not know. This want of knowledge was clearly admitted by the third International Ornithological Congress which met at Paris in 1900, and which passed a resolution requesting the different nations to institute researches into the feeding of birds. Owing to this lack of knowledge very diverse views are held by different classes of people, but in this case the issues at stake are so important that we must use neither the rose-tinted glasses of the sentimentalist nor the smoked glasses of the farmer or gardener. We must rely upon the glasses of the microscope in the hands of a properly qualified investigator, who must be a botanist and entomologist as well as an ornithologist. The examination of the stomach contents of the dead bird has been well called the "Court of Final Appeal," and it is the one that should be employed by the State to ascertain its friends and its foes amongst the birds. The only careful detailed and prolonged investigation into the food of three common British birds that was known to the lecturer was that carried out by Sir John Gilmour in Fifeshire in 1894, when he investigated the food of Wood-pigeons, Rooks, and Starlings for twelve consecutive months. A fairly large and regular number of birds was obtained, the actual numbers being 265 Wood-pigeons, 355 Rooks, and 190 Starlings. It was shown that the Wood-pigeon is a most expensive and dangerous bird, as he attacks and uses the very best of all our crops, the grains of all our cereals, and the leaves of all our clovers. Even though grain be left entirely out of court, the Wood-pigeon stands condemned by the heavy score standing against him for root-crop and clover leaf destruction. The details of the Rook's food showed that 58 per cent. of this bird's food is grain, and that the insects and grubs consumed would not nearly compensate the farmer for the enormous loss of grain The conclusion arrived at is that Rooks in the enormous quantities in which we have them in some counties do an immense amount of damage, and entail an unsuspected and severe loss to the farmers. Their numbers should certainly be kept within reasonable limits. The Starling, on the other hand, is the undoubted friend of the farmer, and this bird should be encouraged and protected The Starling, while using a very small amount of grain, is responsible for an immense destruction of injurious insects. Most interesting details were given of the food of Kestrels and Owls, and it was shown beyond any doubt that these birds are the true friends of the farmer, and should be most carefully preserved and protected because of the huge numbers of mice and rats which they destroy.

One Barn Owl has been known to kill twenty rats in one night, and this silent and unpaid worker would save the farmers many hundreds of pounds every year if only it received a little protection and encouragement. Our forefathers were wiser than we are, because they always left a hole in every barn so that owls could come out and in as they liked, and so rid the barns of the mice which live there at the expense of the owner. The only other bird we know anything about is the House Sparrow, which is known in America as the English Sparrow. No bird ever had a fairer or more impartial trial both here and America; the verdict is guilty, with scarcely one extenuating circumstance. It is hard for us to realise the cost of this bird in figures, but a large farmer near Chester told his audience that sparrows did the country £770,094 worth of damage in a year, reckoning one bushel per sown acre all over the country. It is now known that this measure is too low. The result of an examination of 694 stomachs of adult sparrows at various times and places in Great Britain for over twelve months should make the farmer pause. It shows that about 80 per cent. of an adult sparrow's food is cultivated grain of some sort, chiefly corn, while only 10 per cent. consists of the seeds of weeds. In nestling sparrows not more than 40 per cent. is insect, while 40 per cent consists of corn, but the insects are only taken in this quantity till the young sparrow is sixteen days old. After that he feeds chiefly on corn. Admirable publications on the subject of the food of birds are issued by the American Bureau of Biological Survey, and these he held up as a model to the authorities in this country. Owing to the importance of this question to our farmers, and the country generally, it should be taken up by the English and Irish Departments of Agriculture. The money spent on such an investigation would be repaid many times over, and its importance is such that no more time should be lost before economic ornithology is established as a regular branch of our Agricultural Department.

The address was discussed by Messrs. N. H. Foster, William Gray, and W. J. C. Tomlinson. The election of three new members concluded a most successful meeting.

DECEMBER, 9:—ZOOLOGICAL SECTION. The first meeting of the winter session was held in the Museum, the President (ROBERT PATTERSON, F.L.S.,) in the chair. The Vice-President (W. H. GALLWAY) brought before the meeting a summary of the dredging operations carried on by the Ulster Fisheries and Biology Association in Belfast Lough during the summer. He said that the Association having decided in the spring of 1908 to transfer their Laboratory from Larne Harbour to Bangor, he had been appointed honorary naturalist. It was part of his duties to take out the Association's steam launch "Mysis," and dredge for material to supply the members who took up the study of the various groups. The best find was a specimen of that exceedingly rare marine slug, *Pleurophyllidia Loveni*. Only two or three specimens have been taken in Great Britain, and this specimen was the first recorded from Irish waters. Miss Clara Patterson, the daughter of the President, kindly painted the animal's portrait—a most difficult task. The little animal

was dredged in Smelt Mill Bay, a small bay at the foot of Carnalea golf links, on the 21st July. It spawned on the 17th August, and died on the 29th September. The eggs did not come to maturity. A specimen of the Plumose Anemone which he got measured 12 inches from base to crown, 9 inches across the tentacles, and the diameter of the column was 5 inches. He had not been able to trace the record of so large a specimen having been taken before.

DUBLIN MICROSCOPICAL CLUB.

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

A. R. NICHOLS exhibited statoblasts of the freshwater Polyzoa, *Cristatella mucedo* and *Pectinatella magnifica*. These statoblasts have the form of more or less circular discs, each surrounded with a ring of air cells. In *C. mucedo* a row of anchor-shaped hooks springs from each side of the statoblast and radiates outwards for some distance beyond the margin, but in *P. magnifica* there is only a single row of these hooks, springing directly from the margin. *P. magnifica* is confined to North America, except as introduced at Hamburg, Germany. *C. mucedo*, in addition to having been found in several localities in Ireland, including the Grand Canal near Dublin, has also been recorded from other parts of the British Islands, from the Continent of Europe, and from a few places in North America.

D. M'ARDLE exhibited specimens and drawings of a minute fungus *Periconia byssoides*, Pers., which he had detected on a shoot of Gooseberry sent from Co. Down. It formed small black patches on the shoot, the septate fertile hyphæ with erect stems, composed of threads, bearing compact globose heads; conidia subglobose, dark brown. Mr. Massee, to whom specimens were sent, says that the spores of this species are rough and usually somewhat larger than they are stated to be in books. Saccardo gives the distribution of the plant as follows:—Sweden, Britain, Belgium, Italy, N. America.

F. W. MOORE showed *Phoma grossulariæ*, a fungus which does not seem to have been previously recorded from Ireland, although recently it has been very prevalent on gooseberry bushes. It is not parasitic, and grows on the decaying cortex of the branches.

Dr. G. H. PETHYBRIDGE exhibited a series of specimens of the slime-fungus *Spumaria alba*, DC., together with photographs of the ripe sporangial stage, with its white calcareous covering, taken *in situ* in the habitat in which the organism was found, viz., among the sand-dunes of the North Bull. The microscopic characters of the calcareous covering, the spores, and the capillitium were those of *Spumaria alba*, DC., but instead of being opaque white, as is usually the case in this species, the plasmodium was yellow. A note on this point will shortly be published in the *Irish Naturalist*.

DUBLIN NATURALISTS' FIELD CLUB.

OCTOBER 24.—EXCURSION TO CRUAGH WOOD.—About twenty members and visitors left Terenure at 2.0 on cars and bicycles for Rockbrook, from whence they walked to Cruagh Wood. Here the conductor (D. Houston, F.L.S.) collected the party and gave an interesting account of the structure of the different types of Fungi and distributed an illustrated list of those likely to be found in the locality. The Club had also the advantage of the presence of Dr. E. J. M'Weeney, whose knowledge of the specific differences of most of the Fungi collected, added greatly to the interest. A considerable number of the larger forms of Fungi were collected, and at dusk the members returned to town after a most interesting outing.

NOTES.

BOTANY.

Barbula Hornschuchiana in Counties Down and Armagh.

Often looked for, as a moss that might reasonably enough be expected in County Down, *Barbula Hornschuchiana* has at length been detected not only there, but also in the conterminous County of Armagh. In the former county it occurs—with immature fruit in November—scattered amongst congeneric and other small mosses on garden paths at Lenaderg, and in the latter on stones at Drumlin. Widely distributed, though not by any means common, in Great Britain, it is remarkably rare in Ireland, having previously been recorded from only two localities:—Inchiquin, County Cork (Carroll), and walls of Carrickfergus Castle, County Antrim (Moore).

J. H. DAVIES.

Lenaderg, Co. Down.

Archidium alternifolium in County Down.—A correction.

The moss from County Down adjudged to be *Archidium alternifolium* and recorded as such (*Irish Naturalist*, 1907, vol. xvi., p. 215), has since been found not to belong there. The record must therefore be withdrawn. From their examination of further specimens, recently gathered, Mr. H. N. Dixon and Mr. W. E. Nicholson agree in the opinion that the plant is probably some species of Dicranella, that opinion being supported by the presence of radicular tubercles, but, for the present, it is indeterminable. It has appeared for several consecutive years on cultivated soil, and hitherto has been always sterile. It will, however, be kept under observation in the hope that more light may yet be given.

J. H. DAVIES.

Lenaderg, Co. Down.

ZOOLOGY.

Freshwater Crayfish in Munster and Ulster.

It is perhaps twenty-five years since I was engaged in deepening the Sleivnaun stream, a tributary of the Diel in County Limerick. One of the workmen took a Crayfish from the mud, and showed it to me. I understood that they got a good many.

R. D. O'Brien.

Parteenalax, Limerick.

I see note on the occurrence of the Crayfish in the Shannon. It occurs abundantly in the Suir, Co. Tipperary, and Co. Waterford, and tributaries I kept them for years in an aquarium; the largest I saw was nearly 4 inches. They occur also near Strabane, in Co. Tyrone.

Alex. H. Delap.

Strabane.

I noticed in last year's *Irish Naturalist* (vol. xvii., p. 205) that Crayfish have only been recorded from a few counties. They may be met with in fair numbers in the River Erne, about a mile from Ballyshannon.

E. Crawford.

Stonenold, Ballyshannon.

Noticing that Mr. R. A. Phillips records the freshwater Crayfish for Co. Limerick and Co. Clare in the October number of the *Irish Naturalist*, I should like to add to the list of records Co. Tipperary. I remember some years ago now finding them in numbers in a stream near Borrisokane, Co. Tipperary.

C. E. Y. Kendall.

Leicester.

Referring to Mr. Phillips's note in October number of the *Irish Naturalist*, I may state that the Crayfish is plentiful in this locality, both in the River Erne and in the Pullans River at Ballintra, in both of which they are often found.

H. Allingham.

Ballyshannon.

Orthetrum cærulescens in Co. Wexford.

This dragonfly is not at all uncommon in peaty bogs in the north-western part of Co. Wexford, towards the Blackstairs range. In the valley of the small River Urrin, a tributary of the Slaney, it is, in suitable spots, often quite abundant. From Mr. Halbert's article on Dublin and Wicklow Neuroptera in the British Association Handbook (p. 170) I gather that all the recent records for this insect are from the province of Munster. Its occurrence in Wexford therefore seems to be worth recording.

C. B. Moffat.

Ballyhyland, Enniscorthy.

Lepidoptera in Co. Westmeath.

I captured two females of *Dasychira fascelina* in this county on or about the 8th July last. They were sitting on the top of the heather in the act of laying their eggs, so I broke off the twig, eggs and all, and shut both moths up to finish laying. The eggs hatched out on the 28th July and the larvæ are now about ½-inch long. They had not upon September 16th begun to hibernate but were still feeding. I caught one other in 1904 before I started my own collection. It was also sitting on heather, and I did not realize at the time that it, too, was probably in the act of laying. It is in the collection of Dr. B. L. Midleton. I have some other captures that have not previously been reported from this county —three imagines of *Scotosia dubitata*, and one female *Spilosoma mendica* (1903) two *Bupalus piniarias* (1906); one *Vanessa urticæ* var. 3 in Newman. Also I do not think *Nonagria arundinis* has been reported before. It occurs at Slevin's Lake, Westmeath, where I have seen the chrysalids in bulrushes and imagines have been bred from them by Dr. B. L. Midleton, who discovered them near here.

I have to record the capture by myself on Sunday evening, 4th October, of a male *Acherontia atropos* which flew into the house here through an open window. It measures 5¼ inches across the wings.

Norah V. Levinge.

Violetstown, Mullingar.

Hymenoptera from County Antrim and Down.

Having collected some Bees and Wasps in Antrim and Down this summer, I was anxious to know if I had got any new county records.

Taking J. N. Halbert's list compiled for the Belfast "British Association Guide," 1902, and adding those recorded in the "Irish Naturalist," since that date they total fifteen species for Antrim, and fifteen for Down.

They are as follows:—*Pompilus gibbus*, Down; *Salius fuscus*, Antrim; *Tachytes pectinipes*, Down; *Spilomena troglodytes*, Down; *Passalœcus monilicornis*, Antrim; *Gorytes mystaceus*, Down; *Mellinus arvensis*, Down; *Crabro tibialis*, Down; *C. leucostoma*, Down; *C. palmipes*, Antrim; *Oxybelus uniglumis*, Down; *Vespa rufa*, Antrim; *Sphecodes dimidatus*, Down; *Halticus rubicundus*, Antrim, Down; *H. albipes*, Antrim, Down; *Andrena timmerana*, Antrim; *A. cinerea*, Antrim, Down; *A. nigroœnea*, Antrim; *Nomada ruficornis*, Antrim; *Bombus lapidarius*, Antrim, Down; *B. agrorum*, Antrim, Down; *B. terrestris*, Antrim, Down; *B. sylvarum*, Antrim; *B. soroensis*, Antrim.

I have taken the following which are not in the above list :—*Vespa vulgaris*, Antrim, Down; *V. norvegica*, Antrim, Down; *V. sylvestris*, Antrim. Down; *Andrena rosæ*, Antrim, Down; *A. albicans*, Antrim, Down; *Nomada alternata*, Down; *Psithyrus vestalis*, Antrim; *P. campestris*, Antrim; *Bombus hortorum*, Antrim, Down; *B. laterillellus*, Down: *B. derhamellus*, Antrim; *B. cullumanus*, Down; *B. smithianus*, Antrim; *Megachile centuncularis*, Down.

Hugh L. Orr.

Clearwood Avenue, Belfast.

Lacerta vivipara on Scariff Island, Co. Kerry.

Two specimens of the Common Viviparous Lizard were found on July 12th, under a stone on Scariff Island. The species is of course abundant on the neighbouring mainland, but its occurrence on the islands is perhaps worthy of note.

S. W. KEMP.

Dublin.

The Irish Vertebrate Fauna.

In an article in the *Zoologist* for September Mr. H. E. Forrest draws attention to the absence from Ireland of many vertebrates found in Wales, and puts forward the theory so familiar to Irish workers through the writings of Wallace, Scharff, Carpenter, and others, that the facts cited are to be accounted for by Ireland having become an island before Great Britain did.

Crossbill breeding in Co. Dublin.

To *British Birds* for November, R. Hamilton Hunter sends a note recording the breeding of the Crossbill last spring near the Scalp.

Black Redstarts in Co. Waterford.

I had in my hand to-day (4th November) a female or immature male Black Redstart caught in this house. I liberated it, but before I did so I saw another on my window sill.

This day twelvemonths I caught a Black Redstart in my bedroom, and on 2nd November I saw another outside the window; while on 29th October and 2nd November, 1895, two were caught in this house. The only observation I have made in spring was on 28th March, 1888, when I saw one of these birds outside the hall door.

Black Redstarts have been obtained or seen in six successive seasons from 1880, usually in November, on or near the coast of this county.

This is not the only foreign summer migrant that visits the south or south-east coast of Ireland in autumn. Examples have been obtained from lighthouses of the Lesser Whitethroat, Barred Warbler, Yellow-browed Warbler, Rufous Warbler, Melodious Warbler, Aquatic Warbler, Pied Flycatcher, and Red-breasted Flycatcher, besides other rarities which Mr. Barrington has announced recently.

To speak of these occurrences as taking place "on migration" does not explain the strange fact that summer visitants to the continents of Europe and Asia should so often reach Ireland on their southward journey in autumn.

R. J. USSHER.

Cappagh House, Co. Waterford.

Ringed Plover 700 Miles from Land.

It may be interesting to note that a Ringed Plover (*Ægialitis hiaticula* Linn.) settled on board R.M.S. "Virginian" at 1.30 p.m., on 10th June last, when we were 708 miles off the Irish coast. It kept with us flying about and resting at times till 10 p.m., when it was caught and given to me. It was an adult bird in summer plumage. I placed it in a cage, and it fed freely on bread and milk. There is every probability that this bird was on its way to Greenland, where it occurs annually along with its American representative *Æ semipalmata*. The latter may have possibly visited this country. It is distinguished from our bird by having a web between the inner and middle toes.

J. TRUMBULL.

Malahide.

Mice devouring Snails.

We are in the habit of putting bread crumbs and seeds on the window sills for the wild birds, and any number of mice come up through the ivy to eat the crumbs. If the weather is damp we get crowds of snails on the window sill. One day my brother said he saw a mouse carry off a snail in its mouth. I hardly believed it at the time, but since then I have noticed broken snail shells and half eaten snails quite close up to where the mice come up through the ivy.

Another curious fact I have noticed is that the snails will actually eat the bread placed on the window.

I shall be interested to hear whether these facts have been noticed by others.

H. E. COGHILL.

Athboy, Co. Meath.

[We believe that the preying of mice on snails is familiar to many field naturalists.—EDS.]

GEOLOGY

Booming of Lough Neagh.

Although the fishermen of Lough Neagh for an indefinite period have been acquainted with the boomings proceeding from this lake, it is only within the last twenty-five years, so far as I am aware, that they have been specially noted, and some attention paid to them. Before the time stated, the inhabitants of the neighbourhood were not aware that such sounds occurred. If heard and thought of, they were regarded as of no concern to them. Many natural phenomena are mysterious, the ignorance as to their cause adding to the mystery, but these boomings of Lough Neagh seem marvellous as well as mysterious. I have heard them—dull, heavy, explosive sounds—so far as I can remember, in all kinds of weather, fine and rainy in summer, and cold, fine, and frosty in winter. I have heard them in spring and autumn also. Sometimes

these sounds have appeared to originate near the Tyrone shore, sometimes in the southern portion of the lake, sometimes apparently in Toome Bay, and sometimes close to the shore near Antrim. When the lake was covered with ice, as it was in February, 1895, on a very calm sunny afternoon, there were regular boomings at distant intervals, and lasting perhaps a couple of hours, apparently far away in the south-west, the writer being engaged skating near the Massereene and Shane's Castle demesnes at the time. On another occasion, but during the same protracted frost, and when the ice was about breaking up, there were terrific boomings, apparently about half-a-mile, or less, from the shore nearest Antrim. Skaters were momentarily alarmed, and stopped to look round to see what had happened; but there were no visible effects. On a fine spring day, a golfer was much startled by one of these dull, explosive sounds, which appeared to have originated about a hundred yards from the mouth of the Six-Mill water. The fishermen denominate them "lough shootings." But the mystery attaching to them has not yet been fully stated. They are, I believe, never heard at night. I think I have heard them at almost all hours during the day, and this, fishermen have done; but I have met with none, fishermen or shore-residents, who can say they have heard these boomings during darkness. This seem to me one of the strangest things about them. If the boomings originated within the lough itself, there would surely be some local disturbance of the water; but none is ever seen. Therefore, I conclude that they proceed from the atmosphere above; and yet, if there were aerial explosions, would they not be attended by flashes of some kind? But no flashes are ever seen accompanying the sounds. The fishermen regard them as ordinary occurrences, and never trouble their heads about the cause. Whether any superstition attaches to them I do not really know; but these people appear to me as though they would rather not speak of them.

Sounds of a similar nature to those I have attempted to describe, are heard at intervals in different parts of the world, and according to Mr. G. H. Pentland, they are heard off the eastern coast of Ireland, from Wicklow to Carlingford. Are they, I wonder, heard there in various kinds of weather, though bright and sunny seems to be regarded as most probable; and at all seasons of the year as at Lough Neagh? Are they heard during darkness? It would be interesting to know as fully as possible the circumstances under which the sounds occur. If I understand Professor Grenville Cole aright, he thinks they may possibly, only possibly, be caused by seismic movements of some kind. But do such earth movements never take place during the night? And do they always make a dull, muffled, explosive sound? And would they not be heard coming from the land as well as from water? I fear we are yet a long way from knowing the cause. So far as I am aware, the Lough Neagh reports have not yet been properly investigated.

W. S. Smith.

Antrim.

GEORGE HENRY KINAHAN.
September, 1908.

H. J. Seymour, photo.

To face page 29.]

GEORGE HENRY KINAHAN.

GEORGE HENRY KINAHAN, son of Daniel Kinahan, barrister-at-law, a member of the well-known Dublin family of that name, was born in Dublin 19th December, 1829, and died at Woodlands, Clontarf, 5th December, 1908.

At an early age he entered Trinity College, from which he received his diploma of Engineering in 1853, and immediately started in his profession as assistant, under Sir John M'Neile and Mr. James Barton, at the construction of the Boyne Viaduct, Drogheda. In August, 1854, Kinahan was appointed to the Geological Survey, then under the directorship of J. Beete Jukes, and his first field-work was commenced under the guidance of G. V. Du Noyer and Wyley, in the south-western districts of Cork and Kerry, where he carried on his work with that enthusiasm and zeal which distinguished his entire official life. Later he removed to Limerick city, where interesting volcanic problems afforded him full scope for theory and research. Proceeding to Galway, Kinahan took up the survey of the complicated western area, with which his name is most intimately connected, and it was while here that, in conjunction with the Rev. Maxwell Close, he published his important papers upon the glaciation of that district.

In 1869, upon Du Noyer's death, he was appointed District Surveyor of the Geological Survey. In the earlier years of the Survey's existence, field operations and mapping were pushed on so rapidly that little time was afforded the limited staff to write memoirs on the districts they had traversed, and Kinahan was detailed to remedy this want, so far as the districts of County Wexford and portion of County Wicklow were concerned. This portion of the country, however, having been one of the first surveyed, and the science of geology having meantime made rapid advances, a re-survey of the ground was found necessary, and in this essential his great experience proved invaluable. No feature of the country, however small, from Carnsore Point to the Vale of Ovoca escaped his examination and description. Upon the completion of his work in the south-east, he took up the survey of the Kilmacrennan district of County Donegal, the intricate structure of which was just such a problem as he delighted to unravel. Here he pursued his field labours until

the completion of the One-inch Geological Map of Ireland —a work in which he had played a conspicuous part, his portion extending over at least one-eighth of the whole island.

Kinahan's investigations and researches were not confined to geology. Archæology and natural history claimed his attention —interest in the latter doubtless derived from his eminent brother, the late Dr. John Robert Kinahan, whose early death was such a grievous loss to natural science in Ireland.

No more interesting companion than Kinahan could one have on an "outing;" and whether along the sand-dunes of the Wexford coast, the rugged slopes of the Mount Leinster range, or the dreary quartzite peaks of the Donegal Mountains, the writer has pleasant and vivid recollections of the instructive and interesting hours spent in his company.

He was the last survivor of that band of enthusiastic Irish geologists, which numbered within its ranks Griffith, Jukes, Mallet, Haughton, Close, and other notable men, whose brilliant discourses attracted crowded audiences to the theatre of the Engineering School in Trinity College in the flourishing days of the Dublin Geological Society—the lack of interest taken in the subject of geology in later times presenting a sad contrast.

In 1880-81 Kinahan was President of the Royal Geological Society of Ireland, and his annual address upon the subject of waste lands of Ireland created much comment from an economic standpoint, both at the time of delivery and subsequently. In 1884 the meeting of the British Association (of which he was a member of the General Committe) in Montreal, gave him an opportunity of visiting the Western Continent, and he availed himself of the facilities afforded to examine many localities of interest, his impressions being subsequently recorded in various papers.

It has not been found possible to compile anything like a complete list of Kinahan's writings, which comprised contributions to most of the scientific bodies in the Kingdom, prominent amongst which may be mentioned our own Geological Society, to whose Proceedings he largely contributed from 1860 until its extinction in the late eighties. The kindred society of London also afforded a medium for ventilating his ideas, which he frequently availed of. A reference to the Catalogue of Scientific Papers published by

the Royal Society, the Index by Dr. and Mrs. Woodward of the papers published in the Geological Magazine, 1864–1903, and a similar list of papers read before the Royal Geological Society of Ireland, compiled by Mr. Hugh Leonard, and Praeger's Glacial and Post-Glacial Bibliography, will afford much information; but in addition to these, his papers before other societies were extremely numerous. Indeed, it may be said that in this respect he was indefatigable. From his first start in the geological world he never ceased to record his observations and opinions, and at the very time of his death he had just completed a paper he intended to have read at the Royal Irish Academy. Besides his papers to learned societies, he published several works in geology, prominent amongst which were his excellent "Manual of the Geology of Ireland," "Valleys, Fissures, Fractures, and Faults," "A Handy Book of Rock-Names," "Reclamation of Waste Lands in Ireland," "Irish Peat, its Utility and Possibilities," "Economic Geology of Ireland" (which is widely availed of in connection with economic developments), and, within the past few months "The Superficial and Agricultural Geology of Ireland." His knowledge of Ireland was by no means confined to geology. A recent writer describes it as encyclopædic, and a perusal of the evidence he gave before many Royal Commissions to which he was summoned, more especially the "Industries (Ireland) Commission," in 1885, will show his intimate acquaintance with the social and industrial conditions of Ireland.

A man of strikingly imposing physique—he was generally termed by the country folk "the big miner"—no trouble nor fatigue could deter him from carrying out the work he so keenly revelled in, and he would walk through a river up to his waist to examine a section on the opposite bank as calmly as if he were in a road cutting. He now rests in the picturesquely situated churchyard of Ovoca, overlooking his former residence in the famous lovely vale. Fittingly, his remains were carried to the grave by a squad of the miners attached to the now almost deserted, but once prosperous, Ovoca mines, to most of whom he had been a familiar figure in days gone by.

R. Clark.

Geological Survey, Dublin.

BOTANICAL NOTES, CHIEFLY FROM LOUGH MASK AND KILKEE.

BY R. LLOYD PRAEGER.

Lough Mask.

Although it is one of the largest of Irish lakes, Lough Mask has been but little explored botanically. The lake lies 62 feet above Ordnance datum. It measures about nine miles from north to south, and two to five from east to west—not including the two long narrow arms which run westward into the mountains from the south-west corner. The eastern shore, formed entirely of low Carboniferous limestone, belongs to East Mayo, while the western side, stretching along the foot of the bare slopes of the Partry Mountains, consists of Silurian slates and Carboniferous sandstone, and lies half in West Galway, half in West Mayo. The only systematic botanizing carried out within the region is that of Marshall and Shoolbred[1] along the southern shore of the lake, with Clonbur as centre. Long before, in the sixties, F. J. Foot had collected desultorily on the shores, as recorded by More[2]; and a herbarium composed largely of plants from the east shore, in the neighbourhood of Ballinrobe, made by Mrs. D. D. Persse in 1892–4, helped me materially when compiling East Mayo records for "Irish Topographical Botany." A recent attempt to write a brief note on the botany of Lough Mask proved such a failure, owing to lack of information, that I included that lake in the itinerary of a hurried tour in the West last July, designed for the gathering in of gleanings in several districts.

Reaching Ballinrobe on July 17, daylight allowed of a brief reconnoitering of the ground, from the mouth of the Robe River northward. Next day was devoted to the islands. A high wind rendered operations difficult, and compelled a run for shelter in the evening, but not before a sufficient sampling

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[1] E. S. Marshall and W. A. Shoolbred: Irish Plants observed in July, 1895. *Journ. Bot.*, xxxiv., 250–258. 1896. E. S. Marshall: Irish Plants collected in June, 1896. *Ibid.*, 496–500.

[2] A. G. More: Recent Additions to the Flora of Ireland. *Journ. Bot.* xi., 115–119, 142–148. 1873.

had been accomplished to allow of generalization. On the third day I worked round the north half of the lake from Tourmakeady to Ballinrobe. As the island expedition extended from Aughinish near Lough Carra, to Lusteen in the south-west, and included a walk thence to Tourmakeady, it will be seen that, when Marshall and Shoolbred's results are included, materials were now available for a tolerably satisfactory general view of the vegetation of the lake. In the present notes I need only deal with my own observations.

To take the limestone shore first. This extends from Knocknagool, in the north-east, southward and then westward to beyond Clonbur (Fairhill). It is of the usual low, irregular and much indented type, with many outlying reefs. The shore is usually bare and stony, only here and there covered with drift. Where demesnes occur and cattle have been kept off, as below Ballinrobe, it is wooded with native scrub—chiefly Hazel and Hawthorn, with Ash, Birch, Spindle-tree, the two Buckthorns, much *Rubus cæsius*, and a little *Pyrus Aria*. The limestone shores proved on the whole unproductive. The characteristic plants include *Viola canina*, *Hypericum perforatum*, *Parnassia palustris*, *Galium boreale*, *Carlina vulgaris*, *Anagallis tenella*, *Chlora perfoliata*, *Samolus Valerandi*, *Thymus Serpyllum*. A tract of bare crag-land occupies the shore south of Carrowaneeragh—a desolate area of slabs and blocks of limestone. *Neotinea intacta* occurs here, amid much *Plantago maritima*; but the characteristic pavement flora is almost absent, even the species of the adjoining crag-lands of Lough Carra, such as *Aquilegia vulgaris*, *Rubia peregrina*, and *Sesleria cærulea*, being rare or wanting. Sesleria, indeed, an almost invariable concomitant of bare limestone in western Ireland, was seen on Lough Mask only on a low range of rocks that fronts the lake near Knocknagool, with *Hieracium anglicum*.[3] Many of the plants which brighten the shores and islands of Lough Carra by their abundance, such as *Thalictrum collinum*, *Rubus saxatilis*, *Leontodon hispidus*, *Orchis pyramidalis*, *Epipactis palustris*, are also either absent from or rare by Lough Mask, though at the southern end of the former lake they approach

[3] For the identification of Hieracia my thanks are due to Rev. E. F. Linton.

to within a half-mile of the latter. Among the miscellaneous plants of the eastern lake-shore were *Trifolium medium* and *Solanum Dulcamara.*

Islands are rather numerous along the eastern side of the lake, and it might have been expected that here the limestone flora would have attained a striking development, as on the adjoining Lough Carra. This proved to be not the case. The weather did not permit of an examination of all the islands, but a number, extending from Castle Hag, at the mouth of the Robe River, to Carrigeennasassonagh, off Devenish, were visited, and may be taken as a sample of the whole. These islands are ridges of drift, their long axes lying N.E. and S.W. This drift has been derived not so much from the limestone as from the sandstones and slates lying to the north and west. The matrix is not highly calcareous, and limestone figures only sparingly in the blocks on the shore. On the larger islands the central portion is occupied by a plateau of Boulder-clay, tree-covered or cultivated, with a steep scarp descending to a broad shelf, clothed with trees or bushes, sloping to the water, mostly thickly strewn with blocks of the afore-mentioned rocks (fig. 1). On the smaller islets the waves have swept right across, and only a ridge of stones and blocks, the wreck of the drift, remains.

Fig. 1.—Section of Devenish, Lough Mask, showing Boulder-clay core, with ruined church, and old beach invaded by wood.

Knowing that drainage operations had been in progress around Lough Mask and Lough Corrib about 1840 or 1850, I at first put down this old water-level to pre-drainage denudation. But the Ordnance maps, and also information obtained locally, show that the effect of the engineering operations (which consisted chiefly of the cutting of that lunatic canal across the limestone, which naturally has a bottom like a sieve) was to lower the water-level only two feet. Now the old beach is from 10 to 15 feet above present storm level. The drainage from the lake is still, as it has always been, subterranean.

The bold Boulder-clay scarps on the drift islands show a long period of higher water-level, and the condition of the woods on the broad foreshore on which the scarps look down points to a considerable period during which the water has not transgressed its present limits. So that all the evidence points to a lowering of a long-persistent water level by natural causes, probably some centuries ago, and to an extent of some 15 feet. The lowering was, no doubt, caused by solution-enlargement of water-passages through the limestone between L. Mask and L. Corrib, allowing the drainage to proceed at a level lower than before. The feature is a very interesting one, and would well repay study by a geologist. I am not aware of any similar feature among the other limestone lakes of Ireland.

To return to the flora of the islands. On those that are wooded, the line of the tree-tops rises at a small angle from the windward to the leeward side, where the trees, 20 to 30 feet in height, overhang the water (see fig. 2)—a feature very characteristic of the island-flora of lakes in western Ireland.

Fig. 2.—Wind-moulded wood on a Lough Mask island, seen from the north.

The native trees consist chiefly of Ash, Oak, Birch, Holly, Alder—the last colonizing the foreshore, and assisting the bush-vegetation formed by *Rhamnus catharticus* and willows, with occasionally *Ulex europæus*. *Rhamnus Frangula* is also widespread; it grows usually quite prostrate, with *Rubus cæsius*, and more rarely *R. saxatilis*. *Pinus sylvestris* has been planted on many islands, and sows itself in hundreds on the foreshores, not only of the planted islands, but of others also both to east and west (leeward and windward) of possible parents. The undergrowth of the woods consists largely of *Geranium Robertianum* and *Circæa lutetiana*, and sometimes of Rubi, running down to the water's edge on the eastern sides. The exposed western sides have a broadish, grassy, bushy, block-strewn foreshore. Here *Galium boreale*, *Eupatorium cannabinum*, *Campanula rotundifolia*, *Solidago Virgaurea*,

Carlina vulgaris, *Chlora perfoliata* occur, the first three in beautiful profusion. Amid this rather calcicole assemblage (in which many of the species of the Lough Carra islands are nevertheless missing), it was interesting to find a colony of heaths on the foreshore of Shangorman. These occupied a narrow zone between the bushy beach vegetation and the arboreal zone, where possibly winter storms had by degrees formed a substratum of vegetable débris. Calluna was here, and more sparingly *Erica cinerea*, *E. Tetralix*, and *Dabeocia polifolia*. *Ulex europæus* is confined to the same zone. The occurrence of Dabeocia is interesting. Mrs. Persse reported a single plant on Martyn's Island (the same station) in 1891, which on the evidence I was inclined to consider introduced or casual; but it is clear that the record should stand, this being the only instance, so far as I am aware, of the plant's occurrence within the limestone area. On the same island good *Cnicus pratensis* × *palustris* was seen, with both parents. On a small islet south-west of Devenish, *Ranunculus scoticus* was in fine condition. On Shangorman, *Carex strigosa* was gathered, and also *Hieracium iricum*. On the windward shore of some of the islands weeds of cultivation were abundant, their seeds evidently blown or washed across from the slopes on the western side of the lake.

The mountain shore of the lake is much more regular than the eastern, and runs south-west, with few indentations or islets, from the north end of the lake to the two long arms which have been already mentioned. The ground slopes downward from the Silurian uplands to the water, and is mostly cultivated. Where it is rough, the calcifuge Connemara flora, including *Dabeocia polifolia*, descends to the water's edge. The shore is stony and bare, without rocks. In the north delightful sandy bays occur, backed by mounds of sand. Here *Filago minima* and *Anthemis nobilis* grow. The numerous rocky islets which occur at the north end of the lake, formed of Carboniferous sandstone, have a vegetation of stunted native trees and heather. *Rhamnus catharticus* and *R. Frangula* are abundant, also *Dabeocia polifolia* and *Solanum Dulcamara*. On a sandy bottom in the shelter of the islets grow *Potomageton filiformis*, *P. lucens*, *Sparganium natans*, and commoner plants. At the opposite end of the lake, the

Lusteen islands were explored. They are exactly like the islets of the Connemara lakes, glaciated rocks—in this case altered Silurian—rising out of deep water, and capped with peat and heath. Here again the old 15-foot beach is finely developed, even to the extent of rock-platforms. *Pinus sylvestris* has been planted. The two Buckthorns are common on the rocky beach, with *Galium boreale*, *Hieracium umbellatum*, *Solanum Dulcamara*, and in the water *Lobelia Dortmanna*. Dabeocia is abundant on the raised central heath area. *Listera cordata* occurs (elevation 70 feet) and *Scutellaria minor*. On the northern slopes of Knocknamuck, on the adjoining mainland, an area of fine natural wood occurs, composed mainly of Oak, Ash, and Birch. The scenery around here is as good as the best that Connemara can offer. Near by on the north-west the lake is filled with sand brought down by the Owenbrin River, and at low water great yellow expanses are laid bare, backed by flat sandy meadows. Here again *Potamogeton filiformis* was gathered. Further north, at Tourmakeady, *Agrimonia odorata* grew in abundance.

Of the plants mentioned above, *Rhamnus Frangula* and *Filago minima* are hitherto unrecorded from Mayo West, and *Ranunculus scoticus*, *Hieracium anglicum*, *H. iricum*, and *Carex strigosa* from Mayo East. *Potamogeton filiformis* was previously known from West Galway and from Lough Mask only through a fragment floating loose near Clonbur, found by Rev. E. S. Marshall.

Ballinrobe to Kilkee.

From Ballinrobe I went to Cong, and had a half-day's exploring to the south-east, along that portion of the Lough Corrib shore where Dr. Moore discovered the second known station for *Neotinea intacta*, and whence Miss Jackson contributed some important records to the second edition of "Cybele Hibernica." The boundary between the limestone and the metamorphic rocks runs here along the irregular shore of the lake. The outlying points and islets are formed of the older rocks, between which and the limestone, patches of Carboniferous sandstone intervene. It was interesting to find that *Dabeocia polifolia* penetrates to all these last outposts of the calcifuge flora. It was seen half a mile eastward of the

steamboat quay, and thence occasionally to Cordroon, beyond Ballymacgibbon Bay, where these rocks reach their eastern limit. I see by reference to the six-inch map that this range constitutes merely an expansion of Miss Jackson's *Cybele* station, "between Lisloughry and Lackafinna." *Potentilla fruticosa* was found on the shore opposite the wooded Island Morris at Castletown. This is near, but apparently not identical with, Miss Jackson's station in "Cybele," and may be Moore's old station. The two Scutellarias and the two Buckthorns grew on the shore a little to the north. *Ranunculus scoticus* was seen by the lake nearer to Cong. At Cong itself *Euphrasia Salisburgensis* grows on the rocks right up to the houses of the village, and a fruit-stem of *Neotinea intacta* was seen a short distance to the north-west.

Pushing on to Maam that evening (where *Potamogeton Kirkii* was still in its old station), I crossed the Maam Turk ridge next morning to Recess. On the way up to Corco Gap a thick bed of primitive limestone—a grey crystalline rock like coarse sugar—crops out at intervals for half a mile, beautifully carved and fluted in places by the weather, and producing by solution strange cavernous recesses. *Asplenium Ruta-muraria* is the sole floral indication of the nature of the rock, and it was interesting to find members of the prevailing calcifuge flora—*Saxifraga umbrosa*, *Athyrium Filix-fœmina*, *Blechnum Spicant*—growing in dry soil-less crevices of the limestone. I followed the mountain-ridge for a couple of miles, including the loftiest peak of Maam Turk (2,307 feet); but the higher grounds of these hills are bare and desolate in the extreme, as long ago described by Mr. Hart.[1]

Thence to Recess, where I joined Mr. Welch on a photographic raid on the rare western plants. At Roundstone, our first halt, three fruiting stems of *Neotinea intacta*, found by the roadside where the Dog's Bay lane turns off, strengthened the position of that rare plant in this district; *Sagina subulata* grew hard by.

Near Woodford, our next stop, *Plantago maritima* was seen covering the old road where it crosses the Old Red Sandstone ridge (560 feet) north of the village—a characteristic

[1] Report on the Flora of the Mountains of Mayo and Galway. *Proc. R.I.A.* (2), Science, iii., 694-768. 1883.

plant of the low limestone crags and lake-shores, but which I have not seen before on inland non-calcareous non-alpine rocks. By Lough Derg we had the luck to hit off *Inula salicina* in full flower. At Portumna, on the Tipperary side of the bridge, *Inula Helenium* (new to division 10) was established, and *Eleocharis acicularis* was seen in Mackay's old station (1806). At Limerick we got good photographs of *Scripus triqueter*, growing in abundance, with *Nasturtium sylvestre* and *Potamogeton densus*, on the tidal foreshore of the Shannon, where it is half or wholly submerged at each tide. *Typha angustifolia* grows likewise on the tidal foreshore a little below Limerick Docks, with *Scripus maritimus*, *&c.*—a plant hitherto unrecorded from Limerick, and for which I know of no other station in tidal waters, unless the former Dublin ones were such. The plant is extremely robust here, bearing leaves 11 feet in length, and Mr. R. D. O'Brien suggests that it may be the North American form *T. elatior*.

Dr. George Fogerty, Mr. O'Brien, and I went to Foynes, and rowed up to Trummera Big, where the former photographed *Glyceria festucæformis* for me. Then he and I went *via* Tarbert and Kilrush to Kilkee, where a few days were spent examining the country from Doonbeg and Monmor down to Loop Head.

South-west Clare.

This is a little-known region. As long ago as 1845, it was visited by Charles Carter,[1] who records from it, among other plants, *Eriocaulon septangulare* and *Elatine hexandra*. The latter was found in this area by Dr. Moore also some years subsequently, but neither has been since reported from Clare. We had the good fortune to refind both in the neighbourhood of Monmor bog, in spite of the great alterations to which the surface has been subject owing to half a century of turf-cutting. Mr. P. B. O'Kelly has since given me a second station for the Pipewort in this neighbourhood. Other plants found at Monmor included *Isoetes echinospora* (previously known in Ireland only from Kerry, and from one station each in Galway and Mayo), *Scutellaria minor*, *Vaccinium Oxycoccus*, *Rhynchospora fusca*. *Drosera intermedia* was unusually abundant, *Carex limosa* and *C. filiformis* frequent. *Silene*

[1] Botanical Ramble in Ireland *Phytologist*, ii., pp. 512–14, 1856.

maritima grew on the railway here, five miles from the sea. The form of *Juncus effusus* with spreading stems occurs all over the district.

There are low sand-dunes just north of Doonbeg, and extensive ones a couple of miles to the north-east. *Viola lutea* and *Asperula cynanchica* are abundant on both, and *Eryngium maritimum* and *Convolvulus Soldanella* occur more sparingly on the latter. All these are local or rare in Clare.

The cliffs, on account of the horizontal stratification of the rocks and their rapid denudation, are vertical or even overhanging, almost devoid of vegetation, and in appearance very black, bare and forbidding.

An inlet of the Shannon approaches from the east to within two miles of the Atlantic at Kilkee. The peninsula thus cut off runs down south-westward for sixteen miles to Loop Head, presenting to the ocean an almost unbroken wall of cliffs, with softer lines on the river side. This is an extremely wind-swept region, formed of bleak undulations of Coal-measure shales. The ground is occupied by rushy pasture or by poor meadow land, brilliant with Ragweed and Purple Loosestrife. The vegetation above the cliffs is closely shorn. *Aster Tripolium* and *Glaux maritima* grow by the roadside a quarter of a mile inland, at 300 feet elevation. *Asplenium marinum* was seen on rocks in a little glen the same distance from the sea. Loop Head is surrounded by cliffs 150–200 feet high. The ground above the western cliffs, up to the light-house (233 feet), over many acres is covered with a close smooth sward of *Armeria maritima*—pure except for a little *Glaux maritima*, *Plantago maritima*, *P. Coronopus*, and *Festuca ovina*. Elsewhere good Plantago sward is developed in places, and higher up shorn Calluna heath comes in. On spray-swept stony slopes *Suæda maritima* grows 100 feet above the sea, with the three Spergularias, *Statice occidentalis* and *Cochlearia danica*.

Of miscellaneous plants noted in this district I may mention—*Althæa officinalis* (near houses) and *Myosotis repens* (frequent); *Sagina subulata* south of Kilkee; *Brassica nigra* and *Juncus diffusus* at Cross and Carrigaholt; and *Dipsacus sylvestris* on the beach at Rinevella Bay. The majority of these are on record previously from the northern part of Clare only—mostly from the Burren area.

CRYPTOTHRIPS DENTIPES,

A Genus and Species of Thysanoptera new to the British Isles.

BY RICHARD S. BAGNALL, F.E.S.

Family **PHLŒOTHRIPIDÆ,** Uzel.
Genus **CRYPTOTHRIPS,** Uzel.
Cryptothrips dentipes Reuter.

1880. *Phlœothrips dentipes*, Reuter, *Bidrag till Kannedom af Finlands och Folk*, xl., p. 12.

1895. *Cryptothrips dentipes* Uzel, *Monographie der Ordnung Thysanoptera* pl. iv., figs. 31 & 33, pl vii., fig. 127, p. 234.

1899. *Cryptothrips dentipes* Reuter, *Acta Soc. pro Fauna et Flora Fennica*, xvii., No. 2, p. 23.

On September the 4th and 6th of last year, I was very pleased to find *Cryptothrips dentipes* (Reut.) at Portmarnock, where it occurred, in all stages, on a spiky rush (*Juncus maritimus*) which grows profusely at the edges of the salt-marsh. My attention was first attracted by a red tubuliferous larva which, living as it did on the Juncus, I considered could not be that of *Anthothrips statices* (Hal.), but it was only after an hour's hard work, during which my hands and arms were torn most fearfully, that I found the perfect insect. It is the largest species of the genus, and also one of the largest European forms, my specimens measuring from 2·4 to 3·0 millimetres. When further attention is given to the study of this interesting order of insects, other species of *Cryptothrips* will, without doubt, be added to our fauna. The known species occur in various flowers, on grasses, under bark of certain trees, and in moss and turf.

Ireland.—Both sexes of the apterous forms, as well as the different larval and pupal stages, on *Juncus maritimus*, Portmarnock saltmarsh, near Dublin, September, 1908 *C. dentipes* also occurs in moss and turf, and is recorded by Reuter from Tanacetum, Ervum, Elymus, Calamagrostis, etc.

Previous Distribution.—Finland (*Reuter*) and Bohemia (*Uzel*).

Winlaton-on-Tyne.

ON SOME TERRESTRIAL ISOPODS FROM THE GLASNEVIN BOTANIC GARDENS, DUBLIN.

BY RICHARD S. BAGNALL, F.E.S.

On the occasion of the visit of the British Association to Dublin last year, I had the opportunity of doing a little collecting in the neighbourhood of that city, and on Monday, September 6th, spent an hour with Mr. Pack-Beresford in the Glasnevin Botanic Gardens searching for woodlice. Owing to the kindness of the keeper, Mr. Moore, in giving us every possible help, we were able to find a number of good species, though the time at our disposal was short. It is quite evident that further and more systematic search will bring to light other interesting woodlice, but as four of the species, *Trichoniscus* sp., *Trichoniscus Stebbingi*, Patience, *Haplophthalmus danicus*, B.-L., and *Armadillidium nasatum*, B.-L.[1], do not appear to have been recorded from Ireland, I think it desirable to record them here.

TRICHONISCIDÆ.

Genus **Trichoniscus**, Brandt.

Trichoniscus sp. nov. (?).

I took possession of a very minute and distinct form, which I had the opportunity of examining closely at the Museum. Unfortunately the specimen was afterwards lost, owing to my own carelessness. It was found with *H. danicus* and *H. Mengii* in the fern-house, and I hope that local naturalists will pay special attention to the Trichoniscidæ of the Glasnevin Gardens, and again find this interesting form, so that it may be described.

It resembles *T. linearis*, Patience, superficially, but has each eye composed of three visual elements instead of one. It is, moreover, exceptionally narrow, being nearly five times the length of its greatest width. The lateral parts of the segments of the mesosome are armed with a few (five) very strong, downwardly curved spines. The extreme length of the body, the linear form, the shape of the terminal expansion of mesosome, which closely approaches that in *T. linearis*, and the prominence and number of the spines found on the lateral edge of each segment of the mesosome at once separate the species from *T. pygmæus*.

The colour is white, semi-pellucid, and with ramifications of minium-red across the segments, similar to the coloration of the male of *T. linearis*. The specimen seemed to me to be sexually mature.

[1 See notes on pp. 54-5 of this number.—Eds.]

Trichoniscus pygmæus, G. O. Sars.

Trichoniscus pygmæus, G. O. Sars, *Crustacea of Norway*, ii., p. 162, pl. lxxii., fig. 2, 1897. Bagnall, *Ann. and Mag. Nat. Hist.*, ser. 7, xviii., p. 474, Dec., 1906: *Ann. de la Soc. Roy. Zool. et Malacol. de Belgique*, xlii., pp. 263–266, 1907.

Not uncommon under stones in the open gardens, but not seen in the hot-houses. One can generally recognise *T. pygmæus* in the field by its small size, coloration, and its rhythmic, almost worm-like movements. Mr. N. H. Foster has lately recorded this species from Ireland (Co. Down) (*Irish Naturalist*, vol. xvii., p. 56.) I have taken it in the open country on the Greater Cumbrae (Clyde), near Ayr, and Gibside and near Winlaton, in the County of Durham. In gardens and hothouses, large and small, it occurs more or less profusely in the Clyde area, Edinburgh, Northumberland, Durham, Yorkshire (by the roadside, Romaldkirk), London, Antwerp, and Brussels.

Trichoniscus Stebbingi, Patience.

Trichoniscus Stebbingi, Patience, *Journ. Linn. Soc. (Zool.)*, xxx., pp. 42-44, pl. 7, 1907; Bagnall, *Ann. de la Soc. Royale Zool. et Malacol. Belg.*, xliii., pp. 127-129, 1908.

One specimen in one of the hotter houses; it will, no doubt, be found again if the roots of potted plants are examined. I saw a second specimen, but it escaped in the crevices of a piece of damp rotten wood. It is easily recognised by the usually dark colour of the body and the colourless antennæ, uropoda and legs. From a structural point of view, it is one of our most distinct forms.

First taken by my friend Mr. Patience in the open, and later in various houses in the Clyde area, where I first had the pleasure of seeing it alive. I have since found it in more or less numbers at Alnwick, Wylam and Newcastle, in the County of Northumberland: Kew Gardens, London, and Brussels.

Trichoniscus pusillus, Brandt.—Not uncommon in the gardens.

Trichoniscus roseus, Koch.—Common in the houses and in the open. The specimens found in hothouses, conservatories, etc., are almost invariably more beautifully and richly coloured than those found outside.

Genus **Haplophthalmus,** Schöbl.

Haplophthalmus Mengii, Zaddoch.

This very distinct little creature was found not uncommonly in one of the cooler fern-houses, as well as under stones on a rubbish heap in the open. I have taken it in Scotland, the North of England, London, Antwerp (Belgium), and in the Westphalian hills at Grüne, near Letmathe (Germany). Mr. Beresford tells me he found it not uncommonly in the open at Howth, under a couple of old logs, quite away from any greenhouses.

Haplopthalmus danicus, Budde-Lund.

Rather common in a fern-house, and more sparingly in the open. Both species of this genus are much slower and more deliberate in their movements than the species of other Trichoniscid genera. I have taken this species in Scotland, the North of England, London and Brussels.

ONISCIDÆ.

Oniscus asellus, Linné.—Common.

Porcellio scaber, Latr.—Common.

Porcellio dilatatus, Brandt.—A few.

Metoponorthus pruinosus, Brandt.—We only saw one or two specimens of this pretty woodlouse, though, as a rule, *M. pruinosus* and *P. dilatatus* are found in profusion in or near hothouses.

ARMADILLIDIIDÆ.

Armadillidium nasatum, Budde-Lund.

Rather common in one of the hotter houses. This species will, no doubt, be found in hothouses throughout Europe. It is usually found amongst the pebbles used in many greenhouses to stand the plants upon, and is also found at the roots of the different plants. It occurs in hothouses in the Clyde area, Northumberland, Durham, Kew Gardens, Antwerp, and Brussels; in fact, in such situations I have found *A. nasatum* wherever I have searched for it.

Winlaton-on-Tyne.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four Pigeons from Mrs. Downs, three Barbary Doves from Mrs. Dent, a Yellow-cheeked Amazon from Mrs. Pater, two Meadow-pipits and two Corn Buntings from Mr. W. F. Williams.

The newly-arrived Yak from Tibet has now been placed in one of the cattle-paddocks, and his characteristic points may be readily compared with those of the Indian Zebu bull and the Anoa from Celebes, which are in adjoining enclosures. The Yak is in good health, and very lively.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 9.—The Club met at Leinster House, Dr. G. H. PETHYBRIDGE (President) exhibited the fungus *Diplodina salicis*, West, growing on the bark of a willow, probably *Salix triandra*, from near Limerick. The fungus is new to Ireland, and appears to have been recorded only twice previously, namely, from Kew (*Grevillea*, xiv., 1885-6, p. 64), and

from Courtrai in Belgium (Sacc. *Syll.* iii., p. 411). In both these instances the willow on which it was growing was *Salix babylonica*.

W. F. Gunn exhibited a myxomycetous fungus found on dead pine twigs at Cruagh woods, Co. Dublin. It belonged to the genus Didymium, but the species was not determined. Though resembling *D. farinaceum* in most characteristics it differed from that species in having smooth spores, and in the capillitium threads being flexuose.

Prof. G. H. Carpenter showed *Oxyuropoda ligioides*, a new genus and species of fossil isopod from the Devonian sandstone of Kiltorcan, Co. Kilkenny. The fossil was discovered by I. Swain, who in collaboration with the exhibitor has recently described and figured it (*Proc. R. I. Acad.*, vol. xxvii., B., No. 3 The crustacean is 66 mm. in length, and shows striking superficial likeness to such a "slater" as Ligia.

F. W. Moore showed a section through the peculiar cavities at the base of the leaf of *Tococa formicaria*. This plant is a native of Brazil, and belongs to the interesting group of plants of various natural orders, in which certain ants take up their abode, living in various specialised parts of the plants, and in return for shelter affording protection to the host plant. In *Tococa formicaria* the ants find their abode in peculiar hollow chambers at the very base of the leaf. These chambers appear to be formed by the infolding of the leaf-blade, the edges adhering to the midrib. The ants gain access by minute apertures between the prominent veins of the leaf.

R. Southern exhibited the small Polychæt worm *Exogone gemmifera*, Pagenstecher, belonging to the family Syllidæ. Numerous examples of this species were dredged in two fathoms, in Malahide Inlet, Co. Dublin. This species is remarkable for the fact that the developing embryos are attached near the parapodia of the female till they have reached a high state of development. Several specimens showing this feature were obtained. This species has not previously been recorded from Ireland.

N. Colgan exhibited a male and a female specimen of a parastic Isopod dredged in 10 fathoms off Skerries on the 23rd July last during one of the dredging trips of the Dublin Marine Biological Committee. The parasites, together with a numerous progeny of upwards of 150 minute yet well developed young, were found lodged in the branchial cavity of a small Galathea, the carapace of the host being swollen into a hemispherical protuberance at the point of lodgment. The parasite is probably *Pleurocrypta microbranchiata*, G. O. Sars, as the male agrees perfectly and the female very closely with the description and figures of that species in "Account of the Crustacea of Norway," vol. ii., 1899. The Galathea which served as host measured 16 mm. in length. It was too much injured to admit of certain identification, but so far as can be made out agrees fairly with *G. intermedia*, Lilljeborg. The female parasite was 4.5 mm. long with a maximum breadth of 3 mm.; the male, 1.5 mm. long with a maximum breadth of .5 mm. Further examination will, it is hoped, lead to a positive identification of this interesting Isopod, which is probably new to Ireland.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 14.—EXCURSION TO KELLY'S GLEN.—A number of members and visitors left Terenure on cars and bicycles at 2.15 for Kelly's Glen for the purpose of collecting Fungi. On arrival they were joined by a section which had started earlier, and who were already at work. The remainder of the afternoon was spent, under the conductorship of J. Bayley Butler, M.A. (*Hon. Sec.*), in studying the flora of the glen. The party returned home at dusk, having obtained a number of interesting species.

NOVEMBER 17.—The President (G. H. Pethybridge), in the chair. A lecture on the Geology of County Dublin was given by I. SWAIN, B.A. The lecturer dealt at length with the significance of the Leinster Chain in the geological history of the county, and then discussed the Ordovician series of Portrane, finishing with an account of the Glacial deposits. A large series of lantern slides were shown, those dealing with Portrane being original. The lecture was discussed by the President, Mr. Willcox and J. de W. Hinch. The following were proposed as members:—Mrs. Harford, Mrs. Tatlow, Mr. Tatlow, Miss Kelly, B.A.; Mr. Stafford Johnson, Mr. Irvine.

DECEMBER 5.—EXCURSION TO THE BOTANIC GARDENS, GLASNEVIN.—Thirty members and visitors assembled at 2.15 at the entrance gate, and under the guidance of C. F. Ball, Assistant Keeper, saw many plants of interest during a stay of two-and-a-half hours. Owing to heavy rain, the greater portion of the tour was confined to the glass-houses.

DECEMBER 8.—The President in the chair. The President announced the resignation of the Vice-Presidency by A. R. Nichols, M.A., M.R.I.A. and of the Secretaryship by J. de W. Hinch. R. M. BARRINGTON, LL.B. gave an account of the following birds obtained during the autumn of 1908 at Rockabill lighthouse:—*Locustella certhiola* (Pallas's Grasshopper Warbler), a bird new to the British Isles; *Emberiza pusilla* (the Little Bunting) and *Acrocephalus streperus* (the Reed Warbler). The specimens were exhibited. The paper was discussed by the President, J. Bayley Butler, M.A., and J. de W. Hinch.

J. Bayley BUTLER then read a paper communicated by ALEXANDER WILLIAMS, R.H.A., "On the occurrence of the White Wagtail (*Motacilla alba*) in County Dublin." This paper will be published in a future number of the *Irish Naturalist*.

The PRESIDENT made his report as delegate to the Corresponding Societies Committee, British Association, 1908, in which he dealt at length with the papers which had been brought before the Committee.

W. F. Gunn asked some questions with reference to the proposed natural history survey of the North Bull, and after some discussion the President announced that he would deal with the subject in an address at the annual meeting. The following were elected members;—Mrs. Harford, Mrs. Tatlow, Mr. Tatlow, Miss Kelly, B.A.; Mr. Stafford Johnson, Mr. Irvine.

LIMERICK FIELD CLUB.

Annual Meeting.—Rev. T. F. Abbott was moved to the chair, and in the course of his observations, said the Society was originally intended to encourage the study of natural history, and allied subjects. Subsequently an Archæological Section was added to it, and now the latter had decided to start a Society on their own account. Lord Dunraven had consented to be its first president. The Archæological Society would run the Journal, and the expense connected therewith would be taken off the Field Club. The subscription to the latter would in consequence be lowered, but it would be open to them to join the Archæological Society and to contribute to the Journal. He hoped the new Society would not take from the membership of the old Limerick Field Club which had done excellent work in this city and neighbourhood in encouraging the study of natural history generally, and he expressed the hope that there would be more workers in the different subjects connected therewith.

Dr. George Fogerty read the annual report.

The report for the 16th year of the Club's existence is one differing but little from those that have preceded it. Again we have to report a great want of workers in the natural history branch of the Club. A wide field for work is open in this direction, and members of other Field Clubs in Ireland are constantly coming to our city and county and finding within our district treasures in natural history passed over by our members.

The botanical survey of the Fergus Islands has been completed this year, and we hope to see a full report of the work in a number of the *Irish Naturalist*. The work begun in August, 1907, and sadly hindered by inclement weather, was continued in July, 1908, under more favourable conditions.

The Archæological Section, whose property we may consider the Field Club Journal to be, has been doing good work in a quiet way, and have produced a Journal, the 12th in succession, deserving of all praise. Your Committee have to report that at a meeting held on the 16th October it was decided to help forward the formation of an independent Archæological Society, and with that object the following resolutions were adopted;—

I. It is the opinion of the L. F. C. Committee that the Archæological Section be formed into an independent society, with separate executive and finance, and it be affiliated to the F. C.

II. The members of each to have the privilege of attending the public meetings and excursions held by each society.

III. Each society to elect its own officers, two of the committee of each to be members of both societies.

IV. That the obligation and expense of continuing the Journal be undertaken by the Archæological Section, and that it circulate among its members only (free).

The last annual meeting was held on the 9th November, 1907. Subsequent to the business, Dr. Atkinson delivered a most instructive lecture on "The New Photography," concluding with some beautiful lantern slides on auto-chrome plates.

The report then proceeded to enumerate the indoor and outdoor work of the session—lectures and excursions.

It is the intention of the North Munster Archæological Society to continue the Club's Journal in its present form, and so to form an unbroken series, thereby facilitating the binding and preservation of the numbers. The financial condition of the Club, the report pointed out, was very satisfactory.

The Report was adopted.

In consequence of the formation of the new Archæological Society it became necessary to make some alterations in the Field Club Rules, which were adopted.

The following were elected officers for the ensuing year:—President, Frank Neale; Vice-Presidents, E. H. Bennis and T. F. Abbott.

J. Stewart was nominated as Treasurer, Dr. George Fogerty as Secretary, and the Committee as follows:—P. J. Lynch, B. Barrington, Dr. W. A. Fogerty, Miss Alice Doyle, Mrs. Dodds, H. V. Morony, H. Fogerty.

IRISH FIELD CLUB UNION.

ACCOUNTS, 1908.

RECEIPTS.	£	s.	d.	EXPENSES.	£	s.	d.
To Balance,	11	4	5	P. E. Dallinger, Lecture in Dublin,	1	14	7
Affiliation Fees—				Prof. Cole, Lecture in Omagh,	1	14	7
D.N.F.C., 1907,	1	1	0				
B.N.F.C., 1907-8,	2	2	0				
I.F.C., 1908,	0	19	0	By Balance,	11	17	3
	£15	6	5		£15	6	5

Audited and found correct.

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

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

REVIEWS.

THE LIST OF IRISH BIRDS.

A List of Irish Birds, showing the Species contained in the National Collection. By RICHARD J. USSHER, M.R.I.A., M.B.O.U. General Guide to the Natural History Collections (Museum of Science and Art). Dublin: (Official), 1908. Price 4*d*.

The National Museum is to be warmly congratulated on the publication of the new "List of Irish Birds," drawn up with all the care and minute knowledge that invariably distinguish any work to which Mr. Ussher puts his hand. Though following to a great extent the familiar lines of the old List drawn up by the late A. G. More in 1885, and revised by him in 1889, Mr. Ussher has gone to the utmost pains to ensure that the largest amount of new information which the limits of space would permit shall be accessible to those who make use—as we hope that a very large number will do—of the new publication. Thus the subjects of distribution and migration are much more fully dealt with in the 1908 list than was possible in either of the two previous editions. Mr. Ussher also gives, for the benefit of beginners in ornithology, some practical hints as to the marks by which certain species may be recognised—a distinctly new departure in a list of this character. The order followed is that used in the late Howard Saunders's well-known "Manual of British Birds." As Mr. More, in the two editions of his list, followed the order of the 4th edition (by Newton and Saunders) of Yarrell's "British Birds," the bringing out of Mr. Ussher's list has necessitated a re-arrangement of the collection of Irish birds in the Museum—a change which, happily, the Museum authorities were able to carry out before the week fixed for the meeting of the British Association.

In addition to the newer arrangement and the fuller information, Mr. Ussher's list has, of course, the merit of including a considerable number of new species added to the birds of Ireland between the close of 1889 and the autumn of 1908. Had the publication been delayed a few months later, however, the list would have been enriched by as many as three additional species—two completely new, while the other had been previously bracketed as doubtful—which struck the Rockabill lighthouse during the late foggy autumn, and were shortly afterwards announced by Mr. Barrington:—The Reed-Warbler (*Acrocephalus streperus*), Pallas's Grasshopper-Warbler (*Locustella certhiola*), and Little Bunting (*Emberiza pusilla*).

The number of new species added to the Irish list since Mr. More's publication was issued is set down by Dr. Scharff in the "Preface" as twenty-six. Mr. Ussher, in his "Introduction," which follows the Preface, enumerates twenty-eight, of which, however, five are bracketed as not, in the author's judgment, entitled to a full place. This would reduce the total number to twenty-three, which, however, is raised to twenty-six again by the three lighthouse occurrences enumerated above.

It must, however, be noted that among the twenty-three (not bracketed) species which Mr. Ussher enumerates in his Introduction are two which, in the body of the list, are not accorded by him specific dignity. These are the Greenland Redpoll (*Linota rostrata*) and Holboell's Redpoll (*L. Holboelli*), which appear in the list merely as forms of *Linota linaria*, the Mealy Redpoll. The occasional if not annual occurrence of the Greenland Redpoll on some of our western islands is of so much interest, not merely in itself but for its general suggestiveness, that it is much to be wished that the question of its status as a permanent form with a distinct distribution could be freed from all ambiguity or doubt.

Besides the additions there are the subtrahenda, which, as compared with the list of 1890, are not inconsiderable, amounting altogether to fourteen. Those who are familiar with Mr. Ussher's well-known work, "The Birds of Ireland," will not need to be told what most of these withdrawals are. In general, the author follows the late Mr. Howard Saunders in refusing admission to all American birds not sufficiently aquatic in their habits to render it likely that they could have crossed the Atlantic without aid from vessels. Mr. Ussher has, however, followed a more severe rule in his present list than he did in the "Birds of Ireland" as regards those species whose place in the British list is beyond challenge, but which have hitherto figured in the Irish only on the strength of occurrences not very conclusively attested. The species which in the present list are relegated to brackets after having in the "Birds of Ireland" enjoyed the honour of full admission, are eight in number, and of these one only—the Noddy Tern—belongs to the category of birds withdrawn from the Britannic as well as from the Irish list. The remaining seven are the Marsh Titmouse, Crested Lark, Lesser Spotted Woodpecker, Goshawk, Kite, Little Egret, and Collared Pratincole. In bracketing these seven species, Mr. Ussher does not commit himself to the opinion that they were all erroneously recorded as Irish, but he recognises that the evidence in their favour is less complete than a cautious investigator of data would desire.

The withdrawal of the eight species above named practically counterbalances the additions made to our list since the publication of the "Birds of Ireland" in 1900. The number of species then included was 288. It is now, according to Mr. Ussher's text, 286, or, counting the three recent additions announced by Mr. Barrington, 289. In future it seems probable that all the changes will be in the nature of additions, since no one will accuse Mr. Ussher of having, in the present list, admitted any species on evidence that had not been sufficiently well weighed.

Two slight errors may be noted: there are 28 records of the Rose-coloured Starling in the "Birds of Ireland," not 20 as stated (p. 21); the Antrim specimen of the American Black-billed Cuckoo is not the property of Mr. H. Blake-Knox (p. 25), but is in the possession of Miss Rea of Belfast, the sister of the late Dr. Rea, who shot it.

C. B. M.

NATURALISTS IN ULSTER.

Ulster Nature Notes (Series 1). Edited by ROBERT PATTERSON. F.L.S., M.R.I.A. Pp. 96 + iv. Belfast: W. Mullan and Son, 1908. Price 2*s.* 6*d.*

In this readable little book the editor and his colleagues—including D. C. Campbell, N. H. Foster, H. L. Orr, W. H. Phillips, Rev. W. S. Smith R. Welch, and others known to readers of the *Irish Naturalist*—have reprinted notes and comments extending over five years in the columns of the *Northern Whig*. One correspondent starts a subject, another takes it up, and in glancing through the pages one seems to be overhearing the cheerful talk of a party of Northern naturalists. Discussions on birds occupy most of the space. That depredator of orchards, the Bullfinch is strongly attacked by "W. S. S.," but finds redoubtable defenders in "R. P." and "N. H. F." There are many interesting notes on migration, including several records of exceptionally hibernating Corncrakes. Varied remarks on nesting habits are illustrated by several good photographs. An observation by "W. S. S." suggests that the slimy secretion of Frogs is a very imperfect protection against the attacks of Ducks; the same writer is not sure that Frogs do not eat, or at least damage, strawberries. "R, W." contributes several interesting notes on Mollusca, but why does he apply the name "Arion" to the common Cellar Slug (*Limax flavus*)?

Could not a similar "Nature Notes" column be established in one of our Dublin daily papers? If good for Ulster why not for Leinster also?

G. H. C.

SELBORNIANA.

Saint Gilbert: the Story of Gilbert White and Selborne, with eight illustrations. By J. C. WRIGHT. Pp. 90. London: Elliot Stock. Price 2*s.* 6*d.*

This pleasantly written appreciation of Gilbert White contains little that is original, but need not on that account be condemned as a superfluous publication. It was never more true of anyone than it is of Gilbert White, that to know him, as he deserves to be known, one must have a knowledge of his environment. Mr. Wright's little book, and its eight illustrations, show us as much of Selborne as of the man who has made that "out-of-the-way Hampshire village" consecrated ground for all time to lovers of the study of nature. There is room for a larger and fuller book on similar lines; but in the meantime Mr. Wright's modest contribution is not unwelcome.

C. B. M.

NOTES.

The Biological Subdivisions of Ireland.

I have only now found an opportunity of critically examining the last few numbers of the *Irish Naturalist*. Mr. Adams's scheme of the division of Ireland into biological sub-provinces in last August's number aroused my particular interest, and I wish to associate myself with Mr. Praeger in its praise. I often felt the want of something of the kind. There are many groups of invertebrates whose distribution is so little known that the four provinces are just sufficient to enable us to indicate roughly where these animals are found. Of others we have acquired a little more knowledge. We may thus possibly be able to publish a list giving their range in the more detailed manner suggested by Mr. Adams. There are certain groups, such as the Rotifers, which are so difficult to determine and collect that, unless a specialist visits Ireland, not a single species may be recorded for a long series of years. Yet it is important that we should have some general idea of the existing knowledge of the distribution of these groups, at least as far as the four provinces are concerned.

The subdivisions of the provinces proposed by Mr. Adams, however, do not appear to me all so useful as Mr. Babington's from a zoological point of view. For instance, the fauna of Wexford more nearly approaches that of Wicklow than that of Kilkenny. In the old scheme the first two are linked together. Mr. Adams now proposes to unite Wexford with Kilkenny, and Wicklow with Dublin, Kildare, and other counties.

Nevertheless, the only serious flaw in Mr. Adams's original scheme was that already noticed by him and corrected in a supplementary note in the *Irish Naturalist* (p. 1, *supra*). The marine districts, as first proposed, could not stand. The new ones are far better. I think it would be desirable now to refer the whole scheme to some such body as the Royal Irish Academy Fauna and Flora Committee. Once the active biologists of Ireland have adopted a good scheme, future lists of species should be issued in accordance with it as far as possible.

R. F. Scharff.

National Museum, Dublin.

BOTANY.

Allium oleraceum in Ireland.

In the *Journal of Botany* for January, Mr. J. Adams states that the Antrim records of *Allium vineale* are referable to *A. oleraceum*, and that he proposes to discuss the matter shortly in these pages.

Agrostis nigra not in Ireland.

An Agrostis which is abundant on islands in Lough Carra, which I took to be a form of *A. alba*, I labelled by inadvertence *A. nigra*, a species not yet recorded from Ireland. The specimens went with others to a specialist, who, curiously enough, passed the name as correct, and the plant was referred to as *A. nigra* in my paper on the flora of Lough Carra (*Irish Naturalist*, xv., 210, 1906). Only lately I noticed the discrepancy, and, for safety's sake, submitted the specimens to Mr. Druce, whose verdict is *A. alba* var. *coarctata* (Hoffm.).

R. Lloyd Praeger.

Dublin.

Helleborine longifolia in Co. Derry.

Last August I found this species (formerly known as *Epipactis palustris* Crantz) growing in a damp meadow between Magilligan Station and the sea coast. It has never been discovered previously in Co. Derry, and was thought to be extinct in the North-East. The only previous records for that region were one for Co. Down made by Templeton in 1820, and one for Co. Antrim by Dr. David Moore in the 1st edition of "Cybele Hibernica," 1866.

J. Adams.

Dublin.

Erica Mackaii on Urrisbeg.

In view of the limited range of this Heath, it may be worth recording that, in company with the members of the Central Committee for the Survey and Study of British Vegetation, at the end of August last I found a small colony of it on Urrisbeg, about a quarter of a mile N.E. of the summit, at about 600 feet elevation. Its former stations do not exceed 200 feet in elevation. The locality furnishes some confirmation of Ogilby's Letterdife record of 1845, where the plant has not been found since. This station lies about a mile east of the Urrisbeg one, both being situated about three miles south of the plant's headquarters at Craigga More.

R. Lloyd Praeger.

British Vegetation Committee.

The autumn meeting of the Central Committee for the Survey and Study of British Vegetation was held at Manchester University on December 12-13. Thirteen out of the fourteen members attended. The chair was occupied by A. G. Tansley, M.A.; also present—W. B. Crump; O. V. Darbishire, Ph.D.; F. J. Lewis, F.L.S.; C. E. Moss, M.Sc; Prof. F. W Oliver, D.Sc., F.R.S.; G. H. Pethybridge, Ph.D., B.Sc.; R. Ll. Praeger, B.E.; W. M. Rankin; W. G. Smith, B.Sc., Ph.D.; Prof. F. E. Weiss, D.Sc.; T. W. Woodhead M.A.; Prof R. H. Yapp. Arrangements were

completed relative to the publication by the Board of Agriculture of maps and memoirs sent forward by the Committee, these arrangements including the adoption of a colour scheme and a symbols scheme, and the appointment of a Publication Committee. The following communications were made, most of them being illustrated by maps, lantern slides, or specimens :—Prof. Oliver : Notes from an Idle Holiday ; Prof. Yapp : The relation of Vegetation to Evaporation ; Dr. Pethybridge : Preliminary Observations on the Vegetation of the North Bull ; Dr. Smith : Occurrence of Pine in Peat on Yorkshire moors ; W. M. Rankin : Notes on Some Plant Associations : R. Ll. Praeger : Photographs of West of Ireland Plants.

ZOOLOGY.

Armadillidium pictum—a Correction.

In the *Irish Naturalist*, vol. xvii., p. 135, I announced the finding of *Armadillidium pictum*, Brandt, at Hillsborough and Belvoir Park, Co. Down, and at Glasnevin, Co. Dublin. Since then I have had opportunity of overhauling a considerable number of type specimens of Woodlice in the Museum in Dublin, amongst them being specimens of *A. pictum* and *A. nasatum*, and not being satisfied about the identity of the specimens I had taken here, I asked Dr. Scharff to re-examine them. Dr. Scharff says that he much regrets having wrongly identified *A. nasatum* as *A. pictum*, and he is now fully satisfied that the Irish specimens in the Museum, originally named as *A. pictum*, belong to *A. nasatum*, Budde-Lund. The record of *A. pictum*, must, therefore, be withdrawn, and *A. nasatum* substituted, this being the first discovery of the species in Ireland. Mr. H. L. Orr has since given me specimens of *A. nasatum*, taken by him in a greenhouse in Belfast, Co. Antrim.

NEVIN H. FOSTER.

Hillsborough, Co. Down.

Armadillidium nasatum and A. pictum.

Reference to Dollfuss's paper, "Le Genre *Armadillidium*," in the *Feuille des Jeunes Naturalistes*, 1892, will at once show how different these two species are. In *Armadillidium pictum* the central cephalic lobe is rather prominent, but not narrowed and produced as in *nasatum*, and the side lobes are smaller than in that species. The form of telson is different (*nasatum* having the lateral margin incurved), and also the type of colouration. The relative lengths of the joints of the antennal flagellum is another good character of differentiation, whilst in *nasatum* the endopodite (inner ramus) does not reach to the tip of the exopodite (outer ramus), as in *pictum*. In *pictum* the form of the copulative appendage of the first pair of pleopoda in the male, which are extremely long,

slender towards tip, and abruptly curved outwards in the form of a hook, is a very striking and valuable character. *Armadillidium pictum*, too, is a smaller creature than *nassatum*, and most of Mr. Foster's captures, referred to above, were doubtless not fully grown. *A. pictum* is a common European form, and there is no reason why it should not be found in our hill districts.

RICHARD S. BAGNALL.

Winlaton-on-Tyne.

Dragon Flies in Co. Kerry.

The following eight species of Odonata were observed during the month of July, at Darrynane, Co. Kerry. Although records are very scarce, all are doubtless common Irish forms:—*Sympetrum striolatum*, *Libellula quadrimaculata*, *Orthetrum caerulescens*, *Aeschna juncea* (not caught), *Calopteryx virgo*, *Pyrrhosoma nymphula*, *Ischnura elegans*, *Enallagma cyathigerum*.

S. W. KEMP.

Dublin.

Rhagium bifasciatum in Co. Leitrim.

In May, 1907, my friend Mr. W. A. Hamilton, J.P., sent me a nice example of this Longicorn, which he had captured on the wooded shore of Lough Gill, near Shriff. This is the first record of the beetle for County Leitrim.

W. F. JOHNSON.

Poyntzpass.

A Late Butterfly.

When driving home on the morning of November 3rd, I saw a specimen of the small Tortoiseshell Butterfly (*Vanessa urticæ*) on the wing between my house and Poyntzpass. In 1899 I saw *Pyrameis atalanta* on wing on October 31, and in 1901, *V. urticæ* on wing on November 1. The day was very mild with general sunshine.

W. F. JOHNSON

Poyntzpass.

Late Abundance of Pyrameis atalanta.

During the first eight or ten days of October, I noticed Red Admiral Butterflies very plentiful; one afternoon there were seven perfect ones hovering about in a space of three or four yards.

ERNEST H. BENNIS.

Limerick.

Sligo Mollusca.

In the *Journal of Conchology*, October, 1908, B. R. Lucas gives the results of six hours' collecting in the Sligo district, which he designates "a conchologist's paradise."

Pisidium personatum, Malon, an addition to the Irish fauna.

In the *Proceedings of the Malacological Society of London*, Vol. viii., October, 1908, p. 124, Mr. B. B. Woodward records the above species, which had hitherto been grouped under *Pisidium nitidum* Jenyns. He does not state the characters in which it differs from *P. nitidum*, but states that he had seen examples from Glenshesk (Antrim), Enagh Lough (Derry), MacDara's Island (Galway), Brown's Bay (Sligo), and Portmarnock (Dublin). It seems therefore widely distributed over Ireland.

Pleurophyllidia Loveni—a Correction.

In a short paper read before the Zoological Section of the Belfast Naturalists' Field Club on the 9th December, giving the results of my last summer's dredging in Belfast Lough on behalf of the Ulster Fisheries and Biology Association, I announced the discovery of a specimen of that rare marine slug, *P. Loveni*, in a small bay outside Bangor. I was under the impression at the time that my specimen was the first one taken in Irish waters. My attention, however, has been called to a note in the *Irish Naturalist* for 1893, p. 176, where the animal is recorded as being taken in Bantry Bay; it is also mentioned, I find, in Nichols' "Marine Mollusca of Ireland." I hasten, therefore, to correct my mistake, which was quite inadvertently made, as I have no desire to deprive the first discoverer of his laurels. I may add that I was indebted to Professor Gregg Wilson, M.R.I.A., of Queen's University, Belfast, for the animal's identification; Dr. Wilson also kindly hunted up the literature on the species.

W. H. Gallway.

Bangor. Co. Down.

Late Stay of the Swallow.

A Swallow was seen and, I much regret to say, shot near Clondalkin, County Dublin, on the 9th December. It was an immature bird, but not one of a late brood, judging by the length of the outer tail-feathers.

W. J. Williams.

Dublin.

Turtle Dove near Londonderry.

On 1st December a Turtle Dove (*Turtur communis*) was brought to me. It was shot on 30th November at Derryvane, near Muff, Co. Donegal, about five miles from Derry, by Mr. Robt. Wylie. It had frequented the neighbourhood for some days in company with Wood Pigeons, and was very wild. It was a male, and in fine adult plumage.

Londonderry. D. C. Campbell.

A BOTANICAL TOUR IN THE ISLANDS OF THE FERGUS ESTUARY AND ADJACENT MAINLAND.

BY MISS M. C. KNOWLES AND R. D. O'BRIEN.

THE Shannon tide runs fast at flood between Tarbet and Kilkerin Point, thence it finds a clear channel as far as Foynes, about a mile in average width, between bluff banks of the grits and shales of the Coal-measures. At this point the limestone is uncovered, and at once the scene changes; the hills on the Limerick shore recede towards the south; alluvial lands reclaimed from the river alternate with low limestone crags.

We had, as the *Irish Naturalist* has recorded (1), searched these crags in the vain expectation of finding the plants characteristic of Burren, for the Burren limestone extends into the Limerick Barony of Shanid.

Disappointed there, we noted that the islands in the Fergus are of the same formation, and as their botany seemed never to have been critically examined, we arranged an expedition to explore them for August, 1907, and a detestable wet time it proved.

The Fergus discharges into the Shannon by a great estuary guarded at the mouth by a double rampart of limestone islands. The more southern group, lying in the opening of the stormy river, which is here some five miles wide, may be fancied the outlying fortifications of the citadel. Its principal islands are Inishcorker, Inishtubbrid or O'Grady's Island, Inishmacowney, also called Horse Island, Canon Island and Inishloe.

The true bar of the Fergus, however, is formed by the northern group—Deer Island, Coney Island, Rat Island, Feenish, Deenish and Inishmacnaghtan.

Beyond these lies a huge tract of the finest slobland, the reclamation of which is an enticing engineer's question. Untold Treasury money has been thrown into the river in attacking a corner of the problem in the wrong way.

The strike of the strata in these limestone islands is north-east and south-west, so that their cliff-faces, where there are

(1) *I. N.*, vol. xvi., pp. 185–201.

any, look to the south. As the islands are so difficult to reach, we had hoped to find much wild land upon them; they proved for the most part to be good upland limestone grazings, thoroughly worked and trimmed.

Canon Island, the largest of the southern group, is divided almost into two parts at the middle. The Augustinian Abbey on the northern portion, whose square tower is a well-known land-mark for sailors on the river, was founded by King Donald O'Brien towards the end of the 12th century. The church lies amidst a maze of dry walling and scrub. On the walls of the ruins the Parsley (*Petroselinum sativum*) is abundant, and with it *Sisymbrium Thalianum* and *Saxifraga tridactylites*. At Orlin Point, *Mentha rotundifolia* and *Calamintha officinalis* grow on a grassy bank, and on the shore below, the Mullein, Vervain, *Artemisia maritima*, Teasel, Mallow, *Vicia hirsuta* and *Caucalis nodosa*. *Rubia peregrina* was abundant among the scrub and on the rocks. We also noted *Arabis hirsuta*, *Polygala vulgaris*, *Sagina nodosa*, *Carlina vulgaris*, *Pimpinella magna*, *Gentiana campestris* and *Rosa rubiginosa*. *Viola hirta* and *V. canina*, which grew on the crag-land, are now recorded for the first time from South Clare.

In a pool near the isthmus, we collected *Ruppia rostellata*, *Zannichellia palustris*, and *Zostera marina*. We did not find time to explore the southern half of the island. Neither did we manage to land on Inishmacowney, or Horse Island, as it seems to be called, an omission much regretted, as it shows a long and promising range of cliffs to the southern aspect.

Doon Island is a fragment cut from the shales of the western shore. Inishoul and another unnamed islet adjacent are similar. Flat and grassy, their shores are spread with *Statice rariflora*, while the Sea Aster and Scurvy-grass grow in the rougher margins of the turf, of which the Sea Plantain, the Stag's-horn Plantain, and Thrift are the main constituents.

Inishtubbrid is known as O'Grady's Island. Rising from a gravel shore on the north to a cliff facing south, it reproduced many of the features of Burren and belongs to the same formation, the dark blue Upper Carboniferous limestone. We searched the cliff and rough ground. Spindle-tree, Sloe, White-Thorn, *Viola hirta*, *Asperula odorata*, *Rubia peregrina*,

Circæa lutetiana, Ivy, *Carlina vulgaris*, *Antennaria dioica*, *Verbascum Thapsus*, Marjoram, *Orobanche Hederæ*, *Orchis pyramidalis*, Parietaria, *Kœleria cristata* and Ceterach were the chief plants found. *Brassica alba* and Hop grew near the houses on the low shore.

As the aspect of O'Grady's Island is like that of Inishmacowney, which we were unable to visit, we may perhaps infer that their floras are similar.

The large island of Inishcorker is rolling grass and reclaimed corcass, rich land, and quite uninteresting. *Scirpus maritimus* and *Triticum pungens* were noted on the muddy foreshores.

Inishloe or Low Island is flat, and the most populous of the group. On it is a school, and the master, Mr. Lecky, took an oar in the boat to show us the intricacies of the passages among the outlying islets. *Malva sylvestris* grows in great quantities on the rocky shore, as it does on all the larger islands. Lavatera was noticed near houses; *Papaver somniferum*, *Fumaria officinalis*, and *Stachys arvensis* in a potato field.

Sand Island is the most southern outlier of the Fergus islands, and is exposed to the full sweep of the crossing tides and waves, a long chine of stones, the haunt of seabirds. On its highest point a soil of gravel, broken shells, decaying seaweed, and the wreck and drift of the river has formed a fertile and unvisited seed-bed for many of the characteristic plants of the district. Having found *Glyceria festucæformis* on Trummera Big, on the Limerick side of the river, we were on the look-out for it here. It is one of the most abundant plants on this island. Other species noted on the beach were *Cochlearia anglica*, *Spergularia rupestris*, Aster, and *Statice rariflora*. The broken sward consisted of Glaux, Thrift and Plantago, while on the crest of the island grew a tall fringe of *Atriplex deltoidea* (most of the plants near 3 feet high), *Sonchus arvensis*, *Matricaria inodora*, *Rumex crispus*, and *Triticum pungens*.

Tine Island is similar, and ungrazed. We were unable to land, which we much regretted, as we could distinguish the same tall growth of Atriplex, and, we fancied, *Glyceria festucæformis* on its shore.

Blackthorn and Berger Islands are grazed by sheep and cattle. The shore is thickly grown with *Artemisia maritima*, with occasional clumps of *Glyceria festucæformis* spared by the animals.

Killadysert pier is only serviceable for small boats. In the fields beside the steep road dropping to it, and along the shore, grow Althæa, *Scandix Pecten-Veneris*, *Lycium barbarum*, *Festuca Myuros*, and *Hordeum secalinum*. The ebb tide carried us past rushy shores, on which we noted *Œnanthe crocata* and *Œ. Lachenalii*, to the lower quay, where the steamer calls at the top of the tide that rushes to and fro between Inishmurry and the land. Inishmurry is a flat shale island, thoroughly grazed, on which we noted nothing of interest.

Two days were given to the mainland. The country west from Killadysert is hilly, chiefly wet rushy pasture, with a poor flora ; nevertheless it yielded several plants new to the county—*Lepidium Smithii*, *Linum angustifolium*, *Agrimonia odorata*, *Lycium barbarum* and *Hordeum secalinum*, besides many others that had only one previous record, as listed below.

Close to Killadysert is Ballyleaan Lake. A cliff of flags forms its southern margin, and supports the deep wind-ruffled water and its surrounding marsh. *Potamogeton obtusifolius*, *P. pusillus*, *P. lucens*, *Lemna trisulca*, and *Sparganium simplex* were collected here.

At Gortgloss Lake, where the heather grows, we found *Utricularia minor*, *Typha latifolia*, *Glyceria plicata*, and *Bidens cernua*, of which Mr. Stewart's note from Lough Senan is the only record hitherto for Co. Clare. The spikes of *Lobelia Dortmanna* broke the surface, and on the gravelly shore *Achillæa Ptarmica*, *Alisma ranunculoides*, and a prostrate form of *Ranunculus Flammula* were in flower. *Betula verrucosa* and *Ophioglossum vulgatum* were gathered near.

Approaching Clonderlaw Bay the land is better. The thick hedges of Hawthorn are laced with Plum, Crab, *Prunus Cerasus*, and Holly.

Kilkerin, on which are some interesting ecclesiastical ruins, is a dry grassy promontory sheltering Labasheeda from the up-river winds. The road returns along the river-bank by gravel shore and low shale cliffs to Cahiracon. A large patch

of *Vinca major* grew by the roadside, between Clonderlaw House and Labasheeda. At Labasheeda Lavatera grows near cottages.

The flora of the gravel shore is very similar to that on the Limerick side of the river. *Ranunculus sceleratus, Cochlearia anglica, Apium graveolens, Œnanthe crocata, Œ. Lachenalii, Artemisia maritima, Sonchus arvensis,* Aster, Glaux, *Statice rariflora,* Beet, *Juncus maritimus, J. Gerardi, Carex extensa, C. vulpina,* and *Glyceria maritima* were all noted. *Linum angustifolium* grows plentifully on the verges of the cliffs, and with it *Chlora perfoliata,* the Bee Orchis, and others. *Vicia angustifolia,* whose title to a place in the county list has hitherto rested on a record from the Aran Islands, is common everywhere along the shore, both here and also on the islands. *Althæa officinalis* grows in several spots, generally near houses. On a high bank at Aillroe Beg, *Filago germanica* and *Senecio sylvaticus* were growing together, and nearer Killadysert *Clematis Vitalba, Epipactis latifolia, Veronica montana,* and *Peplis Portula,* all hitherto considered rare in South Clare.

In Effernan Bog we got *Hypericum elodes, Drosera anglica, D. intermedia, Myosotis repens, Pinguicula lusitanica,* and *Utricularia minor.*

On walls by the roadside, near Paradise House, *Cystopteris fragilis* and *Polystichum aculeatum* grow luxuriantly. At Craggykerrivan we saw *Sisymbrium Alliaria,* another plant whose only previous Clare record is the Aran islands, *Verbena officinalis* and *Convolvulus arvensis.*

The crag-land between the road and Killone Lake gave us *Arabis hirsuta, Geranium columbinum, G. lucidum, Poterium Sanguisorba, Rubia peregrina, Euphrasia Salisburgensis,* and *Orobanche Hederæ.* We had little more than half an hour by the lake, yet it yielded *Myriophyllum spicatum, Lysimachia vulgaris, Solanum Dulcamara, Rumex Hydrolapathum, Hydrocharis Morsus-ranæ, Lemna trisulca,* and *Potamogeton decipiens,* enough to make us wish for time to explore further.

This completed our work in 1907. The weather had been very unsatisfactory, and as August was too late in the season for the plants we were seeking, we planned a further expedition for the following June, which fortunately we were able to carry out.

From June 22 to June 30, 1908, was a time of glorious sunshine. Newmarket-on-Fergus is rather far from the river, but is a good centre for exploring the prettiest and most interesting district in South Clare, the country drained by the Sixmilebridge river—the "Owenogarney" of the maps, which has its outfall at Bunratty Castle. The uplands are limestone crag, excellent pasturage, or else bush crag quite overgrown with Hazel and other scrub, often as impenetrable as a tropical jungle. The bottoms are chains of lakes, interesting homes of Pondweeds, Reeds, and Sedges.

Unfortunately that capable County Surveyor, antiquary and engineer, Hill, took them in hand about fifty years ago and lowered the levels of all of them by an intricate drainage scheme which cannot at all have repaid its cost. The boggy swamps laid bare have little natural value, and the disturbance of the conditions of wet and dry has spoiled the landscapes, and probably caused the destruction of interesting plants and animals. Another effect, and one that has not been investigated, is that the work has laid bare the sites of crannoges, of which we noticed some indications. There are still old men who remember the remains disclosed by the drainage, and we hope the attention of some active young antiquary on a bicycle may be called to this enquiry while it is yet time.

Rat Island is on the top of a flat reef of rock which lies immediately north-east of the high Coney Island, and guides the flood tide of the Fergus into its main channel. It is a bank of gravel like Sand Island or Trummera Big, on the Limerick shore, and nourishes a similar vegetation; *Glyceria festucæformis* was the first plant to greet us. *Aster Tripolium*, *Artemisia maritima* and *Statice rariflora* grew with it. The centre was all high tussocks of *Festuca arundinacea* (some specimens 5 feet high) and *Rumex crispus*, among which grew *Anthriscus sylvestris* and *Sonchus arvensis*.

Landing on the steep beach, where the current scours the eastern side of the hill, which is Coney Island, we noticed instantly the imposing *Atropa Belladonna*. This interesting plant has naturalised itself all round the island in the interval between the beaches and the pasture land. It is surprising that it has not established itself in the neighbouring Deer Island, where the conditions are quite similar. Coney Island

is closely grazed and much cut up with walls, but the low cliffs along the shore carry what appears to be some original copse, in which we particularly noticed the large size attained by the Spindle-tree. Teasel, Vervain, Mullein and *Malva sylvestris*, with the Atropa, formed an interesting group below the ruins of the old churches, of which there are two, one founded by St. Brendan, 550 A.D. Amongst other plants which we noted on this island are *Papaver somniferum* and *Carex divulsa*, new Clare records; *Arabis hirsuta*, *Polygala vulgaris*, *Arenaria serpyllifolia*, *Hypericum Androsæmum*, a few small plants of *H. humifusum*, *Vicia angustifolia*, *V. hirsuta*, *Rosa rubiginosa*, *Caucalis nodosa*, *Rubia peregrina*, *Valerianella olitoria*, *Antennaria dioica*, *Carlina vulgaris*, *Leontodon hirtus*, *Primula acaulis*, *Chlora perfoliata*, *Arum maculatum*, *Ophrys apifera*, *Habenaria conopsea*, *Bromus sterilis*, and *Polypodium vulgare*, var. *serratum*.

We had landed on Deer Island in August, 1907, but it was a terribly wet day, and the state of the tide only left us a short time for exploration. Sloping from the hilltop to the southern shore is a rich crag pasture very like the best grazings in Burren, but we found little on it—*Arabis hirsuta*, *Sedum acre*, *Carlina vulgaris*, and *Parietaria officinalis* were the only species noted. In the swamps, *Carex extensa*, *C. distans* and *Hordeum secalinum* grew abundantly.

By the shore we collected *Œnanthe Lachenalii*, *Ruppia rostellata*, and *Atropis Foucaudi*.

A long row brought us to Coonagh Islands, which are ungrazed, but not in the tide-way. The higher centre carried a crop of *Arrhenatherum avenaceum*, *Lotus corniculatus*, Silverweed, Cow-parsnep, *Anthriscus sylvestris*, *Rumex crispus*, and *Triticum pungens*. On the shore, *Cochlearia anglica*, Aster, *Statice rariflora*, Glaux, *Artemisia maritima*, Plantain, Glyceria sp?, and *Festuca rubra*.

The neighbouring Brechinish is reached by cattle at low water, and produced nothing distinctive.

Landing on Ing Point, a long hot walk over the sloblands yielded only *Atropis Foucaudi*, which occurs everywhere on these salt marshes and most abundantly on the salt meadows outside the embankment at Inishmacnaghtan.

Inishmacnaghtan is islanded merely by narrow creeks. Its western end is a hill, but the bulk of it is corcass. Not to

have photographed the *Atropis Foucaudi*, which was in fine flower here, was a serious omission. Our photographer (Dr. Fogerty), and R. A. Phillips, who had joined us for a couple of days, marooned us on Feenish and went on to Coney Island to photograph the Atropa.

Feenish is rocky, with a ruined castle upon it, which perhaps accounts for the *Carduus Marianus* and the *Malva sylvestris*. It also has other plants of interest, as our list shows, the Dogwood being the most important. We did not notice this shrub on any of the other islands.

When the tides did not suit for the islands we spent the days exploring the mainland. At Rineanna Point, the flat but rocky promontory which defines the eastern side of the Fergus estuary, we collected *Arabis hirsuta*, Spindle-tree, *Geranium columbinum*, *Rosa involuta* var. *Doniana* (a new Clare record), and *Euphrasia Salisburgensis*. On the shore, *Carex extensa* and *Lepturus filiformis*, neither previously noted from the Clare side of the Shannon estuary. Near some cottages we found *Marrubium vulgare*, and on a bank by the roadside *Sedum album* was thoroughly established. In a pond at Ballycally we got *Callitriche platycarpa* and *Chara hispida*. *Œnanthe Phellandrium*, growing in the water, with a group of rocks for a background, made us regret the camera left behind.

Cragbrue, near Lough Cullane, gave us *Euphrasia Salisburgensis*. At Magh Adhar we gathered *Ranunculus Auricomus* in the crevices of the rocks, and on the hoary cahir at Cahircalla, *Saxifraga hypnoides*. At Ballycar station, *Diplotaxis muralis*, *Linum angustifolium*, and *Linaria viscida* were growing on the line.

Ballycar Lake is an uninteresting sheet of water, but near it we got *Galium uliginosum*, a new Clare plant, and *Rhamnus catharticus* grows in a lane hard by.

After a vain attempt to penetrate the marsh left by the drainage on the shores of Lough Fin, we climbed the craggy hill above it, finding *Galium sylvestre*, *Euphrasia Salisburgensis*, *Epipactis atro-rubens*, *E. latifolia*, *Ophrys apifera*, and *Sesleria cærulea*. Lunch hour found us on the banks of the charming Ardsollus River. The nooks secluded between the willows and the bubbling stream shone with flag flowers rising from

the June greenness of the untouched grasses. The only plants we gathered here were *Prunus Cerasus*, *Œnanthe fistulosa*, and *Carex muricata*, all three rare in the county.

Dromoland we reserved for another day. Entering at Longough gate we reached the huge old fort, whose outlines, through ruin, restoration and timber can no longer be traced. The ground vegetation is eaten away by rabbits. Except *Epipactis latifolia*, little of interest was found until we reached the lower level of the lake, which is one of the very few that have escaped the drainage Here on the further side of the marsh grow *Carex paradoxa*, *C. filiformis*, *C. riparia*, *C. Pseudocyperus*, *C. teretiuscula*, and *C. stricta*, surely a notable group of sedges. The only previous Irish records for *Carex paradoxa* are from Co. Westmeath. We noticed also *Aquilegia vulgaris*, *Lysimachia Nummularia*, *Solanum Dulcamara*, *Lastrea Thelypteris*, and several others found here by Mr. W. F. de V. Kane.

On the shores of Lough Gash, close to Newmarket, we got *Thalictrum flavum*, *Ranunculus Flammula* var. *radicans*, *Nasturtium amphibium*, *Rubus cæsius* and *Bidens tripartita*, and in the stream *Ranunculus trichophyllus* and *Elodea canadensis*. *Matricaria Chamomilla*, *Inula Heienium*, *Sisymbrium Thalianum*, and *Convolvulus arvensis* grew by the roadsides, and the cultivated fields were yellow with *Brassica alba*, which seems to take the place of Charlock in this locality.

One other day's driving from Limerick completed our investigations. Our aim was the picturesque castle and Lough Craggaunowen, where Mr. H. Fogerty lately found *Anodonta cygnea*. The bush-crag north of the lake fairly baffled our efforts to penetrate it, and we retired much scratched and torn, with little to console us. *Rubus saxatilis* and *Melampyrum pratense*, gathered on the crags north of L. Cullaunyheeda, which we stopped to look at on our way home, were all our booty for the day.

To sum up the results of these two expeditions:—though our list contains 17 plants new to the County (one of which, *Carex paradoxa*, is an interesting addition to the flora of the South), four that had only a previous mention from the Aran Islands, and over 50 rare in or new to South Clare, yet we were disappointed in the main object of our search, viz., the

finding of the characteristic Burren plants on the Fergus Islands. We found no member of this group on these islands or south of Newmarket on the mainland that is not also found on the Limerick crags.

In the following list of the more interesting plants observed, species which had not been recorded from the county previous to our visit are distinguished by the letter C prefixed :—

Clematis Vitalba.—On a high bank near Aillroe Beg.

Thalictrum flavum.—Shores of Lough Gash, Newmarket-on-Fergus.

Ranunculus trichophyllus.—Stream, Newmarket-on-Fergus.

R. Flammula, var. **radicans.**—Shores of Lough Gash, Newmarket-on-Fergus.

R. Auricomus.—In crevices of limestone rocks at Magh Adhar.

C **Papaver somniferum.**—Low Island ; Coney Island.

Fumaria officinalis.—Inishloe.

Cochlearia anglica.—Shore, Killadysert ; Inishtubbrid ; Sand Island ; Rat Island, &c.

Sisymbrium Alliaria.—Craggykerrivan.

Diplotaxis muralis.—Railway at Ballycar.

C **Lepidium Smithii.**—Roadside near Kilfiddane church.

Viola hirta.—Canon Island ; Inishtubbrid.

V. canina.—Canon Island.

Polygala vulgaris.—Canon Island ; Coney Island ; Feenish.

Althæa officinalis.—Killadysert ; Shannon shore west of Killadysert ; generally near houses.

Lavatera arborea.—Labasheeda ; Low Island.

C **Linum angustifolium.**—Frequent along the shore between Labasheeda and Killadysert ; railway at Ballycar.

Geranium columbinum.—Limestone rocks, Rineanna Point and near Killone Lake

Vicia angustifolia.—Canon Island ; Coney Island ; frequent by the Shannon west of Killadysert.

Prunus Cerasus.—Bank of the river, Ardsollus Bridge.

Potentilla procumbens.—Roadside west of Killadysert.

C **Agrimonia odorata.**—Old roads west of Killadysert.

C **Rosa involuta,** var. **Doniana.**—Crevices of limestone crags at Rineanna Point.

R. rubiginosa.—Several places on the crag by the shore on Coney Island and Canon Island.

Saxifraga hypnoides.—On rough ground, Cahircalla.

Sedum album.—Thoroughly established by the roadside near Rineanna Point.

Myriophyllum spicatum.—Small lake N. of Dromoland ; Killone Lake.

Callitriche platycarpa.—Ballycally lake-shore.
Peplis Portula.—Frequent in moist hilly places west of Killadysert.
Petroselinum sativum.—Well established and plentiful on the ruins of the abbey and church on Canon Island.
Chærophyllum temulum.—Roadside south of Newmarket-on-Fergus.
Œnanthe fistulosa.—By the river above Ardsollus Bridge.
Peucedanum sativum.—Near the pier, Killadysert.
Caucalis nodosa.—Canon Island; Coney Island; Feenish.
C **Galium uliginosum.**—Marshy meadow near Ballycar Lake.
Valerianella olitoria.—Coney Island.
Filago germanica.—Roadside, Aillroe Beg; near Killadysert.
Inula Helenium.—Roadside S. of Newmarket-on-Fergus.
Bidens cernua.—Gortgloss Lake.
C **Matricaria Chamomilla.**—Rineanna Point, and common on bare places by the roadside between Newmarket and Ballycally.
C **Crepis biennis.**—Fields near Finlough.
Statice rariflora.—Common on most of the islands in the Fergus estuary and along the Shannon shore.
Primula veris.—Feenish.
C **Lycium barbarum.**—A few plants near the pier, Killadysert, and on the shore west of Killadysert.
C **Atropa Belladonna.**—Thoroughly established on the rocky shore all round Coney Island.
Linaria viscida.—Railway at Ballycar station.
Veronica montana.—Cahiracon; Dromoland.
Verbena officinalis.—Canon Island, Deer Island, Coney Island, and Feenish; frequent on the mainland about Killadysert and Newmarket-on-Fergus.
Mentha rotundifolia.—Canon Island, on a bank near the abbey.
Calamintha officinalis.—With the above.
Marrubium vulgare.—Near Rineanna Point.
Stachys arvensis.—Cultivated field, Inishloe.
Lamium amplexicaule.—Fields, Newmarket-on-Fergus.
Humulus Lupulus.—Deer Island; Inishtubbrid, near the houses on the low shore.
Betula verrucosa.—Shores of Gortgloss Lake.
Hydrocharis Morsus-ranæ.—Killone Lake.
Epipactis latifolia.—Cahiracon; crag above Finlough.
E. palustris.—Damp meadow, Caherkine Lake.
Orchis pyramidalis.—Common on all the larger islands, and on the mainland about Newmarket-on-Fergus.
Ophrys apifera.—Coney Island; Finlough; shore west of Killadysert.
Allium vineale.—Meadows at Parteen.
Potamogeton obtusifolius.—Ballyleaan Lake.
C **P. decipiens.**—Killone Lake.
Ruppia rostellata.—Pools, Canon Island; Deer Island.

Zannichellia palustris.—Pools, Canon Island.
Carex extensa.—Abundant in a salt marsh, Deer Island; shore, Rineanna Point.
C **C. divulsa.**—Coney Island; Feenish.
C **C. paradoxa.**—On the marshy southern shore of the lake at Dromoland.
C. teretiuscula.—Finlough.
C. Hudsonii.—Dromoland; Ballycar Lake.
C. filiformis.—Dromoland; Ballycar, &c.
C. muricata.—Banks of the Ardsollus River.
Sesleria cœrulea.—Crags above Finlough.
Kœleria cristata.—Deer Island; Coney Island; Feenish; Inishtubbrid, &c.
Glyceria plicata.—Near Derrygeena Lake; Gortgloss Lake.
C **G. festucæformis.**—Sand Island; Rat Island.
C **Atropis Foucaudi.**—Abundant in flower on Inishmacnaghtan outside the embankment: Ing Point and Deer Island.
Festuca Myuros.—Walls near the pier, Killadysert.
Bromus sterilis.—Coney Island.
C **Triticum pungens.**—Inishloe; Sand Island; Rat Island; Coonagh Islands; Inishcorker; Inishmacnaghtan.
Lepturus filiformis.—Shore, Rineanna Point.
C **Hordeum secalinum.**—Marshy meadows, Deer Island; west of Killadysert, and near the pier, Killadysert.
Cystopteris fragilis.—Walls of the park at Paradise.
Polystichum aculeatum.—Frequent near Killadysert.
Polypodium vulgare, var. **serratum.**—Coney Island.
Ophioglossum vulgatum.—Near Gortgloss Lake.
Chara polyacantha.—Ballycar Lake.

National Museum, Dublin.

NEWS GLEANINGS.

Geological Honours for Dublin Naturalists.

Our heartiest congratulations to Professor G. A. J. Cole, who at the anniversary meeting of the Geological Society, on February 19th, was awarded the Murchison Medal for his valuable researches in Irish geology.

We are also delighted to record that Dr. R. F. Scharff, of our National Museum, was for the second time chosen to deliver the Swiney Lectures on Geology in London. His course, given in November to large audiences, dealt with the history of the American Fauna.

ENTOMOLOGICAL NOTES DURING 1908.

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

My earliest note for 1908 is on February 3rd, when I took a specimen of the early moth *Hibernia rupicapraria*, Schiff., in my house. In a storm at the end of the month a large branch was blown off a fine *Pinus sylvestris* which stands in front of the house; under the bark I took *Dromius quadrinotatus*, Panz., with some commoner things. I took no insects of any interest till May, when I captured *Hister carbonarius*, Ill., on the road between Acton and Poyntzpass.

I spent the month of June at Coolmore, Co. Donegal, but not with the success from an entomological point of view that I had looked forward to when going there. The early part of the month was cold and damp with a consequent lack of insect life, and when it did become warm and fine my time was drawing to a close. I did not see a single Dyschirius, though on former visits I had met with three species. Carabidæ, in fact, were not very plentiful, and the only capture among them that needs mention is *Amara apricaria*, Payk. The only water-beetle that I met with was a single specimen of *Hydroporus nigrita*, F. I had no opportunity, however, of working at them. Staphylinidæ were fairly numerous. I took several species of Bledii, among them being *B. pallipes*, Grav., *B. longulus*, Er., and *B. erraticus*, Er.; this last was in fair numbers on the golf links. I was fortunate enough to turn up a couple of examples of *Xantholinus cribripennis*, Fauvel. I was very pleased to meet with it again. I also took *Creophilus maxillosus* var. *ciliaris*, Steph., *Philonthus vernalis*, Grav., and *Stenus crassus*, Steph. A dead gull supplied me with a number of *Choleva chrysomeloides*, Panz., a single specimen of *Anisotoma dubia*, Kug., for the determination of which I am indebted to the kindness of Mr. G. C Champion, F.Z.S., *Saprinus nitidulus*, Payk., and *S. æneus*, F.

As soon as the fine weather came in swarms of *Phyllopertha horticola*, L., appeared on the sandhills, attracting numbers of gulls. Other captures of coleoptera comprised *Meligethes viduatus*, Sturm., *Enicmus minutus*, L., *Limnius tuberculatus*, Müll., *Aphodius scybalarius*, F., *A. punctato-sulcatus*, Sturm., *Corymbites tesselatus*, F., *C. quercus*, *V. ochropterus*, Steph.,

Chrysomela Banksi, F., *Longitarsus ater*, F., *Liophlœus nubilus*, F., *Hylobius abietis*, L.

On June 28th my friend Mr. W. A. Hamilton drove me over to St. Ernans, which is about a mile from Donegal and is practically an island. Here we took Lepidoptera—*Lomaspilis marginata* and *Cabera pusaria ;* Coleoptera—*Scaphisoma boleti*, Panz., *Anaspis ruficollis*, F., *A. maculata*, Fourc., *Phyllobius oblongus*, L., *Dorytomus maculatus*, Marsh., and *Balaninus pyrrhoceras*, Marsh ; Hemiptera, *Lygus pratensis*, F., var. *campestris*. F., *L. cervinus*, H. S., *Cixius pilosus*, Ol., *Philenus spumarius* L., *P. præusta*, F., and *P. populi*, F.

I went to Carlingford with the Belfast Field Naturalists' Club on August 8th, but with poor results. A boggy pool on the mountain yielded only *Hydroporus tristis*, Payk., and *H. obscurus*, Sturm., and a few *Coremia didymata* and *Crambus culmellus* were picked up when descending.

On August 13th Mr. F. Balfour Browne, F.Z.S., came here to explore the locality for water-beetles. We tried the canal and the adjoining drain on the Co. Armagh side first; here the most interesting capture was *Laccophilus interruptus*, Panz. Besides this we obtained *Noterus clavicornis*, De G., *Deronectes assimilis*, Payk., *Ilybius ater*, De G., and *Scirtes hemisphæricus*, L. In Lough Shark and some adjoining drains on the Co. Down side we took *Pelophila borealis*, Payk., *Anchomenus gracilis*, Gyll., *Deronectes assimilis*, Payk., *Hydroporus discretus*, Fairm., *Stenus pallitarsis*, Steph., and *Galerucella nymphææ*, L.

Mr. Balfour Browne being anxious to try some of the Armagh localities for water-beetles, we travelled there on October 20th, and, taking the Loughgall road, walked out to the quarries near Grange. Here we were very successful; one of Mr. Browne's first captures being *Dytiscus circumcinctus*, Ahr. ; another very pleasing capture was *Acilius fasciatus*, De G., of which he obtained several examples. In a pond by the railway to Portadown was *Gyrinus minutus*, F., the same place as I first took it twenty years ago. The remarkable thing is that this pond is the only place in that district where it has been found. Walking on into Mullinure a number of *Brychius elevatus*, Panz., were met with in a stream. Other captures were *Haliplus obliquus*, F., *H. confinis*, Steph., *Hyphydrus ovatus*, L., *Hydroporus umbrosus*, Gyll., *H. angustatus*,

Sturm., *H. vittula*, Er., *H. memnonius*, Nic., *Agabus unguicularis*, Thoms., *A. chalconotus*, Panz., *Ilybius ater*, De G., *I. obscurus*, Marsh., *Rhantus exoletus*, Forst., *R. notatus*, Berg., *Gyrinus elongatus*, Aubé., *Hydrobius piceus*, Thoms., *Philhydrus testaceus*, F., *Limnebius nitidus*, Marsh, *Octhebius pygmæus*, F., and *Cyclonotum orbiculare*, F. We captured altogether sixty species of water-beetles, a conclusive proof of the richness of the locality. There is one species whose capture I have not yet mentioned, but which was about the most interesting of all we took. This is *Hydroporus dorsalis*, F., a species which I had never met with anywhere about Armagh when I was there, and the first record of which for Ireland is to be found in the Supplement to the List of Irish Beetles by Mr. Halbert and myself, where it is noted as having been taken by the late Mr. Buckle in the Lagan Canal near Moira. Mr. W. H. Patterson, M R.I.A., took it next on November 17th, 1903, in a quarry at Gilnahirk, near Knock, Co. Down, as recorded by me in the *Irish Naturalist*, vol. xiii. (1904), p. 93. He took it again in the following August in the same place. I have seen a specimen captured by Mr. J. N. Halbert, M.R.I.A., at Tonabrocky, Co. Galway, in September, 1905, so that it has now been found in the extreme west and in the north-east of Ireland. There is but one record for Scotland, "Raehills, Rev. W. Little," which is given with reserve by Canon Fowler,[1] and Mr. Balfour Browne tells me that he knows of no recent capture yet in that country. In England it is widely distributed and occurs in the Northumberland district. Dr. Sharp[2] gives its range as "Northern Europe and Siberia (Sweden; Finland to 68° 10′ North, Sahlberg; Britain, France, Germany)." The remarkable thing about this beetle is that thirteen years ago it was most certainly not to be found about Armagh, yet now it is present in profusion, for we took it in the quarries, in the drains, and in the ponds plentifully. The point to be elucidated now is, from whence is *H. dorsalis* advancing?

I did nothing at Lepidoptera during the autumn, but a very fine specimen of the Death's Head Moth (*Acherontia atropos*) was brought to me in October, which had been found lying

[1] British Coleoptera, vol. i., p. 178.

[2] Dytiscidæ, *Sci. Trans. R.D.S.*, 1882.

dead in Newry, on the footpath near the Corry Monument. It is a very perfect specimen, so that it is impossible to surmise what could have killed it.

Before concluding this note I should like to draw the attention of Irish entomologists to the small amount of knowledge we possess of the insects of the centre of Ireland. There is a stretch of country from Fermanagh to Waterford of which we know practically nothing as far as beetles are concerned. It would be well if our home naturalists would endeavour to reduce this gap in our knowledge of the fauna of our country.

Poyntzpass.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 26.—ANNUAL MEETING was held in the lecture theatre of the Royal Dublin Society, the President (Rt. Hon. JONATHAN HOGG) in the chair. There was a large attendance of members and the general public.

The Hon. Secretary (R. F. SCHARFF, Ph. D.) read the report of the Council for 1908. The admissions to the Gardens during the year were 185,735 and the receipts, £2,259 17*s.* 3*d.*, as compared with 260,666 and £4,074 during 1907. The year 1907, when the International Exhibition was held in Dublin, was, of course, exceptional, but the receipts have not been so low as this since 1901.

Nevertheless, no efforts have been spared by the Council to keep the Zoological Gardens in the high state of efficiency which they had acquired during previous years, and to attract visitors by giving them greater facilities for visiting the collection of animals The receipts from Sunday admissions during 1908 are the most satisfactory part of the income, showing that the Gardens are as popular as ever with the working classes, for whom these exceptionally low fees were specially intended. The Council issued during the year, for the first time, books containing six Sunday tickets for adults and twelve for children at one shilling each.

During the autumn the British Association held its annual meeting in Dublin. The attendance was large, and many members visited the Gardens on this occasion. The Council invited all the zoologists present to a special breakfast, while the Local Reception Committee entertained the Members of the Association and their families at a Garden Party in the Zoological Gardens.

At the last general meeting Dr. Cosgrave was elected to succeed Dr. Dixon as Treasurer. During the past year a general revision of the wages

of the staff was decided on. The staff had passed through a particularly strenuous time, and it was felt that the keepers and labourers deserved to be placed on a better footing. A considerable increase in their wages was therefore sanctioned by the Council.

It has long ago been the intention to revive the old custom of delivering lectures in the Gardens. Yet, on reconsidering the proposal, the Council were of opinion that the gain to the Society might be even greater if the lectures could take place in a more central building and were illustrated by lantern slides. It was finally agreed, with the kind permission of the Council of the Royal Dublin Society, to hold them in Leinster House, and Professor Carpenter delivered the first of the series. To judge from the number alone who attended—there were about 600 present—the first lecture was a great success. It is hoped that Canon Carmichael will give the next lecture.

Band performances were again tried in the Gardens on Saturdays during the month of August. The Dublin Tramways Company not only gave facilities for carrying the band free of charge to and from the Gardens, but also contributed handsomely towards the cost of the performances.

The new Seal enclosure was formally opened in April for the Easter holidays. Two Seals were transferred to it, and later on two Californian Sea-lions, which had, meanwhile, been bought. Finally, after some slight structural alterations had been completed in one of the partitions, the young Otters were also housed there. The Society now possesses therefore, a very attractive collection of aquatic carnivora.

It had been proposed to rebuild the old part of the Lion-house during the past year, the roof of the building having been found to be beyond repair, but it was considered advisable to defer these building operations. The plans were very carefully considered, and various improvements were devised in the cages and the lighting and heating arrangements. The estimated cost of the new building, which will be commenced next April, will be about £3,000.

A division of the Goat enclosure is now kept entirely for the Vultures, which have been pinioned. A suitable shelter has been provided for them on the top of the rockery. A shed for the young Rheas was erected, and the water-pipes in the garden have been overhauled, involving an expenditure of over £30. A new partition was found desirable and has been constructed in the large outdoor Lion-den. Repairs in the aquarium, tanks, bird cages, concreting the outdoor carnivora dens, as well as extensive re-painting, especially of the wire-work, also entailed considerable expense.

The refreshment department has been carried on with continued success during the year, and with an increase in the gross receipts of about £100. Lunches of a more substantial nature than were hitherto provided are now to be obtained, and Members of the Society who have the privilege of using the Members' Room for entertaining their friends have frequently availed themselves of this opportunity in showing the Gardens to visitors.

Inquiries about the Society's Lions have been received from many parts of the world, and actual offers of purchase were made from England, Spain, India, Burma, and Australia.

No less than nine cubs were born and reared during the past year. Unfortunately eight of these were females and only one a male. A feature of particular interest was that the Lion "Niger" and the Lioness "Nigeria" from West Africa deposited by H.M. the King, gave birth to three cubs. It is very unusual for forest-bred Lions to rear their first litter in captivity. Special attention and care was devoted by the keeper, Christopher Flood, to the cubs, and it is mainly due to his excellent management that they survived. They were very deeply spotted. "Conn" and "Vesta," which are in the outdoor den, had a litter of three cubs. This is, therefore, the third occasion on which cubs have been born and reared entirely in an unheated outdoor den. Incidentally it may be mentioned that the Persian Lioness deposited by His Majesty the King many years ago, which was then very light in colour, has now in her old age assumed a much darker hue.

There are quite as many Lions and Lionesses now in the Gardens as last year. Altogether there are twenty, of which fifteen are Irish-born animals. But never in the history of he Gardens have such a large number of cubs (11) been exhibited before.

For many years no Pumas had been born in the Gardens. Since the construction of outdoor dens enabled their transfer to them, three male cubs were born on the 3rd September, two of which subsequently died. A Zebra foal was born on the 20th July, but it also unfortunately died. A young Mongoose Lemur was successfully reared.

By far the most interesting event occurred in the summer, when several of the Rheas (South American Ostriches), which are accustomed to roam freely about the grounds, laid a large number of eggs between the 8th and 24th June. There were altogether twenty-three of them, far too many to be hatched by a single male bird, for among these creatures the cock alone undertakes the duty of sitting on the eggs. Only one of the two cocks in the Gardens was inclined to have anything to do with the hatching business. Eleven eggs were therefore placed under it on the 25th July, and ten of these were successfully hatched after thirty-eight days' sitting. Six of the chicks were weakly and died. The remainder are now strong and healthy. Under these circumstances Professor Scott volunteered his assistance in hatching the remainder of the eggs by incubation.

It was hoped by the Council that some generous donor might possibly offer the Society a gift of an Elephant. So far the generous donor has not come forward. Nevertheless, as an Elephant had to be obtained for the summer months, a young female was hired and was actually trained in the Gardens to carry children, which she did successfully, after some practice with dummies.

A most unfortunate loss was that of the young Zebra foal, shortly after its birth. Several animals, notably a young Ostrich, and a Lioness, died from a disease to which many human beings succumb, viz., tubercu-

losis. Among other deaths may be mentioned a Tasmanian Devil, two Puma cubs, two Bears, several Kangaroos, and a Sea Lion.

The Society's Silver Medal for the best set of pictures was awarded to Mr. William N. Allen; the Bronze Medal for competitors under 18 years of age to Mr. M. E. Nolan, on the recommendation of the Council's Photographic Committee.

The rules for this annual Photographic Competition can be had on application to the Secretary.

The Statement of Accounts shows an expenditure during the year of £3,735, and a balance in hand of over £2,054. There are, however, outstanding liabilities of £3,000, including the projected repairs to the Lion House mentioned above.

Prof. J. A. Scott, M.D., showed an admirable series of lantern slides by himself and Dr. E. MacDowell Cosgrave illustrating the events at the Gardens during the year.

On a ballot, the Hon. Officers were elected, and General Sir Neville Lyttelton, Sir John Ross of Bladensburg, and Mr. G. Stephenson were chosen to vacant places on the Council.

Recent gifts include a Brent Goose, nineteen Bramblings, three Chaffinches, and seven Snow Buntings, from Mr. R. M. Barrington, an Otter from Mr. Mansfield, three Zebu Bulls (two of them Pigmies) from Lord Lilford, five Greenfinches and two Chaffinches from Mr. W. W. Despard, and a Red Grouse from Mr. E. L. Storey. Miss Beryl Nichols has presented a rocking-horse to the Chimpanzees; at present it seems to terrify rather than to amuse the apes. "Barney" and "Jenny" climb to the top of the house and hang on by the ventilator when it is placed in their compartment. "Jane" is less timid, but runs away whenever the horse moves.

DUBLIN MICROSCOPICAL CLUB.

January 13.—The Club met at Leinster House. Dr. G. H. Pethybridge (President) exhibited shoots of the Cherry Laurel in which the leaves were badly disfigured and injured by the loss of portions of their blades, which, in many instances, took the form of what are commonly known as "shot-holes." The fungi commonly supposed to be responsible for injuries of this nature in other plants, viz.:—species of Phyllosticta and Septoria, were not present in this instance, and, indeed, fungus mycelium and spores were rather conspicuous by their absence. In the case of one shot-hole, however, a fungus—probably a species of Hormodendrum—was found, and in three other cases spores and mycelium of the fungus *Napicladium Brunaudii*, Sacc. were obtained. This species is stated in Saccardo's "Sylloge" (vol. iv., p. 482, 1886) to have been found in St. Gaul on still living leaves of *Primus Laurocerasus*; but it has not hitherto been recorded for Ireland. The leaves in some cases also exhibited, when held up to the light, large numbers of minute rather translucent dots, and investigation of these showed that small groups of cells in the leaf were dead and were choked with

bacteria. Whether these represent the beginnings of the shot-holes or not must be decided by further observations The specimens came from near Enniskillen.

C. F. Ball exhibited a parasitical fungus, *Rhytisma salicinum*, growing upon the leaves of *Salix repens*. It was found near Portmarnock, and has previously been recorded for Ireland only from Munster. This Rhytisma forms a thick, shining, black, crust-like stroma on the surface of the leaf. A transverse section showed the fructification, consisting of asci crowded together with paraphyses on a disc similarly to the Sycamore Leaf Blotch (*Rhytisma acerinum*); the leaves of the host with fungus attached fall to the ground in autumn and there remain until spring, when the asci develop spores which continue the life of the fungus.

F. W. Moore showed *Tubercularia Æsculi*, found growing on a species of Æsculus (Pavia). This fungus, said to grow on decaying bark, seemed to extend to the sound bark beneath the diseased portion. It is very prevalent on species of Æsculus and Pavia in the Botanic Gardens, Glasnevin, and spreads rapidly over considerable patches of bark.

Dr. McArdle exhibited *Scapania intermedia*, Husnot, a minute liverwort which partakes of the characters of *S. purpurea*, Hook., and of *S. umbrosa*, Schrad. Though rose-coloured and a pretty object, it never assumes the high colour of the former, from which it differs in the acute antical lobe of the leaf, and from *S. umbrosa* it is separated at once by the rotund postical lobe. In cell structure it much resembles *S. purpurea*. It always grows on dry rocks, while the latter is found in wet places, and frequently on rocks which are often submerged. Its distribution in Ireland is rather restricted; it is recorded from Co. Tipperary, Co. Donegal, and Co. Antrim. In England it has been found at Eskdale in Yorkshire by Mr. Slater, and the Abbé Lamy gathered it in ravines about Mont-Dore in France. The specimens exhibited were collected on cliffs at Windy Gap near Castlebar, Co. Mayo, by Dr. W. Lang of the Glasgow University in September, 1902.

DUBLIN NATURALISTS' FIELD CLUB.

January 16.—Excursion to Lakelands Park (Terenure College).—A number of members and visitors assembled at 2 o'clock at Terenure, they walked at Lakelands, where, under the conductorship of A. H. Toppin, they studied the natural history of the district. The Park contains fine specimens of many trees, which were carefully examined. The Rev. Father Dunne, who has for several years past been stocking the lake with trout, gave a demonstration of the methods in use for hatching the eggs and rearing the young fish until large enough to be set free. The party returned to town at 4.30.

January 19.—Annual General Meeting.—The chair was taken by the President (Dr. G. H. Pethybridge). The Honorary Secretary (J. de W. Hinch) then read the Report for 1908, which showed that,

except for a slight decrease in membership, the year had been most satisfactory. The Report referred to the recent visit of the British Association, and in particular to the success of the photographic survey of the district, which was undertaken by certain members of the Club, and which was exhibited at the Association meeting in September. The Honorary Treasurer's Report was read, and both Reports were adopted. The Chairman then read the names of the officers and committee for 1909, which were as follows:—

President—Geo. H. Pethybridge, Ph.D., B.Sc. Vice-President—Miss M. C. Knowles. Hon. Treasurer—H. K. Gore Cuthbert. Hon. Secretaries—J. Bayley Butler, M.A.; Stafford Johnson. Committee—C. F. Ball, W. B. Bruce, Prof. G. H. Carpenter, B.Sc.; Miss F. Elmes, B.A.; Miss Garner, W. F. Gunn, J. de W. Hinch, Miss M'Intosh, B.A.; C. B. Moffat, B.A.; A. R. Nichols, M.A., M.R.I.A.; R. Ll. Praeger, B.A., B.E.; Rowland Southern, B.Sc.

A special vote of thanks was passed to the outgoing Secretary, J. de W. Hinch, for his valuable services to the Club during his six years of office. Votes of thanks were also passed to the outgoing Officers, the Royal Irish Academy and the Dublin Press. Messrs. Sherrard, MacSweney, O'Hanlon and Pollock were elected Associate Members. Two candidates were proposed for membership. The President then delivered his Inaugural Address, illustrated by lantern slides "On the North Bull and its Proposed Natural History Survey." He proposed to form a Committee to carry out this work, which would be of great scientific importance. R. Lloyd Praeger, J. N. Halbert, D. McArdle and A. Williams spoke in support of this proposal, which was adopted.

FEBRUARY 6.—GEOLOGICAL EXCURSION TO THE DODDER VALLEY AND GLENASMOLE. A few members and visitors took part in this excursion, during which the Conductor, C. MURRAY, B.A., gave a series of demonstrations of the geological processes at work in nature, showing how, by the action of water and atmospheric conditions, the various geological changes were brought about. The members returned by the 5.20 steam tram.

FEBRUARY 9.—The third BUSINESS MEETING was held in the Royal Irish Academy House. In the absence of the President, C. B. MOFFAT, M.A. (Ex-President) took the Chair. H. W. Dunlop raised a question regarding the discontinuance of the tea at the evening Meetings, which was referred to the Committee for further consideration. R. Byrne and W. W. Smith were elected and one candidate was proposed for membership. The Chairman then referred, in feeling terms, to the great loss to botanical science entailed by the death of Miss More. J. ADAMS, M.A., read his paper "On the possibility of distinguishing between native and introduced species of plants in Ireland"; a discussion followed, in which R. Lloyd Praeger, C. B. Moffat, W. F. Gunn and H. W. Dunlop took part.

NOTES.

ZOOLOGY.

Mortality of Birds during Migration.

The following notes were copied by the Principal Keeper of Rockabill Lighthouse for me. out of his private diary, as I told him I was interested in the migration of birds. Its chief interest is the inference from this one lighthouse record what the total mortality during migration must be. In a gale of wind if over 200 birds are found dead on this small rock, how many hundred are blown clear off the rock into the sea? One can also see in the notes the curious double migration of Blackbirds.

R. H. Scovell.

Shankill, Co. Dublin.

Extracts from a Lighthouse Diary.

Nov. 10, 1906.—Our larder was replenished last night to the tune of a brace of Woodcock, a pair of lady Blackbirds, a couple of Fieldfare, a Thrush, and a Starling. Nov. 14.—19 Blackbirds, 4 Thrushes, 2 Redwing, 4 Starling, and a few Larks came to grief last night. Dec. 24.—Early part of the morning a lot of birds about Lantern, 5 Blackbirds and 6 Thrushes, also one carrier Pigeon (No. 102, Louviere, ringed in 1906, very nicely marked) came to grief, they will make a nice pie for Xmas, whilst our comrade enjoys a turkey or goose ashore. Feb. 8, 1907.—We had rain last night, and snow and rain during the small hours of the morning; a few Redwing and Thrushes paid their respects to the light about 3 a.m. March 15.—A number of Starling, Redwing, and Blackbirds about light from 7 to 9 p.m. April 14.—Over a score of birds killed last night. April 25.—A Redstart, Goldfinch, Willow Wren, and Wren caught. May 6.—A lot of birds struck during night, 10 Corncrakes killed and a number alive on Rock during day, 9 Willow-wrens, and several other birds killed also. May 9.—A great number of small birds struck during night, many were caught and let go in the morning, amongst them were a Swift and Whinchat, Wheatears &c.; the following were killed :—8 Corncrakes, 28 Whitethroats, 1 Garden Warbler, 146 Warblers (assorted), 4 Wheatears, 1 Blackstart, 1 Whinchat; about 200 killed altogether. There were a lot of crakes about the Rock during day, also a couple of Redstarts; 1 was caught. . . . Corncrakes make very good soup, and also look well when stuffed. May 9.—Eleven Corncrakes have been stuffed by keepers during past few days. June 12.—A Spotted Flycatcher (?) got . . and a Manx Shearwater on Friday night. August 19.—Hawk attacked Charlie and Dick (the Goldfinches) in their cage, Dick was stretched but came to after the Hawk was driven off. October 5.—Some Blackbirds and Thrushes were killed during night. October 8.—Some Blackbirds, Thrushes and Larks struck lantern this morning. October 9.—Blackbirds, Thrushes and

Larks killed during the night. OCTOBER 10.—A few Blackbirds, Thrushes, Redwing, and Larks, also a Missel Thrush and Ring Ouzel killed during the night. OCTOBER 15.—A large number of birds, chiefly Blackbirds, struck lantern during night, over a score being killed, including a Missel Thrush, a few Thrushes and Redwing, and several Larks. Wind, north, 5 to 6, showery. OCTOBER 18.—A great number of Blackbirds flew against the lantern last night—or rather this morning from 12 to 5, also a few Thrushes, a Missel Thrush, and some Starlings. Only about a dozen birds were killed by striking. OCTOBER 29.—Plucked a number of birds and had a grand dinner; 261 all told killed at lantern last night, including 3 Woodcock, 2 Lapwing, 84 Blackbirds, 58 Fieldfare, 11 Chaffinches and 103 Redwing, and apparently a few rare ones, 1 Black Redstart. NOV. 1.—A number of birds striking, but carried away by the storm, 1 Woodcock found turned inside out. NOV. 2.—About 285 birds killed at lantern last night, 1 Woodcock, 2 Lapwing, the remainder Blackbirds, Redwing, Thrushes and Fieldfare. JANUARY 1, 1908.—A couple of Blackbirds, three Thrushes, a Starling and a Snipe, came to grief last night. MARCH 13.—Kittiwakes arrived this morning. APRIL 24.—Two handsome Duck or Geese flew around the Rock several times and landed on the "Bill," then flew straight for the islands. Probably they are tame—black head and neck with a dark red band around breast and back, back white, tips of wings black, and bill red. Sheldrake probably. MAY 3.—A number of small birds struck during night, but only a few killed—3 Corncrakes on Rock; 2 Redstarts. MAY 4.—A male Redstart caught in the gashouse, but died in the afternoon. A Spotted Flycatcher (?) also found disabled. MAY 5.—A Turtle Dove paid us a visit to-day, occasionally finding his way into the garden. MAY 6.—The Turtle Dove still cruises round the Rock together with a carrier and another Pigeon.

B. R. JEFFERS.

Rockabill Lighthouse, Co. Dublin.

Migration of Birds in Sligo.

To the *Zoologist* for November, Mr. Robert Warren contributes a note on migration of small birds observed during the autumn about Moy View, Ballina.

Records of Irish Birds.

To *British Birds* for December R. M. Barrington contributes a short article, with illustration, on *Locustella certhiola*, and a note on *Emberiza pusilla*, both recently obtained at Rockabill lighthouse.

In *British Birds* for January, H. F. Witherby and W. J. Williams contribute some records of Irish birds.

Birds seen from the "Helga" off the south-west Coast.

Since my previous communications (*Irish Naturalist*, 1907, pp. 163, 184), I have received a series of notes, through the kindness of Mr. G. P. Farran, of the birds observed off the coasts of western Cork and Kerry when from twenty to eighty miles from land. From these I take the following particulars:—

Great Skuas.—August and November, 1907, November, 1908.

Pomatorhine Skuas—August and September, 1907; and in October, 1907, off Carlingford.

Buffon's Skua.—September, 1907.

Great Shearwaters.—In 1907, February and May (none), August (many), September (a few), November (several).

In 1908, January and February (none), August (two), November (many).

Fulmars.—In 1907, May (a few, scarcer than usual and nearer to shore, *e. g.* ½-mile off the Great Skellig) August (many) September (a few), November (many).

In 1908.—January and February (a few), August (many), November (a few).

Taking the whole series of notes, including 1906, we find that:—

Great Skuas have been noticed in February, May, August, and in two Novembers (that is, in November in different years).

Pomatorhine Skuas ,, in May, August, September, October, and November.

Buffon's Skuas ,, in August and September.

Great Shearwaters ,, from August to November in three successive years, but not in January, February, or May.

Fulmars ,, in January, two Februaries, two Mays, three Augusts, one September, and in three Novembers; in short whenever the Helga cruised off the S. W. coast, and sufficiently far from land. The birds were quite tame, and have come within a couple of yards of the ship, picking at scraps which were thrown to them.

These facts go to show that, while the Great Shearwater visits the part of the Atlantic near Munster from August to November, the Fulmar may be met with there at all seasons.

Information as to the months not mentioned above is wanting, as the Helga does not then appear to have been off the coast.

R. J. Ussher.

Cappagh, Waterford.

ON SOME IRISH HAWKWEED AND PONDWEED RECORDS.

BY R. LLOYD PRAEGER.

It may be of interest to report the results of inquiry into the source of one or two Irish records recently published.

Hieracium hibernicum, F. J. Hanb.—"Muckanaght, Maumeen, Galway" (W. R. Linton: An Account of the British Hieracia, 1905, p. 33). This and the following record did not come under my notice till after Mr. Linton's lamented death. In the present case the author has transferred these well-known records of H. C. Hart's from *H. argenteum* to the above allied species. *H. argenteum* was first recorded from Muckanaght, in the Twelve Bens, and Maumeen, on the Maam Turk Mountains, by Hart in the *Journal of Botany*, xxiv., p. 48, 1886, on the authority of James Backhouse, the specimens having been collected by him in his survey of the Mayo and Galway mountains four years earlier. Along with them, and under the same name, he recorded the Moynalt (Co. Donegal) and Broughnamaddy (Co. Down) plants which subsequently formed the type specimens for Hanbury's *H. hibernicum*, described in *Journal of Botany*, xxx., p. 258, 1892. *H. argenteum* has not, so far as I know, been collected in Galway since, but the record has not been questioned. On what grounds, then, have these stations been transferred to *H. hibernicum*? Mr. E. F. Linton, appealed to, can throw no light on the question. He says that in his brother's notes the records so appear without comment; and while he is sure the change must have been based on specimens examined, no specimens are forthcoming. Mr. Hanbury has assisted by going through his set of *H. hibernicum*, without result. Hart's original specimens are in the National Herbarium. They lack the leafy stem of *hibernicum*, and Mr. E. F. Linton, who has kindly examined them, pronounces them rightly named *argenteum*. Hart usually collected very sparingly, and the fact that the two sheets in the National Herbarium bear MS. notes by Backhouse and Babington strengthens the view that the six specimens thereon preserved represent the whole of Hart's collecting.

It is difficult in these circumstances either to accept or to reject the record, but in view of the fact that the original specimens belong to *H. argenteum*, and that no other specimens are known to exist, one feels tempted to suggest—and I put forward the suggestion with all deference—that the insertion of these Galway stations under *H. hibernicum* was a slip of the pen.

Hieracium hypochæroides, Gibs.—"Clare; Sligo" (W. R. Linton, *t. c.*, p. 28). T. H. Corry was the discoverer of this species in Ireland. He gathered it on the cliffs of the Eagle Rock on Slieve Carran, Co.

Clare, in 1879,[1] and I saw it there last year. Without doubt Linton's Clare record refers to Corry's find. The same botanist definitely recorded the plant from the Ben Bulben range ("1,100, 1,200 feet") in his notes made there in 1882, while preparing a report on the botany of these hills for the Royal Irish Academy, which notes were edited after his death by A. G. More and published by the Academy in 1883.[2] Barrington and Vowell, who took up and finished Corry's work on Ben Bulben, state in their report[3] that "there seems to be some doubt about the identification" of Corry's specimens; but Mr. Barrington cannot now say what that doubt was. S. A. Stewart collected on Ben Bulben a plant of which Backhouse reported, "*H. Gibsoni* apparently; agrees with my specimens."[4] And now W. R. Linton has definitely included Co. Sligo in the localities for this species.

Corry's plants are preserved in Queen's College, Belfast. In reply to a query, Prof. Gregg Wilson kindly reports:—"We have *no* specimens of Corry's labelled *H. hypocharoides* or *H. Gibsoni*. We have other *Hieracia* named by him, but none from Sligo." The Cambridge Herbarium, where Corry worked under Babington, and where plants of his might be expected, was also tried; but Dr. C. E. Moss reports:—"There are several of his (Corry's) Irish gatherings in the Herbarium, but there is no Hieracium of his from Co. Sligo." Mr. Hanbury's report as to his herbarium is also in the negative. I cannot find, then, where Linton got his information, though there can be little doubt that some information was forthcoming: in the absence of definite evidence against the plant's occurrence on Ben Bulben, and in view of the confirmatory notes of Corry and of Stewart, I think that it would not be justifiable to doubt the record of so able and accurate a worker as the author of the "Handbook of the British Hieracia," and I think the record ought to stand, pending further information.

Hieracium euprepes, F. J. Hanb.—"Mourne Mountains, Co Down." (Linton, *t.c.*, p. 56). This is a new record for the county. I have not discovered its origin, but have little doubt that the record rests on one or other of many Hawkweeds collected by Mr. Stewart and myself in 1889-90, and sent to England for identification.

Hieracium ciliatum, Almq.—In the course of the fruitless hunt for Ben Bulben specimens of *H. hypocharoides*, the Hawkweeds collected

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[1] Notes of a Botanical Ramble in the County of Clare, Ireland. *Proc.* Belfast Nat. Hist. and Phil. Soc., 1879-80, p. 192.

[2] On the Heights attained by Plants on Ben Bulben. *Proc.* R.I.A. (2), Science, iv., 73-77.

[3] Report on the Flora of Ben Bulben, &c. *Proc.* R.I.A. (2), Science iv. p. 508. 1885.

[4] S. A. Stewart *in litt.* See also Corry's paper, *loc. cit.*

there by Barrington and Vowell were kindly submitted to Rev. E. F. Linton by Miss Knowles. One plant, labelled *H. cæsium* var. *Smithii*, from Ben Bulben, Mr. Linton identifies as *H. ciliatum* var. *repandum* Ley. In Barrington and Vowell's report, *H. cæsium* var. *Smithii* is recorded from Ben Bulben and from Goat Island, Lough Gill. The Lough Gill specimen is not forthcoming, but as the same specialist named both, it would seem that both stations had better be transferred. *H. ciliatum* has not been recorded from Ireland hitherto.

Hieracium Schmidtii, Tausch.—The only specimen of Barrington and Vowell's *H. pallidum* (*H. Schmidtii*), which they collected in three stations, Mr. Linton refers to *H. anglicum*: so it appears doubtful if this plant grows in the Ben Bulben district.

Potamogeton Kirkii, Syme.—*Potamogeton Kirkii* has long been known as growing in the Bealanabrack River, close to the bridge at Maam, and has been frequently collected there. The Bealanabrack River flows into the long north-western arm of Lough Corrib. It sinks to lake-level above Maam, and thence flows with a slow deep course, some 50 feet wide, for a distance of a mile, when it suddenly widens into the lake. Up to Maam the river is navigable, and a small steamer periodically ascends to the plant's habitat to discharge passengers and goods. Two other localities which appear in Fryer's "Potamogetons of the British Isles," p. 18, 1898, invite discussion. The paragraph dealing with the distribution of this supposed hybrid, in the work referred to, reads as follows:—

"LOCALITIES: At present this hybrid-species is only known from Ireland, where it was 'found by Mr. Thomas Kirk, in the Ballinabrack River at Maam, co. Galway' (Syme), 'Loch Neagh by Dr. D. Moore,' Lough Corrib, Galway, T. Kirk, Sept. 7th, 1854."

Correspondence with Mr. Fryer elicited the facts that the Lough Neagh record was based on a specimen in the Edinburgh Herbarium, and the Lough Corrib record on two specimens in Mr. Charles Bailey's Herbarium. Professor Balfour and Mr. Bailey both kindly acceded to my request to send their sets of *P. Kirkii* to Mr. Fryer for re-examination, and at the same time Miss Knowles assisted by forwarding the contents of the *P. Kirkii* cover in the National Herbarium. Professor Balfour was so good as to send the Edinburgh sheets to me in the first place. Mr. Fryer has now critically examined the whole series of plants, and both he and I have paid particular attention to the labels which accompany them.

As to the Maam station there is no doubt, but it comes into the question in this way. Thomas Kirk, the discover of the plant, on all the labels written by him which have been examined (namely, two in Bailey's Herbarium, two at Edinburgh, and three in Dublin), quotes the station as simply "Lough Corrib." Maam is not mentioned, though it was certainly intended in at least some cases, as Kirk is well known to have been the finder of the plant in its classical Maam station. (See *English Botany*, 3rd ed., vol. ix., p. 32, 1869; *Cybele Hibernica*, ed. 1, 1866, &c.) The

dates are 1853, 1854, or 1858. But did Kirk collect it also in Lough Corrib? Or were all his specimens from Maam?

Evidence on the question as to whether there were one or two stations may be sought in the specimens of Dr. David Moore's gathering which are preserved at Edinburgh and Dublin (two in the former collection, three in the latter). On all these sheets the locality is again simply "Lough Corrib," though on two of the Dublin sheets (More Herbarium), "Maam" and "River Bealnabrack, near Maam?" have been added—in the latter case in Miss F. M. More's handwriting. One of the Edinburgh labels bears the legend "growing in deep water, Lough Corrib, Co. Galway," which suggests the lake rather than the river. Only two of Moore's labels (most of which are in his own handwriting) are dated: these are dated Sept., 1853, the same month and year as several of Kirk's gatherings.

But though the labels do not help us much as regards locality, Mr. Fryer adduces important evidence from the specimens:—

"The Edinburgh specimens support the view that I had formed from your Dublin set. That is, that the Lough Corrib specimens *grew in two distinct localities*." "In the genus *Potamogeton* the individuals are so susceptible to local conditions that in the greater part of the species every ditch and pool has its local form." And, later, he writes:—"After a final look I am inclined to think that the 4 sheets in Dr. Moore's set probably grew in a different station from that which furnished the recent gatherings of the plant. All I have seen or possess from Maam have a different look about the floating leaves." Mr. Fryer goes on to suggest that quite possibly a separate patch of the plant, not more than a hundred yards distant, might account for the differences observed; but in view of all the evidence he urges the retention of Lough Corrib as a separate station until further information is forthcoming.

The Lough Neagh record in Mr. Fryer's work rests, as already stated, on a specimen in the Edinburgh Herbarium. The label, in Dr. Moore's handwriting, runs:—"Potamogeton species nearest P. heterophyllus? but different apparently. Growing in rather deep water in Lough Neagh, Co. Antrim.—D.M." Mr. Fryer's re-examination of this specimen confirms his opinion that it is *P. Kirkii*—an opinion shared by Dr. Boswell, as witnessed by the pencil note "sparganiifolius Laest. J.B.S." on the label, and by the following sentence by him in the *Journal of Botany*, 1875, p. 376:—"In looking over the Edinburgh Herbarium I saw a fine specimen of the *P. sparganiifolius* similar to the Maam plant, with a label stating that it was gathered in Loch Neagh by Dr. D. Moore, of Glassnevin," a record which, by the way, is not referred to in Stewart and Corry's "Flora of the North-east of Ireland." Mr. Fryer has submitted this specimen to a searching examination and comparison with the other sheets, and his conclusion is that there is grave suspicion of some transfer of labels having taken place. Comparing it with the Edinburgh specimen labelled in Moore's handwriting "Potamogeton longifolius. Growing in deep water, Lough Corrib, Co. Galway, Sep., 1853. D. Moore," he writes, "I am strongly of opinion that the two

plants were gathered at the same time and place *and dried at the same time*. If a slip of memory or of the pen as to locality occurred, in which case was it?"

That is a difficult question, but one or two points may be submitted. Firstly, the existence of apparently only a single labelled specimen of the supposed Lough Neagh plant, as against several of the Lough Corrib, tells in favour of the latter. Next, Moore's well-known work in the north-east was done twenty years before he collected the plant on Lough Corrib, nor does he seem to have subsequently visited the scene of his former labours. Unless he re-labelled the plants in later years, it is inconceivable that a Lough Neagh specimen could inadvertently have been labelled "Lough Corrib," which he had as yet never visited, and with a date twenty years posterior to the date of writing. Again, the absence of all reference to this important Lough Neagh find in *Cybele Hibernica* or elsewhere in Moore's writings is difficult to explain, if the specimen were really gathered there—although, of course, he might have laid it aside among unnamed specimens. Again, how did an apparently unique Lough Neagh specimen get into the Edinburgh Herbarium? These and other disturbing questions can easily be asked; but the answer lies, probably, not with further puzzling over the sheets, but with careful examination of the localities. Mr. Fryer, in his last letter to me, makes an urgent appeal for a careful search on Lough Corrib and Lough Neagh. Will some of our botanists help? I myself shall do my best to visit both lakes in the near future, but two heads—or three—are better than one.

In the meantime, in view of the perplexing cloud of uncertainty that envelops the whole question, and the chance that both the Lough Neagh and Lough Corrib records are correct, Mr. Fryer is of opinion that for the present we cannot undertake to condemn either of the doubtful stations. The last words of a series of letters, representing a troublesome investigation, for which I feel deeply indebted to him, are, "Finally, I suggest keeping the three stations for the present."

National Library of Ireland.

NEWS GLEANINGS.

Royal Zoological Society's Lectures.

The concluding lecture of the series arranged by the Council of the Royal Zoological Society was delivered on March 24th, at Leinster House, by the Rev. Canon F. F. Carmichael, LL.D. The subject "Animals I have known," was dealt with in a manner delightful to the crowded audience, which included His Excellency the Lord Lieutenant.

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

BY A. W. STELFOX, A.R.I.B.A.

It has now become almost an annual occurrence for some of the most prominent English conchologists to spend their holidays with us in Ireland. Last year Dr. Chaster of Southport, Mr. E. Collier of Manchester, and Mr. C. E. Wright of Kettering were the only members who could join us, while Mr. R. Welch, Mr. J. N. Milne and myself formed the native contingent. Mr. F. Balfour-Browne was also with us for a few days, and his large beetle-net proved a most useful addition to our collecting implements. We adopted much the same programme as that followed by Dr. Chaster and myself on our former visit to Co. Donegal in September, 1905, for the results of which see *I.N.*, vol. xv., p. 62. These notes must be looked on as supplementary to that paper, being mostly new records.

Our itinerary was as follows :—

5th September, 1908.—We left Belfast early in the day, and arrived at Dunfanaghy in time to spend the afternoon at Tramore, Horn Head, the following species being recorded for the first time in this locality—*Helix hispida* and *H. rufescens*. The "colony" of *Helix interscecta* referred to in my report of 1905 no longer inhabits the "circus ring" (which by the way is a spot used by Mr. Stewart for the training of horses), but was found to be living all over the grassy slope as far as the bridge leading to the mainland. Not a single specimen was taken inside or near the ring this year, while in 1905 none were taken more than a few yards from this spot.

6th September.—The morning was spent by the majority of the party in further investigating Tramore, where Messrs. Chaster and Wright found large quantities of wind-drifted shells collected as a rain-wash in a dune hollow by the recent heavy rains. This material was of course composed of shells washed from both old and recent deposits. Close at hand several deposits probably formed in a like manner were exposed near the base of an old sand-hill which was undergoing rapid erosion. The commonest shell found living at Tramore is the *coalita* [12345] form of *Helix nemoralis* with a white lip. This form is to be found fairly commonly throughout West

Donegal, but it nowhere appears to predominate as at Tramore. Mr. Collier and I, not being "pot hunters," left the party at the kitchen middens and worked on to Pollanguil Bay, where on my previous visit I had taken a large and very heavy and thick form of *Helix nemoralis* living on the flat sandy area close to the sea. There is absolutely no cover for anything where these shells are living, and we observed many specimens in the act of appearing from the sand into which they had burrowed to escape some climatic condition which did not suit them. Here also we found *Helix interscecta* in fair abundance, and apparently more at home than in the other locality mentioned above. New records for Horn Head were *Arion intermedius* and *Pupa muscorum*, while a very small form of *Clausilia bidentata* was worth noting.

In the afternoon some collecting was done in the neighbourhood of Dunfanaghy by Messrs. Chaster, Wright and Milne, who noted the following species new to the locality:— From Kill Lough, *Limnæa auricularia* var. *acuta*, and *L. palustris*; from moss shakings collected above Kill Lough, *Hyalinia pura, H. crystallina, Helix aculeata, H. lamellata*; from Sessiagh Lough, a shell identified by all of us as *Hydrobia ulvæ* was taken by Mr. Milne. The operculum was in position, but the specimen was unfortunately lost before we had the opportunity of proving if the animal was alive or not. Sessiagh Lough is a considerable distance from the sea and at an altitude of 96 feet above it, it is therefore strange to find this brackish water species in such a position.

7th September.—Leaving Messrs. Chaster, Collier and Wright at Dunfanaghy, the remainder of the party left early in the morning to proceed to Bunbeg, but after driving for six miles in torrential rain we were held up by the floods descending from the adjoining hills into the valley at Ballymore, which was deeply flooded, both roads being under five to seven feet of water at this point. There was no choice but to retreat, which we did in good order, bringing with us large quantities of the rejectamenta floating along the margin of the flood, containing many species of beetles and other insects, as well as some land shells, among which were a good many *Helix fusca, H. nemoralis, H. ericetorum* and *H. hispida*, all alive, and one dead specimen of *H. hortensis* of the type.

In the afternoon we started again, driving to Falcarragh station and thence by train to Gweedore. Here we found the floods even worse; reinforced by many temporary mountain torrents from the slopes around Errigal and Dooish, the Clady river was in spate, having risen close on eight feet since the previous day, and it was a very wet but happy party that supped that night at M'Bride's home-like little hotel at Middletown.

8th September.—Carrickfin peninsula, including Carnboy Lough, the home of *Planorbis glaber* and the white forms of *Limnæa peregra* and *L. auricularia*, was visited, but throughout our trip we found freshwater collecting most difficult owing to the abnormal height of the water in the lakes. In the flooded area around Dunmore Lough, together with freshwater species, and on the vegetation and stones which projected above the water, *Hyalinia radiatula*, *H. nitida*, *Helix pygmæa*, *Cochlicopa lubrica*, *Pupa anglica*, *Vertigo pygmæa*, *V. antivertigo*, *V. substriata*, *Carychium minimum*, *Balea perversa* and *Succinea elegans*—our small Irish form—were taken alive in abundance. It is evident that all the above-mentioned species can withstand a considerable period of immersion. On the sand-dunes near the southern end of the peninsula a large number of the *citrinozonata* and *roscozonata* form of *Helix nemoralis* were found living. At one spot these two forms easily outnumbered all others taken together. *Amalia gagates*, *Arion intermedius* and *Pupa muscorum* were the only unrecorded species found.

9th September.—Messrs. Welch and Balfour-Browne returned to Belfast, and Mr. Milne and I contented ourselves with working a little patch of old scrub called Clogher-macnaghten Wood, near Gweedore station. Several of the old woodland species were found, viz., *Arion intermedius*, *Hyalinia nitidula* var. *Helmii*, *Vertigo edentula* and *Pupa anglica*.

10th September.—Being rejoined by Messrs. Chaster, Collier and Wright, the entire day was spent on the sandhills lying between Bunbeg and Maghergallon old church, where the small white-lipped form of *Helix nemoralis* occurs in great quantities. Many very small specimens were taken, most of them rather conical, but by far the best find was picked up

two days previously at this spot by Mr. Welch, a full grown specimen, which measures only 14 mm. in width by 12 mm. in height. The prevailing form here was "00345 *libellula*," but many other forms of interest were collected, several with a band formula of 12045 were found, while it may be worth noting that 00300, which is usually looked upon as one of the commonest band formulæ, was not observed in more than a few specimens during the whole tour.

11th September.—On this date we again visited Carrickfin in order to give the *Helix nemoralis* connoisseurs an opportunity of collecting some of the *citrinozonata* form of this species. Mr. Milne and I wandered on as far as Mullaghderg, but found the lough much too flooded for freshwater collecting. We, however, added two species to our Mullaghderg list of 1905, viz., *Amalia gagates* and *Pupa anglica*. The former species was very plentiful and the specimens seen were exceedingly large. We noticed both here and in other localities that this slug was very subject to destruction by the floods, as many drowned examples were to be seen in the rejectamenta of the various lakes visited.

12th September.—This was the only really fine day with which we were favoured during the whole excursion, and was luckily that for which we had saved the tit-bit of our holiday, namely a visit to Inishmeane and Gola, two of the outlying islands, upon which so far as we knew no conchologist had collected previously. As many authorities think that the fauna of such islands is of great importance from a topographical point of view, I give below complete lists of the species taken.

Inishmeane.—*Agriolimax agrestis*, *Arion intermedius*, *Vitrina pellucida*, *Hyalinia cellaria*, *H. alliaria*—type and var. *viridula* ; *Helix pulchella*, *H. ericetorum*, *H. nemoralis*, *H. acuta*, *H. rotundata*, *Cochlicopa lubrica*, *Pupa cylindracea*, *Balea perversa*, *Clausilia bidentata*, *Limnæa peregra*—var. *Boissyi*; *L. palustris*, *L. truncatula*, *Aplexa hypnorum*, *Planorbis nautileus* and *Pisidium pusillum*.

Of the above by far the most interesting shells were the *Limnæa peregra* which were collected in a small peaty pool on the cliffs at the north-east corner of the island. These resemble very much some of the specimens of this Limnæa found

in Carnboy Lough and illustrated in my notes on our 1905 visit, but they are much larger and all of a rich brown colour. In the same pool were also living many contorted specimens of *Planorbis nautileus*, a few of my specimens having a distinct spire. The *Aplexa hypnorum* were taken by Mr. Milne on the elevated boggy area which covers the greater portion of the island. Both Inishmeane and Gola, like the mainland, are composed of granite, and covered with a considerable amount of bog quite useless for sustaining a molluscan fauna.

The following species were taken on Gola Island:—*Agriolimax agrestis, A. lævis, Arion ater, A. hortensis, A. intermedius, Vitrina pellucida, Hyalinia alliaria*—type and var. *viridula, Helix rotundata, H. pulchella, H. ericetorum, H. nemoralis, H. aspersa* (dead only), *H. acuta, Cochlicopa lubrica, Pupa cylindracea, Limnæa peregra, L. truncatula,* and *Pisidium pusillum.*

On the 13th September we drove inland to Dunlewy, and were rewarded with a few interesting finds. *Hyalinia excavata* occurred much more commonly in the wood at Dunlewy House than in 1905, while *Helix fusca* was an addition to our list for this locality. There is a nice little form of *Limnæa peregra* to be found in the lough; but the latter, being so much above its usual level, not many specimens could be procured. Near Dunlewy House Mr. Wright turned up some specimens of *Helix nemoralis* of the same fragile form which is found in some of our moist old wooded districts, and recorded from Glenveagh in 1905. Some of these were almost as difficult to handle when cleaning as *Helix fusca*, owing to the extreme tenuity of the shell.

14th September.—Moving our headquarters to Sweeney's Hotel, Burton Port, we invaded new ground, and on the same afternoon worked Cruit Island, where the following list was made;—*Agriolimax agrestis, A. lævis, Limax marginatus, Arion ater, A. intermedius, Vitrina pellucida, Hyalinia alliaria*—type and var. *viridula, Helix pygmæa, H. pulchella* and var. *costata, H. ericetorum, H. nemoralis, H. aspersa, H. acuta, H. rotundata, H. hispida, Carychium minimum, Cochlicopa rubrica, Pupa muscorum, Vertigo pygmæa, V. antivertigo, Succinea elegans, Limnæa peregra, L. truncatula, Planorbis nautileus, P. glaber, P. spirorbis, Pisidium pusillum,* and *P. milium.*

The habitat of *Succinea elegans* calls for some comment, the animals being found living on the short grassy slopes on the cliffs facing the Atlantic on the western side of the island, and also on the upper surfaces of dried cow-dung, where their colour rendered them very difficult to see. In stormy weather they must be constantly drenched with spray, which, no doubt, accounted for the erosion of nearly all the specimens.

15th September.—This day was spent on the sandhills at Keadew, and several of the small islands were worked, which can be reached at low tide. In Arlands Lough the *Boissyi* form of *Limnæa peregra* turned up again, but they were not such extremely marked shells as those from Inishmeane. In this lake *Limnæa auricularia*, *Planorbis glaber*, *P. nautileus*, *P. spirorbis* and *Aplexa hypnorum* were also living. Mr. Collier and Dr. Chaster took some very nice typical *Succinea elegans* along the margin of a small stream running through the dunes, quite unlike the form of this species which occurs in most places in this district.

As the weather did not improve we brought our holiday to an end on the next day as far as west Donegal was concerned, and returned to Derry, from which centre we worked Magilligan sand-dunes, and finally went to Ballycastle, Co. Antrim, for a couple of days. Our only discovery in these parts was that of *Helix hortensis* at Downhill, Mr. Milne beating a few specimens out of some long grass about a quarter of a mile above Downhill on the way to Castlerock. Only two adult specimens were taken, but young examples were very common, and all were of the bandless yellow form which is undoubtedly the commonest in Ireland. This is the first record of *H. hortensis* for Co. Derry, and although we are all agreed as to the species, I have kept the specimens alive and feeding in order to get the darts examined.

In the above notes I have followed Dr. Scharff's nomenclature as given[1] in this Journal, vol. i. With regard to the Hyaliniæ, it will be observed that I have not adopted the two new species recently described by Mr. A. S. Kennard, F.G.S — *Vitrea hibernica* and *V. Scharffii*—for the reason that these

[1] In the previous list, vol. xv., p. 65, *Helix caperata* was given instead of *Helix intersecta*—the name used by Dr. Scharff.

have not yet been accepted by the majority of English authorities, and also because it has yet to be definitely proved that the radula and genitalia are more unvarying guides than the shell itself. It seems to me that the whole controversy turns on the old old query "what is a species?" In the collecting of the above notes my best thanks are due to the other members of the party.

Belfast.

ON THE DISTRIBUTION OF WOODLICE IN IRELAND AS KNOWN AT THE END OF 1908.

BY D. R. PACK-BERESFORD, B.A., M.R.I.A., AND NEVIN H. FOSTER, M.B.O.U.

During the past year 1908 we devoted some attention to the detailed distribution of Woodlice in Ireland, and in tabulating the results of our investigations according to the 40 County Divisions as scheduled by R. Ll. Praeger.[1] Through the kindness of Dr. Scharff we were enabled to examine the stock of specimens of this group in the Museum in Dublin, and to register the localities in which they had been obtained. Since the publication of Dr. Scharff's "The Irish Woodlice,"[2] only occasional notes, mainly relating to some of the rarer species, have been published; and after collecting all the available data, we found that at the beginning of 1908 no fewer than seven of the County Divisions were barren of a single record, whilst in only fourteen counties were more than four species recorded; although it is probably correct to state that *Trichoniscus pusillus*, *Oniscus asellus*, *Philoscia muscorum*, and *Porcellio scaber* are common all over Ireland. In the past twelve months we have been indebted to many kind friends who, from time to time, sent us specimens from different localities, and these, with the specimens collected by ourselves in various districts, and Mr. Bagnall's collection in September, constitute the material on which our present knowledge of the group's Irish distribution is founded; and it may be observed that only one county, Longford, is now devoid of a record.

[1] *Irish Topographical Botany*, 1901. [2] *Irish Naturalist*, vol. iii.

The number of species of Woodlice recorded from Ireland now amounts to 23; the following 6 species having been added during the year :—

Eluma purpurascens, Budde-Lund, *I.N.*, vol. xvii., p. 255.
Trichoniscus pygmæus, Sars, ,, ,, ,, ,, 56.
Trichoniscus Stebbingi, Patience, ,, ,, xviii., ,, 43.
Haplopthalmus danicus, Budde-Lund, ,, ,, ,, ,, 44.
Philoscia Couchii, Kinahan, ,, ,, xvii., ,, 206.
Armadillidium nasatum, Budde-Lund, ,, ,, xviii., ,, 54.

This last species had been erroneously recorded as *A. pictum*, Brandt, (*cit.*, vol. xvii., p. 135).

Besides these new records we may also mention the capture of some of our rarer species in the following localities, viz. :— *Trichoniscus roseus* at Portumna, North Tipperary (R.Ll.P.); *T. vividus* near Goresbridge, Kilkenny (D.R.P.-B.); *Haplopthalmus danicus* at Fenagh, Carlow (D.R.P.-B.); *H. Mengii* at Glasnevin, Dublin (R.S.B.), and on the Hill of Howth, Co. Dublin (D.R.P.-B.); *Platyarthrus Hoffmannseggii* near Goresbridge, Kilkenny (D.R.P. B.); *Porcellio pictus*, Goresbridge, Kilkenny (D.R.P.-B.), Attymon, Galway (R.W.), Loughgilly, Armagh, Carlingford and Omeath, Louth, and Hillsborough, Down (N.H.F.): *Metoponorthus pruinosus* from Old Forge, Antrim (R.W.), and Hillsborough, Down (N.H.F.); *Cylisticus convexus*, Belfast, Antrim (R.W.); Ballinafeigh, Down (J.N.M.); and Hillsborough, Down (N.H.F.).

One of the most curious facts which our enquiry has so far brought to light is the apparent absence of *Armadillidium vulgare* from the north and west of Ireland. This species, which is so common in the south, had not, till last year, been recorded from any county north of Dublin; whilst it has not yet been found in Kerry, Clare, or Limerick, though it will probably turn up there. N.H.F. found this species very abundant at Carlingford, Louth, but the only record for Ulster is the capture of a single specimen at Portaferry, Down, by J. N. Milne.

We have to thank our several correspondents for their assistance in sending us specimens, and trust that the publication of this paper will encourage them and others to collect and send us more of these animals.

Fenagh, Bagenalstown.
Hillsborough, Co. Down.

REVIEWS.

THE SIMPLEST FORMS OF LIFE.

A Treatise on Zoology. Edited by Sir Ray Lankester, K.C.B., LL.D., F.R.S. Part I. (first fascicle), Introduction and Protozoa, by S. J. Hickson, F.R.S.; J. J. Lister, F.R.S.; J. W. Gamble, D.Sc., F.R.S.; A. Willey, D.Sc., F.R.S.; H. M. Woodcock, D.Sc.; the late W. F. R. Weldon, F.R.S., and E. Ray Lankester, K.C.B., F.R.S. London: A. and C. Black, 1909, pp. xxii. + 296. Price 15*s.* net.

That this volume, together with the one issued six years ago, gives, as Sir Ray Lankester remarks, a more complete account of the Protozoa than is to be found in any similar work hitherto published may readily be conceded. We noted already, with regret, in the *Irish Naturalist* (vol. xii., p. 242), that it should have been found necessary to break the description of the Protozoa into two volumes. Yet in one respect this division of labour has been an advantage. The study of Protozoa is becoming of more and more importance. Chairs of Protozoology are being established at various seats of learning, and the last few years have witnessed very noteworthy discoveries especially among the pathogenic Trypanosomes. A reliable text-book, giving us the results of the most recent discoveries is, therefore, of the utmost value not only to the zoologist but particularly to medical and veterinary students.

The difficult task of editing the accounts furnished by seven different authors has been accomplished most satisfactorily by Sir Ray Lankester. In the valuable introduction to the volume he defines the Protozoa as comprising all the non-filamentous, non-chlorophylligerous microscopic forms which are not referable to the Schizomycetes (Bacteria) or to the simpler Fungi. We are here treading on such debatable ground that this seems almost the clearest definition that can be given. Yet, even among the chlorophyll-forming organisms there are certain forms, the volvocineans for example, which, on account of their close affinity to the Protozoa, are dealt with in this volume, while they also find a place in works of botany. A few, such as the late William Archer's famous Chlamydomyxa, have defied all attempts at classification. All that Mr. Lister can tell us about it and Cienkovski's Labyrinthula is that they are related in one direction to outlying members of the Gromiidea and in others to the Heliozoa and the Proteomyxa. Though Archer's Chlamydomyxa was not described until 1875, it may be mentioned, in honour to the Dublin Microscopical Club, that, a year earlier, it was exhibited to the members of that body on several occasions.

In the splendid work before us Prof. Hickson describes the Proteomyxa, one of which, causing the well-known disease of "Finger and Toe" in turnips, is of economic importance. In conjunction with the late Prof. Weldon, he has also undertaken to deal with the Heliozoa. Another group, the Mycetozoa, classed by botanists among the Fungi, is discussed by Mr. Lister.

Among the best known of the Protozoa undoubtedly are the Lobosa. Formerly of purely systematic interest, it has now been amply demonstrated that their study has led to the recognition of the cause of several obscure forms of disease. *Endamœba histolica*, for example, so like *E. coli* in size and form, yet so different in its life-history, is known to be the active cause of tropical dysentery. Prof. Hickson has made this section one of the most interesting parts of the volume.

The pelagic marine Radiolaria are of less practical interest, except that they form an important element in the constitution of some of our rocks. Yet only now and then is a stray specimen recorded from our coasts. Dr. Gamble, the author of this section, alludes to the discovery, by the Misses Delap, of Thalassicolla on the west coast of Ireland.

Of all the groups classed as Protozoa in this volume the Mastigophora are the most debatable. In the authors' opinion the controversy whether such and such an order of Mastigophora should be reckoned among the unicellular Algæ or among the Protozoa is now practically over, and they hold that biological disquisitions upon the group are equally at home and equally necessary in zoological and botanical treatises. The various sub-classes of this group are discussed by Mr. Willey and Prof. Hickson, except one, the parasitic Lissoflagellata, which has been considered worthy of more detailed treatment.

The unstability of the classification of these organisms is well illustrated by the fact that the arrangement of the Lissoflagellata as adopted by Dr. Woodcock, differs considerably from that proposed by Messrs. Willey and Hickson in the earlier part of the same section. Popularly known as "Trypanosomes," these parasitic Protozoa are of the greatest interest and of extreme economic importance. Inhabiting chiefly the blood of vertebrates, they seem to produce various symptoms resulting in the serious illness or death of the host. Thus "surra," an Indian horse disease, the "tsetse-fly disease" of African cattle and horses, and finally the terrible "sleeping sickness" of man are all proved to be due to various Trypanosomes. To Dr. Woodcock's very able account of these organisms is appended a list of all the known natural hosts of Trypanosomes and allied forms, which will be useful to students.

R. F. S.

A LITTLE MOSS BOOK.

British Mosses. By The Right Hon. Sir Edward Fry, G.C.B. 2nd edition. London: Witherby & Co., 1908. pp. 72. 1*s.* 6*d.* net.

This little work, as the author explains in the preface, grew out of a lecture on British Mosses delivered in 1891 at the British Institution. While covering much the same ground, the 2nd edition now before us has been improved by the omission of the Hepaticæ, which were referred to very briefly in the 1st edition published in 1892.

The author first describes the life-history of a moss with the aid of excellent diagrams and illustrations, and treats of the structure of the Gametophyte and Sporophyte in some detail.

The Sphagnaceæ are described separately, and the last part of the book deals with the formation of peat from Sphagnum and other mosses, the succession of buried forests found in peat, and the possible factors causing their destruction.

The theory given by the author to account for the destruction of some of these forests by the growth of Sphagnum and the subsequent growth of forest over the same area appears to us to be hardly convincing. According to the author the alternation of Sphagnum beds and buried forests met with in some districts is due primarily to the underlying peat being changed into black peat impervious to water, which thus plays the same part as an iron-pan or clay. As far as our own observations go these impervious layers of peat do not exist: some of the deepest bogs showing several alternating layers of forest and bog peat being saturated with water throughout their whole thickness. Further, the author in discussing this question does not take account of the elevation of the upward altitudinal limit of some of the buried forests found in Britain and Scandinavia, and the succession in N. Europe of birch, pine, oak, and spruce, each forest bed having a distinct flora. The table on page 58 giving the forest succession in Denmark, Scotland, and some districts in England, would have been improved if some indication had been given of the character of the peat lying between the forest beds.

The illustrations, with a few exceptions, are excellent, and the book may be recommended as giving a very clear and interesting account of the life-history of mosses and the part they play in modifying the vegetation of a country.

In the hands of a judicious teacher it would probably be extremely useful in schools and in nature-study classes, more particularly as most of the features described can be easily made out by careful dissection and the use of a good hand-lens.

F. J. Lewis.

Liverpool University.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two cuckoos from Miss P. Mercier, a Muscovy Drake from Mr. B. Clarke, five Muscovy Ducks from Lady Constance Butler, Ringed Plovers from Miss Quinn and Dr. Crawford, a Wigeon from the Rev. Dr. Benson, an African Eagle-Owl from Mr. R. Patterson, a Partridge from Mr. W. J. Williams, a Kolbe Vulture from Mr. J. N. Lentaigne, twenty-one Cavies from Mrs. Brock, a Patas Monkey and a Soudanese Jackal from Captain Harding.

The Kolbe Vulture has been placed in the cage long occupied by the great Condor, who after more than forty years in the gardens died last year. The Patas Monkey is a most agile and lively creature, leaping excitedly about his cage at the approach of visitors.

A small gang of workmen has been placed at the Council's disposal by the Dublin Distress Committee for the unemployed. These men are now busily engaged in improving the main walk and other paths of the gardens.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 10.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President) exhibited the fungus *Phyllosticta atro-zonata* Voss., parasitic on leaves of *Helleborus niger* from County Dublin. This species has not previously been recorded from Ireland.

F. W. MOORE showed flowers of *Stelis pubescens*, a minute Orchid from tropical South America. The flowers are very small, but when looked at under a low power they form a very attractive object. Many of the cells are filled with bright reddish-coloured sap, and the cells of the epidermis are all raised and give the appearance of a tesselated pavement.

N. COLGAN exhibited living specimens of four species of Opisthobranch Mollusca recently added to the Dublin Marine fauna, *i.e. Elysia viridis*, *Limapontia nigra*, *Actæonia corrugata*, and *Runcina Hancocki*. All of these had been taken in one fortunate gathering of the common green sea-weed *Cladophora rupestris* made at half-tide near Bullock on the 2nd February last. Both the Limapontia and the Actæonia had deposited their egg masses a few days after capture, and these were exhibited along with the animals. They furnished an interesting example of great dissimilarity of form and size in the eggs of species which are strikingly similar in general aspect.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 11.—The President (Dr. G. H. PETHYBRIDGE) in the chair. R. Ll. PRAEGER showed a series of lantern slides from photographs by R. Welch, illustrating the Lusitanian, American, and other interesting groups in the flora of the West of Ireland. Subsequently a discussion took place regarding the natural history survey of Clare Island, Co. Mayo, which is now being commenced.

Prof. COLE opened the discussion. He stated that the Department of Agriculture had given the Geological Survey a free hand to undertake a revision of the survey of the island, and that particular attention would be paid to the Glacial drifts. He stated that as yet no fossils had been found on the island, and in consequence the age of the rocks could not be known with certainty, though they were presumed to be the same age as similar formations on the mainland.

R. LLOYD PRAEGER followed with further details regarding the character of the island, and the problems which it presented to the naturalist. An attempt would be made to distinguish the truly indigenous plants and animals from those which owed their presence to man's operations, and to discover the route and period of migration of

both groups. To do this it would be desirable to divide the island into several districts, and the adjoining mainland likewise, and to compare the fauna and flora of each. The question of the date of the final separation of the island from the mainland was of course most important, and an exact study of the flora and fauna would probably throw much light on this.

C. B. MOFFAT drew attention to the fact that in the fauna and flora of the island, differences might be expected to develop after insulation in five principal directions:—1. A large number of animals and plants would (from a variety of causes) die out on the island but survive on the mainland. 2. New species might establish themselves on the mainland but fail to reach the island. 3. Competition with these new species might cause some of the old species to disappear on the mainland which would still survive on the island. 4. The re-adjustment of the balance of competition due to all these changes might cause some species which inhabit both mainland and island to be much more numerous on one than on the other. 5. Varieties (or in extreme cases new species) might originate on either the island or the mainland without reaching the other.

J. N. HALBERT referred to the lack of information concerning the insect fauna of the larger islands off the west coast. Achill has been only partially explored, but some interesting insects are known to exist there, notably the excessively local moth *Nyssia zonaria*: and a rare alpine ground-beetle, *Leistus montanus*, was discovered a few years ago on the summit of Slievemore. It was pointed out that the Rose-beetle, *Cetonia aurata*, a species of south-western range in Ireland, occurs in abundance on the limestone tracts of Inishmore in Galway Bay. It was considered likely that the entomology of Clare Island would yield some interesting comparisons with that of the mainland.

J. DE W. HINCH suggested that the island was connected with the mainland at the Glacial epoch, but that subsequently submergence took place similar to that which occurred along the S.W. coast of England.

J. BAYLEY BUTLER stated that in the chart of Clew Bay the channel between Achill and the island was much deeper than that between Roonah Head and the island. He suggested that the land connexion possibly existed for a later period between the two latter than between Achill and the island.

Dr. PETHYBRIDGE drew attention to the importance of investigating the physiological characters of the alpine and southern plants which grow side by side in Clare Island and in the West of Ireland. The conditions must be somewhat different to their native environment.

MARCH 13.—EXCURSION TO ZOOLOGICAL GARDENS.—Fifty members and visitors assembled near the Superintendent's House at 2.30. The party was then conducted through the Gardens, when Dr. Scharff pointed out features of interest. Tea was served at the Haughton House.

NOTES.

BOTANY.

Montia lamprosperma Cham. in County Down.

Recently my attention having been called to the occurrence of this plant in the Færoes, I was led to examine my specimens from the North of Britain. I was glad to find it represented by a specimen from Ross, Aberdeen (Loch-na-Gow, 3,400 feet), etc., and also by a specimen gathered in the hills above Newcastle, County Down. It is an addition to the British flora, at any rate in name.

It may be known from *M. fontana* by its larger chesnut brown seeds, which are glossy and reticulated. In *fontana* the seeds are smaller, dead dull black, and covered with acute tubercles. *M. rivalaris* Gmel. has the tubercles less acute. In the last edition of Koch's German flora it is kept as a distinct species.

G. Claridge Druce.

Oxford.

ZOOLOGY.

Doris flammea from the Clare Coast.

On the 15th February last I received a fresh specimen of this rare and handsome sea-slug from Mr. R. A. Phillips, who had found it the day before on a rock at half-tide near Kilkee, Co. Clare. There appear to be only three previous Irish records for this species, two from South-west Ireland and one from Galway. The Kilkee specimen was one inch long and agreed perfectly in colour and form with the plate in Alder and Hancock's Monograph.

N. Colgan.

Sandycove, Co. Dublin.

Little Gull in Co. Meath.

A specimen of the Little Gull (*Larus minutus*) in adult winter plumage was killed about the 7th March, in a field between the railway line and the sea-shore near Laytown, and forwarded to me in the flesh. This gull is rare in Ireland, no specimen having been recorded since 1876, if we except this one and possibly another lately reported from Cork—but not yet verified. The Laytown locality appears to be in Co. Meath.

R. M. Barrington.

Fassaroe, Bray.

Herrings at Killala Bay.

To the *Zoologist* for January, Mr. R. Warren contributes a note on some recent remarkable takes of herrings trapped inside the training walls at the mouth of the Moy.

Some unrecorded Birds of Prey.

The following specimens, which have passed through the hands of Messrs. Williams and Son, Dublin, do not appear in most cases to have been individually recorded, though I have taken account of them in my "List of Irish Birds," 1908. I have been supplied with these particulars by the kindness of the owners and of Mr. W. J. Williams.

Snowy Owl, *Nyctea scandiaca* (Linn.)—An immature female was obtained in Co. Mayo about the beginning of December, 1906, and is now the property of Mr. R. Burke, The Grove, Fethard, Co. Tipperary. An immature male (?) was shot near the village of Ardagh, Co. Kerry, and was received by Messrs. Williams on 6th March, 1907. The owner, Mr. E. J. Baird, of Newcastle West, states that it measures 25 inches from the centre of head down the back to the tip of the tail, and that the spread of wings is about 45 inches.

Montagu's Harrier, *Circus cinereaceus* (Mont.)—An immature bird was shot at Castle Flemyng, Queen's Co., in September, 1901, and was received by Messrs. Williams on the 12th of that month. It is the property of Mr. R. Hamilton Stubber, of Moyne, Durrow. I have noticed this specimen in *British Birds*, vol. ii., p. 310, where it is called *C. cyaneus* by mistake. This is the only instance in Ireland in which a Montagu's Harrier has been obtained at a distance from Co. Wicklow, in or near which county the other examples were killed, and where the species may have bred, as three immature birds were shot in August and September, 1899. If protected, these Harriers might establish themselves

Rough-legged Buzzard, *Buteo lagopus* (J. F. Gmel.).—A pair of these birds frequented the moors between Sallygap and Brittas, on the Wicklow Mountains, in the latter part of 1906. They were both killed by poison. The male, obtained on the 9th December, is in the collection of Mr. R. M. Barrington (*Irish Nat.*, 1907, p. 162) The female, which has not been recorded, frequented the above moors until she was killed in the same way. This specimen was received on 26th February, 1907, and is in the collection of Mr. C. J. Carroll, Rockford, Fethard. The Rough-legged Buzzard recorded in the *Irish Nat.*, 1903, p. 111, as shot in Co. Tyrone was received by Williams and Son on 5th November, 1902, and not in 1903.

Greenland Falcon, *Falco candicans*, J. F. Gmel.—An immature male, shot at Castlegore, Co. Mayo, was received on 30th March, 1906, and is in the collection of Mr. C. J. Carroll. An immature female was received on 31st December, 1906, from Sir Malby Crofton, of Longford House, Ballysodare, Co. Sligo, having been killed in that locality. An immature male was received on 12th April, 1907, from Mr. Thomas Merritt, of Westport, Co. Mayo.

R. J. Ussher.

Cappagh, Co. Waterford.

19

1-6, SPINTHER ONISCOIDES; 7-10, S. MINIACEUS; 8, 9, 11, 12, S. CITRINUS.

SPINTHER ONISCOIDES, JOHNSTON.

BY W. RIDDELL, M.A.

(PLATE I.)

The genus Spinther was established by Johnston (5) in 1845, for an annelid dredged in Belfast Lough. Unfortunately the type-specimen has disappeared. In 1850 Sars (10) described, under the name of *Oniscosoma arcticum*, an annelid from Komagfjord, parasitic on a sponge. In 1854 Stimpson (11) described a similar form from the Bay of Fundy, calling it *Cryptonota citrina*. In 1860 Grube (3) described a new species of Spinther, *S. miniaceus*, from Trieste. In 1865 Claparéde (1) pointed out the identity of the genera Spinther, Oniscosoma, and Cryptonota; and Malmgren (7), in 1867, included Sars' species under the genus Spinther. M'Intosh (8), in 1865, described from North Uist a form which he at first regarded as *S. oniscoides* Johnst, but afterwards (9) identified as *S. miniaceus* Grube.

In 1882 Hansen (4) described a form which he identified as *S. arcticus* Sars, but which v. Graff (2) has shown to come nearer *S. oniscoides*. Wirén (13), in 1883, also described a species which he called *S. arcticus*, and identified with Hansen's form, but which, as he himself noted, differed in many respects from Sars' form.

In the same year Levinsen (6) gave a diagnosis of the genus, and included two species—*S. arcticus*, which included both Sars' form and Wirén's, and *S. major*, n. sp., for Hansen's *S. arcticus*.

In 1887 von Graff (2) published a paper—"Der Anneliden-Gattung Spinther"—in which he gave a complete history of the genus, described fully the anatomy, and distinguished three species. These species were—(1) *S. oniscoides* Johnston, = *Cryptonota citrina* Stimpson = *S. arcticus* Hansen = *S. major* Levinsen; (2) *S. miniaccus* Grube = *Oniscosoma arcticum* Sars = *S. arcticus* Sars, Malmgren, and Levinsen; (3) *S. arcticus* Wirén. This last species he identified with M'Intosh's *S. oniscoides* (1865), which M'Intosh has since shown to belong to the species *miniaceus*.

In his description of the species v. Graff seems to have been doubtful as to the position of *S. oniscoides* Johnst. He says "Not quite so sure is the identification with *Sp. oniscoides* Johnston, and it is very possible that still a second species of Spinther with parapodial cirri exists."

Meanwhile no undoubted specimen of Johnston's species had again been found in British waters, nor had any specimens of the genus been found off Ireland. A few years ago, however, in the course of the investigation of the fauna of Larne Lough by the Ulster Fisheries and Biology Association, specimens of Spinther were found; specimens have also been taken in Belfast Lough, at the very spot mentioned by Thompson (Nat. Hist. of Ireland) as the original locality. These specimens were originally recorded by Prof. Gregg Wilson (12) as *S. miniaccus*. On further examination he came to the conclusion that they did not agree with v. Graff's description of that species, and he therefore asked me to determine the identification. I hope to prove in this paper that these specimens belong to Johnston's *S. oniscoides*, and that the species which v. Graff has described as *S. oniscoides* is not Johnston's species.

The genus Spinther may be briefly defined as follows:— Polychæta, body oval in outline, convex dorsally, flattened ventrally. Each body-segment with a pair of hook-bearing parapodia laterally, and a pair of setiferous lamellæ dorsally. On the head-region a single dorsal tentacle, with four eyes at its base. Mouth ventral. Mid-gut with paired lateral diverticula. A dorsal cæcum is present. Branchiæ absent. All parasitic on marine sponges.

The character which distinguishes *S. miniaceus* and *S. arcticus* from Johnston's species, is the absence of a parapodial cirrus. Now if it can be shown that there are two species of Spinther with parapodial cirri, then it seems to me that the species which comes from the place where Johnston's example was found, and which more nearly answers to Johnston's description, is the species which is entitled to be called *S. oniscoides*. I shall now describe the features in which my specimens, from Larne Lough and Belfast Lough, differ from v. Graff's *S. oniscoides* and from *S. miniaceus* and *S. arcticus*.

CIRRI.—In figs. 1 and 2 I have drawn parapodia with cirri. For purposes of comparison I have also shown, after v. Graff, a parapodium from *S. miniaceus* (fig. 7) and one from v. Graff's *S. oniscoides* (fig. 8).

It is evident from these figures that we are here dealing with a species each of whose parapodia bears a dorsal cirrus; this character would of itself be sufficient to distinguish this species from *S. miniaceus* and *S. arcticus*. The possession of a parapodial cirrus was one of the points mentioned by Johnston in his description, the "large bulb" which he described being the parapodium.

SETÆ.—Johnston described the setæ of his specimen as follows:—"The bristles are of three kinds; viz. (1) the spinous, sharp and fashioned like a needle; (2) the forked, which are filiform with a bulbous root, and cut into two scarcely equal prongs at the apex; and (3) the clawed, a bristle which has a stem slightly incrassated upwards, where a strong curved and sharp claw is articulated by an oblique joint. The forked bristles are the most numerous . . ."

Von Graff says that in his *S. oniscoides* the setæ of the dorsal lamellæ are mostly one-pointed, but two-pointed forms also occur.

I have been unable to satisfy myself as to the occurrence, in my specimens, of any one-pointed dorsal setæ; the only sharp-pointed setæ are those included in the parapodia. It will be noticed that Johnston, in contrast to v. Graff, says the "forked bristles" were the commoner, but he says nothing as to where each kind occurred. Even if he did include sharp-pointed forms among the dorsal setæ, I think this is attributable to deficient magnification. I have on several occasions had to employ a magnification of 250–350 diameters to make sure that a given spine was really two-pointed. In figure 4 I have drawn two views of the same seta. The one is magnified 80 diameters, the other about 400 diameters. It will be seen that the high-power view shows a distinct second point, in fact this seta is comparable to the upper one of the three shown in fig. 3.

In this respect, then, my specimens do not agree with v. Graff's, and v. Graff's description is also opposed to Johnston's.

The hooks are figured by v. Graff (see figs. 11 and 12), as having the terminal process of the shaft strongly serrated. In none of my specimens could I see any sign of such serration (fig. 5). In this respect again my specimens differ from v. Graff's species.

Size.—Johnston's specimen was about 12·5 mm. long. V. Graff gives the size of his species as follows :—Length 11·4 mm. to 26 mm. ; average proportion of length to breadth $\frac{1·8}{1}$. The average length of 22 of my specimens which were in good enough condition to measure at all accurately, was 8·1 mm., the specimens ranging from 4·8 mm. to 13 mm. The average measurements of 7 of my best specimens were :—length 9·28 mm., breadth 6·93 mm., average proportion of length to breadth $\frac{1·84}{1}$.

Von Graff's measurements of 22 specimens of *S. miniaceus*, ranging from 0·9 mm. to 8·5 mm. in length, give the following averages :—Length 4·65 mm., breadth 3·05 mm., average proportion of length to breadth $\frac{·52}{1}$.

S. arcticus ranges from 22 mm. to 50 mm. in length ; average proportion of length to breadth $\frac{1·25}{1}$.

Number of Segments.—Johnston described his specimen as having "about 30" segments, but in his figures he shows only 21 rows of lameliæ and 26 or 27 pairs of parapodia. Von Graff gives the number of parapodia in his species as 48 pairs. I have never seen more than 26 pairs, the majority having from 20 to 25. *S. miniaceus* has 12 to 24 pairs of parapodia, *S. arcticus* up to 50 pairs.

Here again my specimens agree with Johnston's description, but differ considerably from the species described by v. Graff.

The Ventral Surface.—A point included by v. Graff in his diagnoses is the appearance of the ventral surface. Of his *S. oniscoides* he says :—"Ventral surface provided with warts, which are scattered in a median area, and from there extend to the bases of the parapodia in thickly packed, tumid, elevated stripes, separated by wartless intervals." This agrees very closely with the appearance shown by my specimens, in some of which, however, probably owing to bad preservation, the warts are difficult to detect. The lack of warts, which occur also in *S. arcticus*, is one of the diagnostic characters of *S. miniaceus*.

LAMELLÆ.—Another point to which v. Graff has attached some importance is the difference, in the various species, of the shape of the transverse section of the lamellæ. In *S. miniaceus* a typical lamella begins, next the middle line, as a simple fold. As we trace it outwards, the top of this fold curves over, another edge becomes developed, and finally at the outer edge the lamella shows a Y-shaped section. In *S. oniscoides* (v. Graff) the shape is that of a Y with a broad stem and shallow top, the depressed surface of the top being tuberculate. My specimens show no trace of such a gradation as occurs in *S. miniaceus*, the general plan closely resembling the appearance seen in v. Graff's *S. oniscoides*.

EXTRUDED PHARYNX.—This is figured by v. Graff in *S. arcticus* as rosette-shaped, while he describes his *S. oniscoides* as resembling *S. arcticus*. In *S. miniaceus* both v. Graff and M'Intosh (9) figure the extruded pharynx as trumpet-shaped.

In my examples the pharynx, wherever it was found extruded, was always rosette-shaped.

INTESTINE.—The mid-gut in Spinther is provided with paired diverticula, which in *S. miniaceus* have a fairly wide communication with the gut. In this species the dorsal cæcum is also provided with paired lateral diverticula, corresponding in position with the diverticula of the mid-gut. The cæcum has no lateral diverticula in either v. Graff's *S. oniscoides* or *S. arcticus*. Of the mid-gut diverticula in these two latter species v. Graff says :—"Their width is, on the contrary, very considerable, quite in opposition to the gut, which appears narrow and considerably compressed from above downwards. The diverticula are attached to it like expanded sacs." This appearance is shown in Plate 1 (fig. 9), which shows the shape as figured by v. Graff. In the shape of the diverticula, and of the gut itself, my specimens differ from v. Graff's *S. oniscoides*, resembling rather *S. miniaceus* (see fig. 6.) There is no apparent compression of the mid-gut, nor are the diverticula of the shape described by v. Graff.

In none of my sections, either transverse or longitudinal, have I been able to detect any trace of diverticula from the cæcum.

Summary.

The specimens I have described belong to the genus *Spinther*, and have a parapodial cirrus.

They are distinguished from *S. miniaceus* by (1) the presence of a cirrus; (2) size; (3) character of ventral surface; (4) the shape of the extruded pharynx; (5) the absence of lateral diverticula from the cæcum; (6) the shape of the hooks (fig. 10); (7) the shape of the lamellæ.

From *S. arcticus* my species is distinguished by (1) size; (2) the presence of the cirrus; (3) the number of segments.

From v. Graff's *S. oniscoides* it differs in (1) size; (2) number of segments; (3) setæ; (4) hooks; (5) the shape of the mid-gut and its diverticula.

It agrees with Johnston's *S. oniscoides* in (1) size; (2) possession of a cirrus; (3) (probably) setæ; and it comes from the same locality.

I consider that the points I have mentioned are sufficient to distinguish my specimens and v. Graff's as belonging to different species. The difference in size, in number of segments, in the shape of the hooks and setæ, and in the shape of the gut and diverticula, is, I think, sufficient to differentiate them. Further, my specimens correspond more closely to Johnston's description than do v. Graff's, and they come from the same place as Johnston's original. I think, then, that I am justified in claiming that while my specimens do belong to Johnston's species, v. Graff's do not.

It remains to try to settle the name of v. Graff's species. Now, the specimens which he examined were (1) American specimens, and (2) Hansen's original "*Spinther arcticus*." These he decided to unite in the one species, which he, doubtfully however, identified with Johnston's *S. oniscoides*. Though Stimpson's original *Cryptonota citrina* had been destroyed in the great Chicago fire, yet Verrill pronounced these American specimens to belong to Stimpson's species. Von Graff says that in response to his enquiry he was informed that Verrill was well acquainted with "*Cryptonota citrina*," which was found in a spot near to the Bay of Fundy, and these specimens were forwarded by Verrill.

Stimpson's description is, unfortunately, too meagre to do more than show that his specimen belonged to the genus

Spinther. But if Verrill's identification is correct, which I see no reason to doubt, then Stimpson's specific name must be attached to this species. Verrill seems to have had no doubt as to the identity of the specimens sent to v. Graff.

The genus Spinther therefore includes four species, as follows :—

I. **Spinther oniscoides,** Johnston.
S. oniscoides, Johnston (1), 1845.
S. miniaceus, Wilson (12), 1904.

II. **Spinther citrinus** (Stimpson).
Cryptonota citrina, Stimpson (11), 1854.
Spinther arcticus, Hansen (4), 1882.
Spinther major, Levinsen (6), 1883.
Spinther oniscoides, v. Graff (2), 1887.

III. **Spinther miniaceus,** Grube.
Oniscosoma arcticum, Sars (10), 1850.
Spinther arcticus, Sars, 1862; Malmgren (7), 1867; Levinsen 1883.
S. oniscoides, M'Intosh (8), 1877.
S. miniaceus, Grube (3), 1861; Drasche, 1885; v. Graff, 1887; M'Intosh (9), 1900.

IV. **Spinther arcticus,** Wirén.
S. arcticus, Wirén (13), 1883; Drasche, 1885; v. Graff, 1887.

The species may be diagnosed briefly as follows :—

A. Parapodia without dorsal cirri;
(1) Small: up to 24 segments; setæ two-pointed; dorsal cæcum pouched ... ... *miniaceus.*
(2) Large; up to 50 segments; setæ one- and two-pointed; cæcum not pouched ... . *arcticus.*

B. Parapodia with dorsal cirri; cæcum not pouched;
(3) Small; segments up to about 25; setæ two-pointed; lip of shaft of hook plain ... ... *oniscoides.*
(4) Larger; 48 segments; setæ mostly one-pointed; lip of shaft of hook serrated ... ... *citrinus.*

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Explanation of Plate.

1. Two parapodia of *Spinther oniscoides*, showing cirri (c) × 45.
2. Parapodium and cirrus from a transverse section, × 36.
3. Points of setæ, × 190.
4. The same seta under high and low power, *a* × 80, *b* × about 300.
5. Hook, × 190.
6. Outline of gut in a slightly oblique transverse section, × about 8; ca = cæcum, d = diverticulum.
7. Parapodium of *S. miniaceus*, × 27. After v. Graff.
8. Parapodium of *S. citrinus*, × 27. After v. Graff.
9. Diagram of tr. sec. of gut of *S. citrinus* (*S. oniscoides* v. Graff).
10. Hook of *S. miniaceus*, × 124. After v. Graff.
11. Part of hook of *S. citrinus* × 124. After v. Graff.
12. Hook of *S. citrinus*, × 124. After v. Graff.

Marine Laboratory, Bangor, Co. Down.

REVIEWS.

BRITISH TREES AND SHRUBS.

Trees and Shrubs of the British Isles, Native and Acclimatised. By C. S. Cooper, F.R.H.S., and W. Percival Westell, F.L.S. 4to. London: J. M. Dent and Co. In 16 parts, at 1s. each.

The authors state in their Foreword that the book has been written "to enable the reader to identify not only the Trees and Shrubbery Plants of the British Isles, but also the more common cultivated Trees and Shrubs." The number now issued contains an Introduction, treating, in a very elementary manner, with the chief character of timber-trees from the botanical, physiological and popular points of view. Paragraphs are also found on such subjects as "The Advent of the Garden City," "Insect and Fungoid Pests," &c. It is unfortunate that the authors did not make this introduction more thorough and comprehensive, for, in its present form, it contains little information of

any value, while, much of what there is, can scarcely be termed relevant to the subject matter of the work.

The main body of the book is arranged on a botanical basis, each Natural Order being dealt with in turn. In the first part the Ranunculaceæ, Magnoliaceæ, and Calycanthaceæ are dealt with, and the arboreal and shrubby species in each described, and in most cases figured. Here, again, the authors appear to have confined themselves to a number of brief statements on the habitual requirements, botanical characteristics, and derivation of nomenclature of the species under review, but have omitted a good general description of each genus, which would be likely to interest the amateur or professional culturist to an equal or greater degree than botanical phraseology, important though the latter may be in itself.

The work is well printed, and the illustrations are clear and well drawn, and the book will doubtless be of considerable value to the student of trees and shrubs from a botanical stand-point, and may assist the practical gardener or amateur in identifying species.

A. C. F.

A STUDY OF "WHITE ANTS."

Die Termiten oder weissen Ameisen: eine biologische Studie, Von K. ESCHERICH. Leipzig, Dr. W. Klinkhardt, 1909. (Pp. xii. + 198. Coloured frontispiece and 51 figures. Price 6s.)

The insect-fauna of Ireland, like that of Great Britain, has no example of that most interesting tropical group of lowly-organized insects, the Termites (commonly misnamed "white ants"), which are represented by several species in the Mediterranean district. Termites exhibit an elaboration of social life comparable to that of the highly-organized Hymenoptera—ants, wasps and bees, and a knowledge of their habits is of great interest to all naturalists.

Dr. Escherich, the author of the work, is well known to zoologists through his valuable morphological researches on several of the lower groups of insects. His present book shows—like his earlier volume on the true ants—that he is deeply interested in insect bionomics, and he has added to an exhaustive and critical survey of the literature on Termite societies, nests, and habits, observations of his own made on a journey in East Africa. No account of the structure of the insects is given in this book; in a brief paragraph in the introduction, the author mentions the various systematic associations in which the Termitidæ have been placed, and accepts the suggestion of those writers who, like Handlirsch, regard the family as forming a distinct order. Handlirsch's scheme of insect classification carries so-called ordinal divisions to the most extreme limits; the curious Embiidæ, resembling the Termitidæ in structure and to some extent in mode of life, might well be allowed also inclusion in the order Isoptera. At the end of the book there is a useful synopsis of the sub-families and genera, but the geographical distribution of the latter is imperfectly given.

Most of the volume is devoted to a full discussion of the nature and origin of the termite society, the various castes, the modes of feeding and nest-building, and the "guests" and "messmates" of the termite communities. The "workers" and "soldiers"—undergoing one moult less than the winged sexual forms—are regarded as permanently modified nymphal stages. In the chapter on feeding the clear account of the "mushroom gardens" of the termites is especially welcome. In a section of the useful and injurious effects of the termites with regard to man, Dr. Escherich discusses the suggestion—familiar to English readers through the picturesque writings of Henry Drummond—that termites in tropical countries play the same beneficial part in the economy of nature that earthworms perform in temperate regions. While admitting that there is ground for this idea, Dr. Escherich points out that the earthen excrement of termites—in contrast to that of earthworms—is very hard and largely divested of its organic nutriment. This consideration was apparently not overlooked by Drummond, who wrote "though the white ant may itself have no power in the first instance for creating soil, as a denuding and transporting agent its ministry can scarcely be exaggerated."

All students of insects must feel in debt to Dr. Escherich, for he has collected in a readily assessible form the cream of what is known about termites, and his extensive bibliography directs us to any further information that we may need.

G. H. C.

A NEEDED WARNING.

The Care of Natural Monuments, with special reference to Great Britain and Germany. By H. Conwentz. Cambridge University Press, 1909. Pp. 155. 10 illustrations. Price 2*s.* 6*d.*

This timely volume is an extended version of a lecture delivered by the author, who is a Prussian State Commissioner for the care of natural monuments, before the British Association at Leicester, in 1907. By instances taken from all parts of the world, we learn how much "natural monuments"—beautiful landscapes, waterfalls, rare plants and animals, woodlands, and fens—need to be preserved from the devastating hand of the company promoter, advertiser, shooter, and collector; while we are also told what is being done to protect those natural possessions of ours which are still available for being protected. It is gratifying to find approving mention of the protection afforded to nesting Terns at Malahide by the Irish Society for the Protection of Birds, and of the establishment of the Lambay "sanctuary" by the Hon. Cecil Baring. The author, who is clearly in close touch with naturalists, both on the Continent and in these islands, suggests that work of the kind advocated might be taken up with benefit by the Vegetation Survey Committee and by the British Association. Why not also by the British Government?

G. H. C.

ON THE OCCURRENCE OF ALLIUM OLERACEUM LINN. IN IRELAND.

BY J. ADAMS, M.A.

For the last ten years I have been acquainted with a species of Allium growing on the banks of the Six-Mile-Water at Antrim. As *Allium vineale* Linn. had been recorded from that neighbourhood, I thought the plants collected must be abnormal specimens of that species, though I could not reconcile them with the descriptions given of it. At the time of flowering the lower leaves had completely withered away, so in order to see what these were like I dug up some of the bulbs and planted them in my garden, where I could observe them all the year round. When the young leaves came up in the following spring they were channelled on the upper side. Bulbils were freely produced among the flowers, and on falling on to the surface of the soil they readily took root. The conclusion I came to finally was that the species was *Allium oleraceum* Linn. On forwarding specimens to Dr. Rendle, of the British Museum, he confirmed my identification.

As I could never find *Allium vineale* Linn. anywhere in the neighbourhood of Antrim, the thought occurred to me that possibly a mistake had been made in its identification. It seemed advisable, therefore, to look up all the specimens of *Allium vineale* Linn. collected in that locality to see if they were correctly named.

Among the specimens of *A. vineale* Linn. in the National Museum there was one labelled "*Allium vineale* Linn. Damp waste ground, Antrim. Aug., 1888." This, however, turned out to be *A. oleraceum* Linn. In the herbarium of the Queen's University, Belfast, there was one specimen collected in "Aug., 1886," from a "pasture at Antrim," which was *Allium oleraceum*, although labelled as *A. vineale*. I am indebted to Prof. Gregg Wilson for his kindness in enabling me to see this specimen. The Rev. C. H. Waddell kindly looked up for me a specimen in the Belfast Museum, and on a later occasion through the courtesy of the Curator, I was able to see the

specimen myself. This was labelled "*Allium vineale* Linn. By the railway line near Antrim. Aug., 1888," and was also *A. oleraceum.*

There are two records of *Allium vineale* having been found in the grounds of Shane's Castle. In Dickie's "Flora of Ulster" the reference is "Shores of L. Neagh near Shane's Castle. Mr. Orr," while in the *Flora of the North-East of Ireland* it is said to have been found in Shane's Castle grounds by the late Mr. Corry. There does not appear to be any specimen in existence of *Allium vineale* collected at Shane's Castle. Whether it really grows there or, as seems probable, was mistaken for *A. oleraceum*, it is impossible at present to say, but possibly some of the northern botanists may be able to clear the matter up during the coming summer.

There is no previous record of *Allium oleraceum* having been found in Ireland, and the credit of being its first collector (although the plant was wrongly named by the authorities to whom he submitted it) must be given to the late Mr. David Redmond, of Antrim, who found it in the year 1886.

Perhaps it may be worth while to point out the more obvious differences between *Allium vineale* Linn. and *A. oleraceum* Linn. so that anyone in future may be able readily to distinguish them.

A. vineale.	*A. oleraceum.*
(1) Leaves hollow.	(1) Leaves solid, grooved on upper side.
(2) Only one bract present, which is shorter than the flower stalks.	(2) Bracts two in number and much longer than the flower stalks.
(3) Each of the three outer stamens trifid.	(3) Stamens all simple.

At present I express no opinion as to whether the species is native or alien. It occurs in at least three places extending over a distance of about a mile along the river from the banks of Moylena down to the Great Northern Railway bridge. It occurs on both sides of the river.

Royal College of Science for Ireland.

LAND-SHELL RAIN-WASH AT HORN HEAD CO. DONEGAL.

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

(Read before the Belfast Naturalists' Field Club, 3rd March, 1909)

In recent years the little pockets of land-shells, that are collected by the wind in hollows of the sand-hills, have received a good deal of attention from conchologists, who find such collections useful in survey work. When sieved free of sand, they often provide a good index to the molluscan fauna of a dune-area and the immediate district. This is especially true of the very small species such as Vertigo, which are often most difficult to find otherwise. Though these pockets consist largely of shells drifted by the wind from similar deposits in old dunes now undergoing erosion, they often contain living shells and others not long dead as well.[1] For that reason, while a party consisting of F. Balfour Browne, G. W. Chaster, Ed. Collier, J. N. Milne, C. E. Wright, A. W. Stelfox, and myself were, last September (1908), visiting north-west Donegal, we kept a keen look-out for such "pockets" or shell deposits generally, as A. W. Stelfox had found many on a previous visit with Dr. Chaster, in 1905. Heavy rain before our arrival had spoiled most of the pockets, but while walking up a long dune valley at Tramore, Horn Head, some of the party in advance called my attention to some narrow dark bands from one to two inches thick in a remnant of an old dune that was rapidly undergoing wind-erosion. On examination we found the dark bands consisted of immense masses of small land-shells loosely cemented together by fine mud, but quite unlike any dune deposit we had ever seen or heard of. Shells sometimes collect in shallow pools in dune hollows, but the matrix, when the pool dries up or is filled up with sand, is usually earthy sand, and only a few of the larger species that live on sand-hills are present. No one thought of a "rain-wash" in the middle of a great sand-hill area, yet it was clearly a deposit formed by water in some way. On climbing over a growing dune close at hand, that was encroaching on a bare hillside area, Mr. Wright found a key to the mystery. Here, in a little hollow between the dune and hillside, was an exactly similar

[1] See R. Standen, *I.N.* vi., p. 2, 1897; R. Welch, *id.* vii., p. 77 1898.

deposit in the course of formation. Heavy rain, sweeping down the hillside against the encroaching dunes on two sides, had washed masses of shells, mostly from old deposits, into the hollow, where they had collected as a natural floating, to be deposited on the surface of a layer of fine mud as the water filtered away through the sand. The day was dry and windy, and sand coming up over the dune from the west was already covering up the shells and would soon press them into the soft mud, and give a thin dark band in the sand, full of shells, like those in the old dune. This was clearly the way the older deposits had formed, and if we had dug down under the new one we would likely have found several others separated by sand. The species too were the same, and with few exceptions were the shells any fresher than in the older deposits.

Though rain-wash shell-deposits are not uncommon on hill-sides and in the rifts of rocks, limestone especially, I have never seen nor heard of one in a sand-dune before. The others, too, contain only a small proportion of shells compared to the general mass, while the reverse was the case in these Tramore deposits. Modern examples of the way in which local masses of shells, or other debris of animal or vegetable origin, may form deposits, are of interest. They point the way in which somewhat similar fossil masses present in the older rocks may have been formed. The mass of shells was taken to our hotel and washed free from the muddy matrix in a sieve of fine miller's gauze. It was then seen that the general condition of the shells was as good as if they had been sieved out of modern shell-pockets. Even the tiny Vertigo and Carychium were perfect, and many of the Cochlicopas were as glossy and translucent as if only recently dead. The fine matrix had, of course, a good deal to do with this; but in these western sand-hills of calcareous sand, shells are much more perfectly preserved than in the silicious sandhills of the east coast of Ireland. Rain percolating through the latter soon dissolves out shells and any other calcareous matter present, but where the dune-sand is itself calcareous, the water quickly gets saturated and unable to do harm.

The sand is largely calcareous at Horn Head, containing as it does finely comminuted marine and land shells, Foraminifera, Urchin tests and spines, &c., which form so much of the

sand also in other western dune-areas. For this reason shell masses collected together from any cause, if they are quickly covered by the blowing sand to a fair depth, are protected against solution largely or entirely.

When freed from mud, sand, and some vegetable debris, the great bulk of the old dune-deposit proved to be composed of five species, mostly only partly grown—*Helix ericetorum*, *H. acuta*, *H. nemoralis*, *Cochlicopa lubrica*, and *Pupa muscorum*. With these were at least sixteen other species, including very large numbers of *Helix pulchella*, *Vertigo pygmœa*, *V. angustior*, and *Carychium minimum;* with many *Helix pygmœa*, *H. hispida*, *H. aculeata*, *Vertigo substriata*, and the rare *V. pusilla*. The more recent deposit-material I have not worked out yet. It seems to be composed of just the same species as the older, and, in any case, will be a mixture of shells of various periods, like all these dune collections. None of the species found are new to the district. A. W. Stelfox, on his previous visit in 1905, obtained most of them alive, the rest in shell-pockets. In his north-west Donegal list in this Journal, vol. xv., pp. 62–67, 1906, he is careful to separate out these latter from those found living.

Belfast.

THE GORDII OF IRELAND.

BY ROWLAND SOUTHERN, B.SC.

IN 1908, a small collection of Irish Gordian worms, in the National Museum, Dublin, was sent for examination to Professor L. Camerano, of the University of Turin, the well-known authority on this group of worms. His report on the collection was printed in the *Bollettino dei Musei di Zoologia d. R. Università di Torino*, 1908, Vol. xxiii., No. 578.

The worms included in this group are commonly known as "hair-worms." They are found in the adult stage in ditches, ponds, and streams, usually attached to water-weeds. Often they occur in considerable numbers, with their long slender bodies tangled and twisted together in knots. Hence the generic name of Gordius.

They frequently appear suddenly in large numbers, in water previously free from them, thus giving rise to many popular and fallacious theories as to their origin. For instance, it is said that horse-hairs, thrown into water, change into these worms; or that there has been a rain of worms. The real explanation of this phenomenon is supplied by the study of their life-history. They spend the earlier, and in point of time, the main portion of their existence, as parasites in the bodies of various animals, insects being specially favoured; but the larval stages have also been found in spiders, crustacea, fishes, frogs, &c., and I have frequently noted the presence of the very young larvæ in the bodies of small aquatic Oligochaetes. On reaching a certain stage of development, the larval Gordii leave the body of the host, and as the individuals of a species, living in individuals of a certain host-species all reach this stage at the same time, the sudden appearance of these worms in large numbers in accounted for.

In the National Museum there is exhibited a specimen of *Parachordodes violaceus*, our commonest Irish Gordius, emerging from its host, the beetle *Silpha subrotundata*. The mature Gordius does not feed during its short period of freedom, and the mouth and alimentary canal become atrophied. The male is easily distinguished from the female by its forked tail. The eggs are laid in strings, round water-weeds, and the young larva, on emerging from the egg, is provided with various spines by means of which it bores its way into the body of its first host, which is usually the larva of an insect. The latter is eaten by the second host, in whose body the larval Gordius completes a further stage of development, at the end of which it emerges as the free-living form.

The small collection sent to Prof. Camerano included two species—

Parachordodes violaceus (Baird),

which has already been recorded from Great Britain and Ireland.[1] It appears to be the most prevalent species in this country. The list of localities comprises Killaloe, Co. Clare; Clonbrock, Co. Galway; Swords and Lambay, Co. Dublin;

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[1] *Vide* R. Southern, *Irish Naturalist*, 1907, p. 84.

Mornington, Co. Meath; Ballymote, Co. Sligo; and Bundoran, Co. Donegal.

Elsewhere, it has been found in England, Germany, France, Italy, Bohemia, and Transcaucasia.

Gordius Villoti (Rosa).

This species was obtained from two localities—viz., R. Caragh, Glencar, Co. Kerry; and Abbeyleix, Queen's Co.

This species has not been previously recorded from the British Isles, though it seems highly probable that it was included with other forms under the name "Gordius aquaticus." It is widely distributed over the Palearctic Region.

National Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include an American Tapir and three Grey Squirrels from the Duke of Bedford, a Pine Marten from Mr. N. Patterson, a young Otter from Mr. W. H. B. Moorhead, a Badger from Mr. W. W. Despard, a Squirrel from Mr. Grattan Bellew, a Turtle Dove from Mr. H. B. Rathborne, two domestic Pigeons from Miss A. Kinahan, a Long-eared Owl from Mr. T. Lombard, several small birds from Capt. J. W. H. Seppings, two Missel Thrushes from Mr. W. J. Williams, Wild Ducks from Mr. A. H. B. Ferrier and Mr. Thom, a Cormorant from Mr. A. Robinson, a Merlin from Mrs. Ellis, five Lesser Redpolls from Mr. W. W. Despard, two Red-breasted Weaver birds from Miss D. S. White, and a Locust from Miss Thomson. Two Canadian Porcupines, two Alpine Marmots, a Green-billed Toucan, and two Red-crested Cardinals have been bought.

The young American Tapir is a most valuable addition to the Gardens. It is nearly twenty years since one of these primitive allies of the Horse-family has been on view in Dublin, and everyone interested in zoology will be eager to see a living mammal of a type that has survived, with little change, since Miocene times, during which we know that tapirs inhabited Europe, though they are now restricted to tropical America and the Malay countries. The Alpine Marmots and Canadian Porcupines also are interesting recruits to the series of exhibited Rodents.

Work on the rebuilding of the old portion of the Lion-house is now in rapid progress, while the walks are greatly improved by the changes that have been made in the Gardens during the spring months.

DUBLIN MICROSCOPICAL CLUB.

MARCH 10.—The Club met at Leinster House.

Dr. G. H. PETHYBRIDGE (President) exhibited the so-called "spore-balls" of *Spongospora subterranea* (Wallr.) de Lagerh. This organism is found associated with one of the forms of scab in potato tubers and is generally regarded as the cause of it. It was first described by Wallroth in 1842, who gave it the name of *Erysibe subterranea*. Later in the same year it was seen and figured by Martius, who, considering it to belong to the genus Protomyces, named it *Protomyces tuberum solani*. Berkeley figured and described it again, in 1846, under the name of *Tuburcinia scabies*. Ten years later it was described and the "spore-balls" excellently figured by Von Mercklin, who, however, did not consider it to be a fungus, but thought, rather that the spore-balls were degeneration products of the cells of the potato tuber, and, consequently, he gave it no name. At this early period not very much attention was paid to the parasitic nature of the organism or to the damage which it caused. For many years it appears to have been lost sight of, until Brunchorst, in 1887, without being aware of the previous accounts of the organism, found it causing considerable damage to potato tubers in Norway and described it as a new genus and species under the name of *Spongospora Solani*. Fischer de Waldheim had, ten years previously, transferred it to a position among the family of "smuts" and re-named it *Sorosporium scabies*, but Brunchorst considered it as probably belonging to the class of Myxomycetes. It is highly interesting to notice that de Lagerheim reports it, in 1891, as being quite common in the neighbourhood of Quito, the probable home of the potato plant itself. This observer disagrees with Brunchorst as to the nature of the organism, and considers that whatever it may be it is certainly not a myxomycete. It was de Lagerheim who first suggested that the correct specific name for the organism as *subterranea* (Wallr.) It was first recorded from Ireland by Johnson, about 1904, and has since been found to be quite common here—especially in the west. Johnson's studies lead him to accept Brunchorst's view of the organism as being a myxomycete, and, without entering deeply into the question of nomenclature, he apparently accepts the name given to it by Brunchorst, at least provisionally. Not so, however, Massee who, being apparently in ignorance of de Lagerheim's paper and of Wallroth's original description, has, unfortunately, and quite unnecessarily, added yet a fresh combination of names (*Spongospora scabies*) to this already much named parasite.

The organism in mild cases forms a "scab" on the surface of the tuber, which has been called, perhaps not very happily, "corky scab," and which, with the naked eye, is not very easily distinguished from the ordinary or brown scab. It is true that sometimes the spore balls of the fungus are plentiful enough to form a rusty-coloured, granular mass on the scab, plainly visible with a pocket lens, but this is frequently not the case, and the microscope is necessary in order to distinguish with certainty between the two forms of scab. The exhibit also included a

series of attacked tubers, showing that when the attack is a virulent one the word "scab" is quite a misnomer, for the fungus destroys the tissues of the tuber so as to form large cavities, which at first sight might be put down to the work of crows or of rats or mice. In this form the term "canker" would seem to be somewhat more appropriate, and the damage done is far more serious than that produced by a mere surface scab. The organism is apparently widely spread up and down the west of Ireland, and experiments are now being carried out with a view to obtaining a practical method of treatment against the disease.

R. SOUTHERN showed the heteronereid stage of *Nereis Dumerilii* Aud. and Ed., from Ballynakill harbour. The sexual characters and modifications for a pelagic life were pointed out. The specimen exhibited was taken in the surface townet, at 11.45 p.m. on June 26th, 1902.

F. W. MOORE showed seedlings of a hybrid Sarracenia in various stages. The first leaf formed after the cotyledons, appeared as a minute straight tube. The second leaf had the apex bent over, and was somewhat larger, but remained closed. The inner surface of this second leaf showed numerous glands, although the leaf did not open.

Prof. G. H. CARPENTER showed a Springtail from Campbell Island, in the Antarctic Ocean, to the south of New Zealand, belonging to a new species of Triacanthella, a genus hitherto known only from Patagonia and Tierra del Fuego. He exhibited also drawings, which, with a description and an account of the structural features of the genus, will be published by the Canterbury Philosophical Institute, New Zealand.

J. N. HALBERT showed a Perla-nymph from a stream flowing from Lough Eighter, Co. Kerry, probably *Perla cephalotes*, a species hitherto unrecorded from Ireland.

W. F. GUNN showed "seeds" of the grass *Anthoxanthum odoratum*, and demonstrated the highly hygrometric property of the awns. A very small loss or absorption of moisture produces active movements, the seeds sometimes jumping to a distance of 15 times their own length.

NOTES.

BOTANY.

Ptilidium ciliare, Hampe, in Co. Antrim.

It is strange that this liverwort, which, while not a common plant anywhere, has yet a wide distribution in England and Scotland, has hitherto only been found in a few localities in Kerry and Cork. I was glad, therefore, to find it a few weeks ago near the summit of Colin Mountain, Co. Antrim, a well-worked locality not far from Belfast. It may hitherto have escaped detection from its habit of growth usually in single stems mixed with Dicranum and other mosses. It grows on the south and west sides of the hill about 50 yards from the top.

C. H. WADDELL.

Saintfield.

A New Irish Moss.

The discovery in Ireland of a moss hitherto known only as a native of North China will, I think, interest every Irish botanist. In May, 1908, while on a visit to the Rev. C. H. Waddell, Vicar of Saintfield, in the County of Down, I picked up a small tuft of a Catharinea, which has since turned out to be the rare species *C. rhystophyllæ* of C. Müller. And on 5th February of the present year I paid another visit to my good friend, and was lucky enough to gather some more of this moss. There is a short account of it, and a comparison with an allied species also from China, in *Journal of Botany*, vol. xl p. 2. It comes near *C. angustata*, which, though found in six English and one Scotch county, has not yet been met with in Ireland. It was growing in a turf or sod on the mud-capped top of an old stone fence, in association with *Ceratodon purpureum* and *Stereodon cupressiforme*, and at first sight bore a superficial resemblance to *Polytrichum aloides*. Mr. H. N. Dixon very kindly verified my specimens. Ireland being such a paradise of Mosses, it is likely that we shall soon hear of *C. angustata* having been collected in it, and there is every reason to suppose that *rhystophyllæ* will turn up in other localities in addition to Saintfield.

H. W. Lett.

Loughbrickland.

Chenopodium polyspermum Linn. on the shore of Lough Neagh.

On the 28th August, 1906, I obtained a number of specimens of this species growing among shingle on the shore of Lough Neagh near Ardmore Point, a few miles south of the town of Antrim. Specimens were sent to Dr. Rendle of the British Museum, who confirmed my identification. There are several old records of its occurrence in Ireland given in *Cybele Hibernica*. More recently in the *Irish Naturalist* for June, 1906, it was recorded by Miss Knowles as occurring among a number of aliens collected at Straffan in Co. Kildare.

J. Adams.

Royal College of Science for Ireland.

ZOOLOGY.

Pisidium personatum – A correction.

The Co. Sligo record for the above species, p. 56 *ante*, is inaccurate, and is probably a slip of the pen. I find the specimens sent to Mr. Woodward from Dublin Museum, were collected by myself at Brown's Bay, near Larne, Co. Antrim, in 1899. I never collected at any locality of that name in Sligo.

R. Welch.

Belfast.

THE WHITE WAGTAIL IN COUNTY DUBLIN.

BY ALEXANDER WILLIAMS, R.H.A.

[Read before the Dublin Naturalists' Field Club, December 8, 1908.]

The movements of the White Wagtail (*Motacilla alba*) on the line of its spring migration on the west coast of Ireland have been, from time to time, carefully recorded by our veteran naturalist, Robert Warren. The island of Bartragh, in Killala Bay, at the mouth of the River Moy, seems to be a favourite resort, and, on one occasion, a specimen was obtained so far west as Achill Island. From the east coast of Ireland, it would appear that no occurrence has so far been authenticated, though it is only reasonable to suppose that, at the proper time, a migration does take place. The Rev. Dr. Benson[1] mentions having seen at Balbriggan, in September, a Wagtail, which he believed to be *Motacilla alba*. Unfortunately immature individuals of both species, the Pied and the White in transition, have so much pale grey in their plumage, and are so similar in appearance, that even when handled it is very puzzling to determine them.

In the year following, April, 1904, a friend living on the Pigeon-house Road, Ringsend, so accurately described two pairs of Wagtails that frequented for a couple of days the vegetable gardens attached to the Coastguard Station there, that I had little doubt they were migrating White Wagtails, especially when he mentioned that he had noticed similar birds, more than once, at that time of the year. This locality appears to be in the direct line of spring migrants, as I have regularly gone there to search for early appearances of the Wheatear (*Saxicola œnanthe*), an adult male of which I observed as early as the 21st of March, 1907.

A couple of days after my friend had noticed the Wagtails at Ringsend, whilst I was resting near the roadside at Robb's Wall, between Malahide and Portmarnock, on April 24th, a bright sunny day, with a southerly wind, four Wagtails suddenly alighted on a bit of sandy beach, between the rocks, and, after resting quietly for a few moments, commenced searching the refuse above high-water mark for food. They were so close, about 10 yards off, that I had a perfect view,

[1] *Irish Naturalist*, vol. xii., 1903.

and, by their light grey backs, deep velvety black gorgets edged with white, and large patches of white on cheeks and foreheads, I saw at once that they were two pairs of White Wagtails in full nuptial plumage. I watched them more closely, with a binocular, until they flew off north across Malahide estuary. I thought at the time that they might have been the same birds my friend noticed at Ringsend, and were travelling along the coast to northern Europe.

Although keeping a good look out each spring-time, it was not until the morning of Sunday, April 26th, 1908, a bright day with a cool south-east wind, that I was rewarded with a sight of a solitary White Wagtail on the pebbly shore behind the Coastguard Station at Dollymount. It allowed me to approach quietly to within a few yards, and I was able to see that it was an adult female, as it lacked the brilliancy of a male's shining black and white colouring. It displayed none of the restless activity of the Pied Wagtail, but was very quiet and sedate in its movements, kept watching the people passing, and occasionally uttered a low call-note. On my approaching too closely it took wing and flew over the buildings to another part of the shore, where it allowed me again to get very close to it, and it seemed to be reluctant to fly off like common Wagtails when disturbed. This time I was determined, if possible, to have the bird authenticated, and in the afternoon my brother, W. J. Williams, who was quite familiar with the species from seeing it frequently about the houses in Norway, accompanied me to Dollymount. The bird was still in the vicinity of the Coastguard Station, and he instantly recognised it as a White Wagtail. It later on took flight, and we watched it disappear north, over the houses and trees of the Dollymount shore. It is interesting to note that the date, April 26th, tallies with the appearance of the birds on the west coast of Ireland, as Mr. Warren informs me that they usually arrive during the last week in April and the first week in May, but that the time depends on the weather conditions. With us the previous week was intensely cold, and, on Friday night, April 24th, there was a great snowstorm all over the country, but, on Saturday, the snow had almost disappeared on the sea-coast, and a rapid rise in temperature took place.

Dublin.

ON THE POSSIBILITY OF DISTINGUISHING BETWEEN NATIVE AND ALIEN SPECIES OF PLANTS IN IRELAND.

BY J. ADAMS, M.A.

[Read before the Dublin Naturalists' Field Club, 9 February, 1909.]

The flora of a country such as Ireland is slowly but steadily changing. As the result of the destruction of most of the ancient forests, followed by agricultural and trading operations, many of the aboriginal species have been compelled to narrow their limits, or have even vanished altogether from districts where they formerly abounded. At the same time other species have extended their range, being more at home on the artificial medium thus created; while to complicate matters still further, foreign species have been introduced, some of which appear to be as much at home in our climate as the real Hibernian species themselves. It will be evident to the student of the geographical distribution of plants that correct ideas on the origin and affinities of the Irish flora can only be arrived at by taking into consideration the species that are native to the country, and leaving out of account those that are known to have been introduced. Considerable difference of opinion has existed among botanists of high rank, such as De Candolle, Hooker and Arnott, Babington, and Watson, as to the exact standing of certain species, some considering them as genuine natives, others regarding them as introduced species. The following passage from Watson's "Compendium of the *Cybele Britannica*" seems well worthy of repetition in this connection :—

"Inexperienced observers more readily believe in the true nativity of plants; while those of greater experience will frequently find grounds for doubt or distrust. Besides this personal difference, the desire of appearing as discoverers too often leads vain-glorious collectors to make out the best case they can in support of the 'native claims' of species and the 'truly wild' character of their localities."

Watson divided British plants into five groups :—Natives, Denizens, Colonists, Aliens, and Casuals. The last four groups represented introduced species, and were arranged in descending order according to their success in maintaining a foothold in competition with the truly aboriginal species.

Hooker and Arnott, the authors of the *British Flora*, consider a plant to "be truly indigenous where it fortuitously presents itself."

Dunn, in his *Alien Flora of Britain*, uses the following definitions :—

"A species which exists in perfectly wild and natural surroundings both here and in the neighbouring parts of the world is deemed indigenous."

"A species will not be considered a native of Britain which is not known in at least one natural habitat, nor even then if it can be shown, by geographical or other arguments, that it was introduced thither by artificial means or from an artificial source."

"The term *alien* is used to designate any species which, though now spontaneous, originated in Britain through human agency."

Finally, Woodruffe-Peacock states that—

"Man has been the predominant factor so long in any old country like England, that the terms "aboriginal," "native," or "indigenous," used of modern conditions, simply lead to mental confusion instead of perspicacity in definition"; and that "in England there is nothing *natural* if you exclude human influence."

In my judgment we have still in Ireland many habitats for plants that might fairly be described as "natural," over which man has had no influence, or so little as not appreciably to affect the distribution of the plants growing therein. Such are the long ranges of cliffs occurring around many parts of the coast, as well as inland escarpments, the precipitous sides of many glens, parts of some of the more extensive bogs, the floor of many lakes, and small islets occurring therein, and here and there bits of the primeval forest. There are also large tracts of mountain and moorland over which the grazing of sheep and cattle has had but slight effect—at any rate I think it will be found that few, if any, species have become extinct in consequence, although their actual distribution may have become modified.

In order to avoid confusion it will be necessary to attach a definite meaning to the terms employed. A "native" species is one that existed in the country prior to the advent of man, or, if introduced since, has not been introduced by human agency, directly or indirectly. An introduced or "alien" species is one that has been brought into the country by man intentionally or accidentally.

In accordance with these definitions, the species of plants found in Ireland may be divided into three groups:—(A) Those which are certainly native, such as Bell-Heather, Bracken, Sea Pink. (B) Those which were certainly introduced, such as Canadian Water-Thyme, Fragrant Butter-Bur. (C) Those species regarding which there is some doubt as to whether they are genuine natives or have been introduced. It is with this last group that we are chiefly concerned at present. Before considering their claims it will be necessary to refer to the various ways in which foreign species are introduced into this country.

I. FOREIGN GRAIN USED FOR MILLING OR IN BREWERIES.—Wheat is imported from Canada, United States, Russia, India, Australia, and the Argentine Republic. The weed seeds are sifted out and are frequently used for feeding fowls, with the result that some of them germinate and may succeed in establishing themselves. A very interesting account of some of these will be found in Miss M. C. Knowles's paper cited at the end. As an example of this method of introduction *Sisymbrium pannonicum* Jacq. may be mentioned.

Barley used for malting comes from France, Germany, the Danube, Turkey, and Persia. A list of about fifty species found in the neighbourhood of the Belfast Distillery was published by the late Mr. Richard Hanna.

With regard to this method of introduction only the fringe of the subject has yet been touched, but the results achieved are sufficient to show what an important factor foreign grain is in introducing new species to our flora.

II. FARM SEEDS.—Flax seed is imported from Holland and Russia. *Camelina sativa*, Crantz, and *Centaurea Cyanus*, Linn. have been introduced in this way. Clover seed comes from France, Germany, United States, and other countries.

It ought to be possible to get much useful information on the impurities occurring in farm seeds from the Seed-testing Station under the Department of Agriculture, but, as yet, no account of these seems to have been published.

III. FEEDING STUFFS, such as Indian Corn, Oilcake, Hay, and Bird Seeds. The occasional appearance of Hemp and Canary Grass is, probably, due to this group.

IV. Wool.—Dunn mentions that *Medicago ciliaris*, Willd., from the Mediterranean, *Calotis cuneifolia*, R. Br., from Australia, and *Lepidium lacerum*, C. A. Mey, from Central Asia, have been introduced into Britain in this way, but I have seen no record so far of their occurrence in Ireland.

V. Hides and Furs.—I am not acquainted with any species so far which can be traced to this source, but the subject seems scarcely to have been investigated as yet.

VI. Horticulture.—Very varied and numerous are the species of plants grown in gardens as vegetables, fruits, ornamental plants, pot-herbs, and medicinal plants. Foreign seeds may be introduced in some cases as an impurity, such as *Draba muralis*, Linn.; in other cases, seeds or roots may be thrown out among rubbish and become permanently established; some seeds may be carried to a distance by wind or birds, as in the case of Gooseberry. Medicinal plants were more largely cultivated in former times and, doubtless, Thorn-apple, Deadly Nightshade, and others, owe their present existence to this source.

VII. Ships' Ballast.—This was a more important method of introduction in the days when sailing ships were more numerous. Plants introduced in this way occur in the neighbourhood of seaports; *Lepidium Draba*, Linn., is a probable example.

VIII. Logs of Timber.—These are imported from America and Northern Europe, and are frequently floated down stream to the nearest seaport. Mud, containing seeds or pieces of plant stems may, sometimes, adhere to them. Mr. Praeger informs me that *Zannichellia polycarpa* may have been introduced in this way.

IX. Potting Materials.—My attention has been called to this method by Mr. Gunn, who states that peat for potting plants is obtained from Hampshire, and sand from Bedfordshire.

X. Shipwrecks.—Some years ago the *Labrador* was wrecked on one of the western isles of Scotland. Barrels of Canadian Apples were washed ashore, and many of the seeds germinated.

It remains to be seen next whether any of the doubtful species (Group C) have sufficiently strong claims to justify their inclusion among the genuine natives of the country. We have, as it were, to examine their credentials. Are there any tests which can be applied to settle the question whether such and such a species is a native or an alien in this country? Doubtless there will still remain some species as to whose exact status there will never be any consensus of opinion, but it ought to be possible to determine, with a reasonable amount of certainty, which of the "suspects" are natives and which are aliens.

Before dealing with the Flowering Plants it will be advisable to refer briefly to the groups of Cryptogams which have been introduced. The majority of these belong to the great group of Fungi. In the case of a parasitic fungus, if the host plant on which it occurs be an introduced species, the fungus will then be considered an alien also. As an example, the common Potato Blight (*Phytophthora infestans*, De Bary) will be considered an alien until it is found growing in this country on *Solanum Dulcamara*, Linn., when its claim to be native may possibly be conceded. The same test will apply to saprophytes. If the medium on which the fungus grows is a foreign substance, such as the wood of Laburnum, or rotting Oranges or Bananas, and, if it is not found growing on any other medium, then it may fairly be regarded as an alien whose spores were introduced with the decaying vegetation on which it grows.

Among higher Cryptogams a few species of Ferns have been found on walls to which their spores were, doubtless, blown from the nearest garden.

Returning to the higher plants, or Phanerogams, the following questions are those which suggest themselves as likely to help in solving the question of the nativity or alien nature of any doubtful species.

1. *What is the habitat of the species in question, and how does this compare with its habitat in countries in which it is known to be native?* House-Leek, for instance, is found in this country only on walls and roofs; on the Continent it occupies similar

situations, but it is also found growing on rocks. A very comprehensive list of habitats will be found in Woodruffe-Peacock's paper.

2. *Is the species found only on ground that has been cultivated or manured, or on artificial structures such as walls?* Dandelion is common on cultivated ground, but may also be found on the shingle of the sea-shore, or on ground that has never been broken up. Red poppies, on the other hand, are, probably, always found on ground that has been disturbed. *Geranium lucidum*, Linn., occurs in the clefts of limestone rocks; it is also found on walls, these being the nearest approach to its natural habitat.

3. *In what other countries is the species found, and what is the centre of its distribution?* If, for example, a species occurs in Great Britain, and in Western Europe, there is nothing unreasonable in its being found in Ireland also; on the other hand, a species occurring in Ireland, which has its home in Australia, would be liable to strong suspicion.

4. *What other species of plants or of animals are associated with it in the areas in which it occurs, and have any of these a similar distribution in foreign countries?* Some authorities have expressed a doubt as to the Arbutus which occurs in the Spanish peninsula and shores of the Mediterranean being a native of Ireland. But several animals found in the south-west of Europe also occur in Ireland—such as the Kerry Slug, Pyrenean Weevil, a millipede, and two species of earthworms—and it will hardly be suggested that these were introduced.

5. *Have seeds or other remains of the species ever been found underlying peat bogs or in lacustrine or fluviatile deposits or associated with crannogs?*

Compared with the extensive researches of Mr. Clement Reid, and others in Great Britain, little or nothing has been done in Ireland in the investigation of lake deposits. Whatever be the age of these deposits it is extremely improbable that any of the species found therein were introduced by human agency. In the case of crannogs the seeds of cultivated cereals have been found, but it is highly probable that the timbers used in building the crannog were all native and grew in the vicinity.

6. *What is the date of its first being observed in Ireland? Has it an ancient Irish name?*—In the *Cybele Hibernica* and Colgan's *Flora of the Co. Dublin* will be found the dates of the first records of some Irish species. A plant such as Canadian Water-Thyme, which is now so common over the country, would surely have been mentioned by some old writer if it had been in Ireland for centuries. Its first recorded appearance was about the year 1836 in Co. Down, the presumption being that it was introduced.

But little stress can be laid on the plants having an Irish name if this is a modern one—as in the case of Tobacco and Potato. If, on the other hand, the name occurs in some old record or has given rise to a place-name, there is a strong probability of the species in that case being native

7. *Has the species ever been cultivated in field or garden for use or ornament?*—The fact that plants like Hop and Vervain were formerly cultivated vitiates to a large extent their claim to be considered native, even though they may occur in what looks like perfectly wild surroundings.

A wild plant, on the other hand, may sometimes, on account of its beauty, be cultivated in gardens, as in the case of Foxglove and Welsh Poppy.

8. *Is the species ever introduced at the present time accidentally in consequence of trading operations with foreign countries?*—The various methods of introduction have already been referred to. *Thlaspi arvense*, Linn., and *Lychnis Githago*, Scop., are both being introduced at present among foreign seeds. There is therefore a presumption that they were originally brought to this country in the same way.

9. *Has the species extended its range very considerably within recent years?*—Some introduced species, finding the Irish climate well adapted to their requirements, have extended their range very markedly in a few years. Canadian Water-Thyme was an example of this. *Arenaria tenuifolia*, Linn., was first observed in 1897, but is now quite common along railways in the central parts of Ireland. The genuine natives, on the other hand, seem to be extending their range very slowly, or have disappeared from certain localities altogether.

10. *Does the species ever ripen viable seeds?*—I believe it will be found that most plants which are genuine natives of any country produce fully ripened seeds at some period of their history. Various causes may operate to prevent this, such as coldness of climate, or absence of fertilisation due to the flowers being unisexual and all of the same sex, as in Canadian Water-Thyme. In other cases where the flowers are hermaphrodite self-fertilisation is apparently ineffective, as in *Lysimachia Nummularia*. Linn., and *Acorus Calamus*, Linn.

Care must be taken, however, in applying this test. Mr. Clement Reid states that after watching *Ruscus aculeatus*, Linn., in England for twelve years he found that, as a rule, only one plant in fifty produced any fruit. Ostenfeld mentions 36 species which scarcely ever ripen their fruits in the Faeroes. Five of these never even flower.

11. *What are the natural methods of distribution of the species under consideration?*—On this subject we have still a great deal to learn with regard to the plants found in Ireland. There are four outstanding methods of dispersal, namely, by (*a*) spontaneous ejection, (*b*) water, (*c*) wind, (*d*) animals.

(*a*) This method only serves to distribute the species over short distances. The other three methods might conceivably be the means of occasionally introducing new species into our island, and of rapidly disseminating them over the country.

(*b*) Extensive investigations were carried out by Guppy to determine the transporting power of fresh water, sea water, and ice. One fact will suffice to show the value of his observations. He found that fruits of *Sparganium ramosum*, Huds., germinated after being twelve months afloat in sea water. As another striking instance of the transporting power of water, we know that West Indian seeds are cast up on the west coast of Ireland. Maury, in his *Physical Geography of the Sea*, mentions the case of a bottle thrown over off Cape Horn being picked up subsequently on the coast of Ireland.

(*c*) The transporting power of wind over fruits and seeds provided with wing-like expansions or parachutes formed of hairs, is well known. Definite experiments showing the exact distance over which the wind can carry such seeds and fruits would be a welcome addition to our knowledge. Ernst states

that the Flora of Krakatau and neighbouring islands, in 1906, consisted of 137 species, of which 39 per cent. were brought by oceanic currents, 30 per cent. by wind, and 19 per cent. by birds. The vegetation of these islands was entirely destroyed by volcanic eruptions in the year 1883.

(*d*) Hooked fruits are carried on the fur or feathers of animals. Fleshy fruits are eaten by birds, and the seeds germinate after passing through their bodies. This occurs in the case of Ivy and Hawthorn. But the subject of the feeding habits of our native birds is still in its infancy, and we have much to learn of the part they play in seed dispersal. It seems possible that the migratory birds may occasionally introduce seeds into Ireland in this way, and some of these may possibly be killed by hawks before the seeds are digested.

Darwin, in his *Origin of Species*, states that fresh-water fish eat the seeds of yellow Water-Lily and Potamogeton. He does not state what species of fish, or whether the seeds will germinate after passing through their bodies.

It will be evident that many further observations must be made before we can answer the eleven questions outlined above. When we can answer these questions satisfactorily it will then be possible to say from the evidence, with a reasonable amount of certainty, whether such and such a species is a Native or an Alien.

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OBITUARY.

FRANCES MARGARET MORE.

The death of Miss More, on February 7th, was an event of sad interest to Irish naturalists, to whom for the past fourteen years her life had been a valued link with the not yet distant past in which her distinguished brother, the late A. G. More, filled so prominent a place. Miss More had from childhood been her brother's chief companion, and devoted herself with rare and unselfish assiduity to the seconding of his pursuits. It is a rather remarkable, though, perhaps, accidental, fact that A. G. More's first attention to botany was the result of a request made by her at the time of his first visit to Ireland (in 1850) that he would collect some of the County Galway plants for a small herbarium she had begun to form. A few years later the brother and sister visited Castle Taylor together. More's important paper on the flora of that neighbourhood was the result of work done by them in common, and it is well known that the subsequent discovery of *Habenaria* (or *Neotinea*) *intacta* as an Irish and Britannic plant was practically Miss More's achievement. Her quickness of eye was very remarkable, and frequently led to the discovery of some of the best prizes obtained during their joint botanical rambles, in the Isle of Wight as well as in the early visits to Ireland. After the death of her father in 1886 Miss More took up her residence permanently with her brother in Dublin, and from that time onwards most Irish naturalists have enjoyed the privilege of counting her among their friends. Though she did not put herself forward as a scientific naturalist, her knowledge in more than one department of nature-study was far from inconsiderable. Lepidoptera and shells were among her favourite subjects, and it was an instructive pleasure to be shown by her through the large and interesting collections which she and her brother had together formed. After the death of the latter Miss More rendered a real service to botany by forwarding the publication of the new edition of the Cybele Hibernica. Of her personal characteristics this is scarcely the place to speak, but she possessed in a rare degree that forgetfulness of self and interest in others which made her brother so long a guiding spirit amongst students of nature in Ireland.

C. B. M.

REVIEWS.

CRABS, LOBSTERS, AND THEIR ALLIES.

A Treatise on Zoology. Edited by Sir Ray Lankester, K.C.B., LL.D., F.R.S. Part vii. Appendiculata (third fascicle), **Crustacea** by W. T. Calman, D.Sc. London: A. and C. Black, 1909, pp. viii. + 346. Price 15*s.* net.

No one can fail to be impressed by the thoroughness which characterizes this scholarly work. Dr. Calman has accomplished the difficult task of furnishing us with an excellent treatise on the structure and classification of the Crustacea. To the ordinary Irish reader who has been accustomed to regard William Thompson as the one great native naturalist, and who has scarcely heard of J. Vaughan Thompson of Cork, this book will be revelation. Though not a popular writer like his northern namesake, the latter has the distinction of being the first zoologist to place the crustacean nature of the so-called acorn-shells (Cirripedia) beyond dispute. He was the first, also, who drew attention to the phosphorescence of certain crustaceans. Altogether, his many original observations on marine invertebrates place J. Vaughan Thompson among the foremost naturalists of the early part of last century.

Apart from the fact that the Cirripedia, to which the acorn-shells belong, have attracted attention from the time of Aristotle, their sessile nature in the adult stage while the young are free-swimming, their structural differences from typical Crustaceans, and the most remarkable sexual dimorphism exhibited by some of them, have always caused a lively interest to be taken in them. In most of the Cirripedia, moreover, the individuals of a species are similar and hermaphrodite. In the two genera Scalpellum and Ibla however, dwarf male individuals occur. The latter are attached within the mantle-cavity of the larger individuals. When these are hermaphrodites, the dwarf males pair with them, thus presenting a most curious and unique condition.

The change from a free-swimming to a sessile condition with a corresponding modification in structure is carried even further among those species which eventually become purely parasitic. In Sacculina we possess one of the most striking instances of such a modification to be found in the whole Animal Kingdom. The larva is hatched out as an active free-swimming nauplius. A few days after it becomes attached to a crab, undergoing a remarkable metamorphosis within the body of the latter. The adult Sacculina re-appears on the abdomen of the crab as a simple sac without traces of segmentation, limbs, or alimentary canal, taking its nourishment by means of root-like processes from the body of the host. Of especial interest is the phenomenon lately investigated by G. Smith, that the infected male crabs, in various degrees, assume the secondary sexual characters of females.

As a rule, when a parasite retains to some extent the power of locomotion, the general structure of the adult does not differ greatly from that of the free-living types. But parasitism and its general effects in producing structural changes can be studied, to great advantage, among the Crustacea. In some Copepod crustaceans the female only is parasitic and becomes modified, the male remains free-swimming. Occasionally, as in the Monstrillidæ, which are endo-parasitic within polychæt annelids, the adults of both sexes are free-swimming, but are without mouth-parts or alimentary canal. All intermediate conditions of parasitism between the extreme cases of Sacculina and Peltogaster, which are modified almost beyond recognition, and the simple Copepods, living on the excretions of the skins of fishes, occur.

Dr. Calman's account of these is fascinating. And yet, even in reading his description of the interesting Anaspides, which we are so familiar with from his own researches as one of the few forms preserved to us with little change from Carboniferous and Permian times, we feel a certain disappointment at the comparative neglect of two great branches of the subject which the modern naturalist would expect to find in a great work of this kind. Of the geographical distribution of the Crustacea there is little, while the remarks on their habits and the manifold ways in which their modes of life affect our industries, are often too cursory. This is the only serious fault in a work which is well illustrated, excellently written, and carefully brought up to date.

R. F. S.

BRITISH AND IRISH DESMIDS.

A Monograph of the British Desmidiaceæ. By W. West, F.L.S., and G. S. West, M.A., D.Sc. Vol. i., pp. xxxvi. + 224, Plates i.—xxxii., 1904; vol. ii., pp. x. + 204, Plates xxxiii.—lxiv., 1905; vol. iii., pp. xv. + 274, Plates lxv.—xcv., 1908. London (Ray Society). Price 25*s.* net per vol.

There is no one better qualified to write a work on such a subject than the two authors who have undertaken this Monograph. Certain it is that as regards Ireland most of our knowledge of the distribution of Desmids and of Freshwater Algæ generally in the northern and western parts of the country is due to their investigations.

The work begins with a short historical account of previous studies on the group. Ralfs' "British Desmidieæ," published in 1848, enumerated 162 species and 32 varieties as occurring in the British Isles. The account of Desmidieæ in Pritchard's "Infusoria," 4th ed., 1861, was written by William Archer, who was for many years one of the leading members of the Dublin Microscopical Club, and to whose work a just tribute is paid by the authors of these volumes. Cooke's "British Desmids," published in 1887, contained descriptions of 290 species and 48 varieties. In the present work about 750 species and 450 varieties will be described. Apparently two more volumes will complete the work.

After a preliminary account of the structure, habitats, distribution, and affinities of the group there follows a detailed account of the genera and species. In the three volumes published up to the present 436 species are described. Keys are given to facilitate the determination of the genera and also of the species belonging to the larger genera such as Closterium and Cosmarium. Every species and variety is figured, the plates in many cases being coloured. Accompanying the description of the species is a full list of synonyms with references to the literature. A detailed account of the county distribution of the group is given in England, Wales, Scotland, and Ireland, as well as in foreign countries. There is a copious Bibliography in vol. i., which is added to in the succeeding volumes. Both paper and type are good, and the figures are carefully executed.

In a work containing so many references it is only to be expected that some omissions or errors will occur. No Irish locality is given for *Euastrum Sendtnerianum* Reinsch, although it is included in Archer's List for Dublin and Wicklow. Among the Irish localities there are several topographical errors. In vol. i., p. 45, Lough Brin is included in Co. Galway although elsewhere in the work it is correctly referred to Co. Kerry. In vol. ii., p. 82, and again in vol. iii., p. 72, Lough Moher is included in Co. Galway but really belongs to Co. Mayo. In a number of places in vols. ii. and iii., Castletown, Adrigole, Sugar Loaf Mt., and Glengarriff are referred to Co. Kerry, but all of them are in Co. Cork.

In the Bibliography there is a slight inaccuracy in the date of Archer's papers in the *Quarterly Journal of Microscopical Science*. All notes and other contributions by him to the pages of that journal appeared between the years 1858 and 1880.

It is rather a pity that the habitat of each species, whether pond, peat bog, mountain pool, &c., is not indicated, as was done in Cooke's Handbook. But these are slight blemishes in a work where so much is excellent. Guided by the beautiful illustrations and descriptions it should be easy to identify any British species of Desmid.

J. A.

A GUIDE TO BIRDS' NESTS.

Birds' Nests and Eggs and how to Identify them: The young People's Birds'-Nest Chart. By the Rev. S. N. Sedgwick, M.A. Pp. 61, 4 coloured plates and 16 photographs. London: Robert Culley, 1909. Price,

This is a chapter from the Rev. S. N. Sedgwick's "Young People's Nature-Study Book," reproduced separately so as to form a portable and pocketable guide to the identification of birds' eggs and nests. Starting with the idea that egg-collecting should be discouraged, and that a nest once found by a beginner in the course of a country walk is not likely to be visited a second time, the author draws a logical enough inference from his own premises in considering that the young student ought to have with him, at the moment of discovery, the means of identifying there and then, and as quickly as possible. The nests are therefore "classified" according to the kinds of situations in which they are likely

to be found: there is a table giving succinct descriptions of the distinguishing qualities of each, and of the eggs they should contain; and the coloured plates give good representations of the eggs of 37 species (all passerine), selected as those which the author considers to be the "most generally confused." There are also a number of photographs, but it can hardly be said that these are intended to assist identification. Their object is rather to stimulate the young naturalist to "go and do likewise." As there is so much diversity of temperament among young people one hesitates to say a word in disparagement of Mr. Sedgwick's mode of appealing to them, which will doubtless be effective in some quarters; but we are inclined to think that identifications made in the hurried manner that this book aims at promoting will not leave a very abiding impression on the memory. We would prefer recommending a book of moderate dimensions that can be left at home, that does not make a point of disregarding classification and "technical or Latin names," and whose zeal for brevity is not carried to the excess of leaving us to distinguish a swallow's nest from a House-martin's by the single criterion of its greater untidiness. C. B. M.

THE SURVEY OF THE DERRY DISTRICT.

The Geology of the Country around Londonderry. By S. B. Wilkinson, A. M'Henry, M.R.I.A., J. R. Kilroe, A.R.C.Sc.I., and H. J. Seymour, B.A., F.G.S. (Memoirs of the Geological Survey of Ireland). Pp. 106, coloured map, 7 plates and 11 text-figures. Dublin: H. M. Stationery Office, 1909 Price 2*s*.

In pursuance of the plan adopted by the Irish Geological Survey, of presenting the large centres of population with a map accompanied by a memoir, in which a detailed account of the physical features and the geological structure of the surrounding country is given, the fifth of an interesting series of memoirs has been published.

The map is composite, containing portions of 4 one-inch sheets—11, 12, 17 and 18. It is of the usual size 18″ × 12″, and thus embraces an area of 216 sq. miles, at about the middle of which the city stands.

Part I., Section I., refers to the Physical Geography of the area, and here the origin of the Promontory of "Inishowen," literally Owen's Island, is discussed. Professor Hull's opinion that "within the historic, or at least, traditionary period, it may have been really an island, at least during high tides," is commented upon. A subsidence of 20 feet would allow the sea to flow over most of the low tract between Loughs Foyle and Swilly, along which the railway to Buncrana now runs, whilst a further reduction of level by 30 feet would convert Inishowen into an island once more. In discussiug the Foyle and Burngibbagh valleys, which preserve a distinct parallelism for 12 miles, Mr. Kilroe concludes that the Burngibbagh was originally the principal stream, whose head waters were captured by the Foyle long before the Glacial Epoch. Fincairn Glen, 3 miles E. of the city, is an example of a dry gap. It extends for two-thirds of a mile, and is about 100 feet deep, with precipitous walls of rock. The frontispiece gives a view of the north end, with a delta fan formed by the river which now occupies the glen

In Section 2, Professor Cole gives a brief summary of the geological history of the area. Mr. Seymour gives a general account of the rocks. These include epidiorites, lamprophyres, limestones, grits, schists and slates. Sedimentary rocks are much in the preponderance, and are all more or less altered. The chief type is a greenish-gray shale, associated with which are black phyllites, slates, schistose grit, and a small amount of crystalline limestone. The secondary structure is due to pressure, thermal action being much less evident. The igneous intrusive rocks have, with one exception, shared in the general metamorphism.

Part II. gives a more detailed account of the survey. The area was divided into four districts, one of which was allotted to each member of the Survey. The microscopical petrology of all is described by Mr. Seymour, who also is responsible for the excellent photographs.

Mr. Wilkinson discusses the glaciation of the north-western district. The previous Inishowen memoir mentions the prevailing directions of striations as S. to N.20°E., and in addition states that the roches moutonnées with steep western faces give evidence of ice coming from the north-east. Strengthening this conclusion the present survey has revealed deep grooves, having a W.S.W. direction, and in an earlier Boulder-clay at Burnfoot, 8 miles N.W. of the city, basalt, chalk flints, red sandstone, and a fossil shell, *Gryphæa incurva*, from the Lias, have been found. In the later Boulder-clay of this district some red granite blocks occur which have a close resemblance to Barnesmore granite. These, together with the deep grooves running in a varying direction from N. 15° E. to N. 10° E., support the theory of a later ice movement from the south-west. The evidence from the other three districts confirm these conclusions.

In Part III. the Economic Geology is treated of, Chap. VII. dealing with brick clay, building materials, road metal, water supply, and sea shells. It is interesting to note that whereas formerly the setts for road-making within the city were imported from Scotland and Wales, a suitable granite from Carrigart, Co. Donegal, is now being used. Sea-shells are commonly used for agricultural purposes along the seaboard and are carted several miles inland. An extract from a paper by Samuel Molyneux, about the year 1726, reads that "about 30 years ago they made lime of the shells and manured their land with it; but a poor countryman, that, out of laziness or poverty, had not provided to make lime, threw the shells unburnt on his land; his crop proved as good as his neighbours; and the second and third crop better, and all took the hint, and have used them so ever since."

Chapter VIII. is devoted to soils. Analyses of 28 different kinds have been made by Mr. Hallissy under the direction of Mr. Kilroe. Reference is made in the introduction of this subject to the earlier work done by Portlock in the North of Londonderry. Now that so much attention is devoted to soil physics in England, Germany, America, and Japan, it is gratifying to reflect that soil analyses were carried out in the early part of last century by that distinguished officer.

I. Swain.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Patas Monkey from Commissioner W. S. Wright, a Mona Monkey from Mr. H. Hopkins, a Weeper Capuchin Monkey from Lieut. L. C. A. Moore, a White-fronted Capuchin Monkey from Mr. J. K. Bradbury, two Badger cubs from Mr. D. R. Browning, Common Squirrels from Mr. C. G. Tottenham and Mr. Grattan Bellew, a Guinea Pig from Miss A. Barrington, a Crowned Crane and a number of Waxbills from Dr. Montgomery, a great Sulphur-crested Cockatoo from Mr. J. H. Richardson, a Sparrowhawk from Mr. J. Johnston, a Goshawk from Mr. H. B. Rathborne, and two Napoleon Weaver Birds from Capt. J. W. H. Seppings. A female Coypu with young has been bought. A Ringtailed Lemur, a Mongoose Lemur, and a Tree-Porcupine have been born in the Gardens. These baby Lemurs are most interesting objects in the Monkey-house at present.

DUBLIN MICROSCOPICAL CLUB.

April 14.—The Club met at Leinster House. A. R. Nichols (Vice-President) who was in the Chair, showed living specimens of the fresh-water polyzoon *Cristatella mucedo*, recently emerged from their statoblasts. In some of the specimens fresh individuals were already being formed by budding.

F. W. Moore exhibited seedlings of *Drosera pygmæa*, a rare Australian species. The plant is minute, not more than one inch in height, with numerous leaves, and inconspicuous flowers. The glandular tentacles appeared on the first leaf developed after the cotyledons.

BELFAST NATURALISTS' FIELD CLUB.

December 16, 1908.—The President (Robert Patterson, F.L.S.) in the chair. Mrs. Hobson presented her Report as the Club's delegate to the Dublin meeting of the British Association, in which she went into the details which have already appeared in the *Irish Naturalist*. T. Anderson followed with a paper on the "Geology of the Dublin District." The papers were spoken to by the President, Miss Andrews, N. H. Foster, M.B.O.U.; T. H. Dewhurst, and R. Welch, M.R.I.A.

December 19, 1908.—Botanical Section.—Sylvanus Weir read a paper on the "Fertilisation of Flowers," which was very fully illustrated by a fine series of micro slides.

January 6, 1909.—Archæological Section.—A. Milligan read a paper on "The Ancient Inhabitants of Ireland and their Kindred."

JANUARY 19.—The President in the chair. F. BALFOUR BROWNE M.A., read a paper on "The Life-History of the Water-Beetle," in which he brought forward several new facts in the development of water-beetles. The President and Messrs. Hamilton, Tomlinson, Gray, and Orr, spoke on the paper.

JANUARY 27.—GEOLOGICAL SECTION.—T. H. DEWHURST, A.R.C.Sc., gave a lecture on "The Determination of Specific Gravity and the Use of Heavy Liquids."

FEBRUARY 3.—ARCHÆOLOGICAL SECTION.—JOSEPH SKILLEN read a paper on "Church Island," illustrated with lantern views.

FEBRUARY 10.—ZOOLOGICAL SECTION.—F. BALFOUR BROWNE gave an informal lecture on "Method in Biological Research." He described his own work among water-beetles as consisting of four sections—collecting, systematic work, life-history work, and distribution, and he went into the details of the methods he employs. Messrs. Foster, Welch, Stelfox, Orr, Milne, Maxwell, and Gallway took part in the discussion.

FEBRUARY 13.—BOTANICAL SECTION.—A most interesting biographical paper was read by W. J. C. TOMLINSON on "The Charles Darwin Centenary: Darwin as a Botanist."

FEBRUARY 16.—W. J. Fennell in the chair. Miss MARGARET DOBBS read a paper on "The Dawn of History in Ireland," which gave rise to considerable discussion at the close.

FEBRUARY 24.—GEOLOGICAL SECTION.—A paper which contained a good deal of original research was read by JAMES STRACHAN on "The Opal Deposits of Sandy Braes; their Formation and Origin." The lecturer was highly complimented at the close on his work on these local deposits.

MARCH 3.—Joint Meeting of ZOOLOGICAL and GEOLOGICAL Sections. R. WELCH, M.R.I.A., read a paper on "Rain-wash Deposits of Land shells on Sand-hills at Horn Head." At Horn Head land shells occur in the dunes in myriads, and where the dunes have been formed along a hillside having a surface of stiff clay, sudden heavy rainfalls have undercut the dunes, floating out shells of all sizes. The paper, which has been published in the *Irish Naturalist* (pp. 113-115, *supra*), gave rise to a prolonged discussion.

MARCH 10.—ARCHÆOLOGICAL SECTION.—JOHN M. DICKSON read a paper on "Celtic Misnomer."

MARCH 13.—BOTANICAL SECTION.—Rev. C. H. WADDELL, B.D., read a paper on "The Goosefoots, Knotweeds, &c. (Incompletæ), and the new classification of Engler." This was followed by a paper by W. J. C. TOMLINSON on "Local Plant Gleanings, 1908," the more important records having already appeared in this Journal.

MARCH 16.—The Vice President (W. H. Gallway) in the chair. R. LLOYD PRAEGER, B.E., M.R.I.A., read a paper on "Rock Gardens, Natural and Artificial." There was a very large attendance. Mr. Praeger described the special characters of rock plants and alpines, and went on to describe the natural rock gardens of the Alps, and also the

remarkable rock garden of the Burren in Co. Clare. Afterwards the cultivation of rock plants and alpines was dealt with, and the building of rock gardens.

MARCH 24.—GEOLOGICAL SECTION.—WILLIAM GRAY, M.R.I.A., read a paper entitled "A Gossiping Geological Speculation on Cavehill."

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 6.—C. B. MOFFAT, M.A., in the chair.—Prof. G. H. CARPENTER lectured on "The Darwinian Theory after fifty years," giving examples of facts discovered in recent years that afford support to the general doctrine of evolution, and discussing the theory of Natural Selection as offering a rational explanation of the process of evolution. A short account of contributions to the problem made by Romanes, Mendel, Bateson, and other investigators followed. A discussion ensued in which the chairman and J. Bayley Butler took part, the former laying stress on the importance of sexual selection, and the latter calling attention to some evidence and arguments in favour of use-inheritance recently brought forward by Prof. M. M. Hartog, of Cork.

NOTES.

ZOOLOGY.

Ascidicola rosea in Belfast Lough.

During the past year I have come across several specimens of *Ascidicola rosea*, Thorell, in the branchial sacs of *Ascidia virginea*, and other species from Belfast Lough. This copepod is not included in Pearson's "List of Irish Copepoda," nor have I been able to find any definite record of its occurrence in Irish waters, though it is probable that this was one of the forms originally described by Allman under the name of *Notodephys ascidicola*.

W. RIDDELL.

Belfast.

Early appearance of Macroglossa stellatarum.

A Humming-bird Moth was seen here in March in a conservatory, and on the 15th April a fine specimen was seen in the garden hovering over the flowers. This moth does not usually show here till late summer.

M. J. DELAP.

Valentia, co. Kerry.

A SPECKLED FORM OF THE COMMON OTTER,
from Lough Sheelin.

To face page 141.]

ON THE OCCURRENCE OF A SPECKLED OTTER IN IRELAND.

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

[PLATE 2.]

THE National Museum of Ireland recently acquired from Mr. W. J. Williams, of Dublin, a full-grown Otter, which differs from ordinary otters, in that its rich brown fur is dotted all over with white spots, as shown in the accompanying illustration (Plate 2). It was trapped in Lough Sheelin, which lies partly in the County Cavan and partly in Westmeath.

The fur, as a rule, is of a rich chestnut brown in Irish Otters. It is composed of two parts, the woolly under-fur and the longer stiffer hairs projecting beyond this. The colour of the under-fur is very light grey changing to greyish-brown above, while the longer hairs are chestnut brown throughout. On closely examining an Otter skin we sometimes find that the under-fur is not quite uniformly coloured throughout. Here and there, separated by wide spaces, very small perfectly white tufts are met with in the under-fur. When these occur in such large patches as to be clearly noticeable, their presence impairs the value of the skin from a furrier's point of view. Mr. Williams informs me that, occasionally, amounting to about 1 per cent. of the skins prepared by him for the fur trade, the skins are speckled in this manner. The whiteness, however, in these cases, is still hidden to some extent, in the unprepared skin, by the brown colour of the long hairs. It is only after removal of the hairs by the furrier that the white spots become plainly visible.

In the specimen here figured, not only has the under-fur white patches of variable size, but the whiteness extends even to the long hairs, giving the Otter a most peculiar speckled appearance. Mr. Williams tells me that, among several thousands of skins that have passed through his hands, this is the only specimen of that kind he has seen.

From the Royal Irish Academy Fauna and Flora Committee's records, I find that perfectly white Otters have been observed in the River Shannon, being, presumably, true albinos, and recorded in the *Field* (vol. xci., 1898, pp. 141–42). We know that an albino Otter from Scotland is preserved in the Belfast Museum, but the only record of a speckled Otter that I have noticed is of one supposed to be in

the Hancock Museum of Newcastle-on-Tyne. On applying to Mr. E. L. Gill, the Curator of this Museum, about the specimen, he kindly informs me that there is no such otter in the Hancock Museum. The Irish speckled Otter now described is therefore, as far as I can ascertain, a unique specimen.

In connection with this very abnormal skin of the Otter, I re-examined the ordinary ones with a view to verifying Mr. Ogilby's statement[1] that Irish Otters differ so much from English ones as to deserve a special name. He proposed to call the Irish Otter *Lutra roensis* instead of *Lutra vulgaris*.

As there are no English skins of the Otter in the Irish National Museum, I was unable to compare the two externally. Mr. Ogilby gives the dark colour, which he describes as almost black, as the principal character of the Irish Otter. There are about half-a-dozen Irish skins in the National Museum, but none of them are darker than chestnut brown. Mr. Ogilby mentions that there are differences also in the size of the ears and in the proportions of other parts in the Otters from the two countries without, however, indicating to us anything more definite. More recently Dr. Sclater has drawn attention to this alleged difference in the fur, while William Thompson[2] thought that the skull of the Irish Otter was larger than that of the British, and stated that Dr. Robert Ball considered the two Otters to be, perhaps, distinct varieties.

None of these authorities clearly define how an Irish can be discriminated from a British Otter. There are sixteen recent Otter skulls from various British and Irish localities in the National Museum. After a careful examination of these I failed to detect any character by which Irish skulls can be distinguished from British ones. At any rate we cannot argue from a comparison of a few skulls that the Irish Otter is larger than the British. The size of a species varies in every country between certain very definite limits, and, as the largest specimens are generally sent to a museum for preservation, a large series is required to determine the average size. As far as the skull is concerned, I think the Irish Otter is not, specifically, distinguishable from the British.

[1] OGILBY, W., *Proc. Zool. Soc. London*, 1834 (part ii.) p. 110–111.

[2] THOMPSON, W., Natural History of Ireland, vol. iv., 1856, p. 6.

National Museum, Dublin.

PALUDESTRINA CONFUSA, FRAUENFELD,

An Addition to the Irish Fauna.

BY R. A. PHILLIPS.

In August, 1907, while collecting shells near New Ross Co. Wexford, I found in a small tidal tributary of the river, Barrow a few specimens of a Paludestrina, or Hydrobia, which at the time I was unable to identify. They were subsequently included among other shells sent to Mr. W. Denison Roebuck as a contribution towards the completion of the Conchological Society's census. Through the Society's referees they were finally submitted to Mr. E. A. Smith, of the British Museum, who has made a special study of the genus, and he at once identified them as *Paludestrina confusa*, Frau. This is the little brackish-water mollusk formerly better known as *Hydrobia similis*, Drap. In Mr. L. E. Adams's "Collector's Manual" (Ed. 2, 1896), it is said to be almost extinct in the lower Thames marshes, which for many years was its only known British station. Mr. A. S. Kennard, however, informs me that it has lately been found at Blythburgh and Oulton Broad in Suffolk, and at Saltfleetby in Lincolnshire.

The botanical features of the lower Thames, as described by the earlier naturalists, are in many respects similar to those of the Shannon—for instance, *Leucojum æstivum* and *Scirpus triqueter* are among some rare plants characteristic of both—and it struck me that a similarity in the fauna of each of the two rivers might also be looked for. Accordingly, Dr. George Fogerty and I recently visited the Shannon below Limerick and at once found *P. confusa* extremely abundant all over the tidal marshes and in brackish drains, its associates being *Paludestrina Jenkinsi*, *Limnæa palustris*, *L. truncatula*, *Planorbis spirorbis* and *Succinea elegans*.

Dr. Scharff, who has kindly worked out its foreign distribution for me, states that it occurs in France only in the south, in the stagnant waters of the Rhone and generally between the Alps and Pyrenees. It is also said to occur in Sardinia, Sicily, Spain, Algeria and Morocco. Being so rare in Great Britain and such a thoroughly southern species elsewhere, its occurrence in Ireland is of special interest.

Cork.

MOSSES AND LIVERWORTS FROM CO. FERMANAGH, AND SLIEVE LEAGUE, CO. DONEGAL.

(Collected for the Flora and Fauna Committee of the Royal Irish Academy.)

BY DAVID M'ARDLE.

In June, 1907, I spent a few days in Co. Fermanagh. My principal object in going there was to endeavour to extend the range of Spruce's Amblystegium, a minute and very distinct moss which I found in Correl Glen in October, 1905; another object was to rediscover in good condition a Bryum very like *B. purpurascens;* in all the specimens I found on my previous visit the fruit was too old, and it was impossible to tell the difference between it and *B. inclinatum.* However, in my anxiety to find these two plants I miscalculated about the growth of the Bracken, which was in full possession of Correl Glen and other places, and it was impossible to find anything amongst such dense growth. Turning from the glen to the other side of the main road I got into what was once a splendid Pine plantation but now almost completely burned out. I was attracted to the place by the extensive bright patches of a moss, closer inspection proved it to be a Funaria; it looked different from the common *F. hygrometrica*, so I took specimens, and it has proved to be *F. calcarea*, a plant which has rather restricted distribution in Ireland. The Census Catalogue records it from Counties Cork, Antrim and Derry. It is also known under the name of *Funaria Muhlenbergii*, being first detected by Dr. Muhlenberg in Pennsylvania. This curious genus extends to the tropics, and after a forest fire Funaria is almost the first sign of returning vegetation on the burned soil. The specimens I collected were mostly among stones, rocks and burned peat. I spent a day about Knockmore, where the limestone forms massive walls of rock; the huge grey cliffs can be seen from a considerable distance. I pushed on from here to Rossinure More, an extensive range of cliffs, where I gathered very fine specimens of *Breutelia arcuata*, some of them nearly six inches in length, the stems covered with reddish brown radicles, and similar luxuriant specimens of *Neckera crispa* were plentiful. On shaded rocks among Rossinure More

cliffs I found *Orthothecium intricatum*, a rare moss, conspicuous on account of the yellowish-green silky tufts; it may be overlooked for *Hypnum cupressiforme* var. *resupinatum*, but it is more highly coloured and grows on rocks. Though I searched the neighbourhood carefully, I found it only in one place; hitherto its range has been confined to North Kerry, Sligo and West Donegal.

One wet morning I got a boat and rowed about a mile on Lough Erne to Heron Island, which is probably the smallest which dot the extensive lough near Church Hill. I chose this island as it was near the shore; the boat was a very frail structure, and had been exposed to the sun and weather for a long time. Some grass and trees of Alder and Birch grew among the rocks. The liverworts I gathered were *Metzgeria furcata* and *Radula complanata* on the trees, *Aneura multifida* and *Blasia pusilla* among the wet rocks. Mosses were better represented, and I gathered seventeen species.

On this trip I add eighteen species and five varieties to my former list[1] of Fermanagh mosses. Among the liverworts collected I add the following to the previous list :—*Cephalozia curvifolia*, *Scapania umbrosa*, *Jungermania crenulata*, *J. barbata*, *Nardia scalaris*, *Blasia pusilla*. Other species included below which were in former list are from a locality remote from where they were previously collected, and much yet remains to be done in this interesting county.

I spent a few days on Slieve League, Co. Donegal, searching for mosses and liverworts. I followed a stream to near the summit, which rises to 1,972 feet. At a small waterfall *Eurhynchium rusciforme* and the variety *atlanticum* flourished within the spray—very fine specimens of the latter, similar to those I found some years ago on a steep rocky bank near the sea on the shore of Dingle Bay, Co. Kerry. Here also I gathered a rare liverwort, *Scapania subalpina*, a very distinct plant. On decayed wood with Frullania, *Lophocolea heterophylla* grew sparingly; it has a remarkable aromatic smell. *Nardia obovata* was on the rocky bank of a stream; I have some forms of this interesting plant which very closely associate it with *N. hyalina*, and I would be inclined to say they are both forms of one species. On wet rocks, *Marsupella*

[1] *Irish Nat.*, vol. xvi., p. 232, 1907.

sphacclata was very scarce; in a stream not far from the road leading to "One Man's Pass," *Ancura sinuata* flourished. Beside it, in the crevices of the rocks, *Reboulia hemisphærica* grew sparingly.

FERMANAGH.

Mosses.

Sphagnum subsecundum, Nees, var. **contortum,** Schp.—Correl Glen.

S. acutifolium, Ehrh. var. **purpureum** Schp.—Correl Glen.

Polytrichum piliferum, Schreb.—Heathy bank, Poulaphuca.

P. juniperinum, Willd.—Heathy bank, Heron Island. On decayed wood, shore of Lough Erne near Church Hill.

P. gracile, Dicks.—Peaty bank, Correl Glen.

Ditrichum flexicaule, Hampe.—On rocks, Rossinure More; Knockmore.

Dicranum scoparium, Hedw.—Rossinure More.

D. majus, Turn.—Knockmore, Poulaphuca.

Fissidens adiantoides, Hedw.—Heron Island. Abundant on rocks and banks along the shore of Lough Erne near Church Hill.

Grimmia apocarpa, Hedw.—On stones, Heron Island. A slender form also grows on Rossinure More with long hair points (the var. *gracilis* W. and M.; *G. gracilis* Schleich.).

G. pulvinata, Smith.—Rossinure More.

Racomitrium lanuginosum, Brid.—Knockmore.

Tortula muralis, Hedw.—Rossinure More.

T. subulata, Hedw.—Heron Island.

Barbula lurida, Lindb.—On decayed wood among rocks, Poulaphuca. An abnormal form grows on wet stones on Heron Island.

B. fallax, Hedw.—Abundant in the crevices of rocks, Heron Island; Knockmore.

Welsia rupestris, C. M.—On rocks, Heron Island.

Trichostomum crispulum, Bruch.—On rocks, shore of Lough Erne; Knockmore; Rossinure More.

T. mutabile, Bruch.—Knockmore.

T. tortuosum, Dixon.—On rocks, Poulaphuca: Knockmore; Heron Island.

Cinclidotus fontinaloides, P. Beauv.—On stones, Heron Island, often submerged.

Encalypta streptocarpa, Hedw.—Among rocks, Heron Island.

Zygodon Mougeotii, B. and S.—On rocks, Poulaphuca; Knockmore; Rossinure More.

Funaria calcarea, Wahl.—Abundant on stony ground where a plantation of conifers had been burned opposite Correl Glen.

Philonotis calcarea, Schp.—Boggy places, Poulaphuca.

Breutelia arcuata, Schp.—On rocks, very luxuriant, Rossinure More; Knockmore.

Bryum pendulum, Schp.—Heathy bank, Heron Island; Poulaphuca.
B. inclinatum, Bland.—Peaty bank among rocks, Heron Island.
B. capillare, L.—On rocks, Heron Island.
Neckera crispa, Hedw.—On Rossinure More and Knockmore, very luxuriant.
Anomodon viticulosus, Hook and Tayl.—Knockmore, plentiful.
Cylindrothecium concinnum, Schp.—Rossinure More, among grass at the base of rocks.
Orthothecium intricatum, B and S.—On damp rocks, Rossinure More.
Pleuropus sericeus, Dixon.—Rossinure More, plentiful.
Brachythecium rutabulum, B. and S.—Poulaphuca.
B. purum, Dixon.—Knockmore.
Eurhynchium Swartzii, Hobkirk.—Bank on Heron Island.
Hypnum stellatum, Schreb.—On wet rocks, Rossinure More.
H. chrysophyllum, Brid.—A curious abnormal form grows on damp rocky ground on Heron Island, which has the single nerve and opaque angular cells of *H. chrysophyllum*, but the leaves resemble those of *H. stellatum* in their squarrose habit.
H. commutatum, Hedw.—On wet banks, Poulaphuca, very luxuriant.
H. cupressiforme, L.—On trees and rocks; common.
Var. **filiforme,** Brid.—On the trunks of trees in fruit, Rossinure More.
Var. **ericetorum,** B. and S.—Heron Island; a very distinct form with flattened complanate stems and branches and a pale green colour.
H. molluscum, Hedw.—On wet banks, shore of Lough Erne; Knockmore; Rossinure More, on rocks near a stream.
H. palustre, L.—Marshy place among rocks, Poulaphuca.
H. cuspidatum, L.—Growing in large masses on Heron Island; Rossinure More.
H. Schreberi, Willd.—Heathy banks, Poulaphuca.
H. squarrosum, B. and S.—Very luxuriant about Rossinure More.
H. triquetrum, B. and S.—Banks about Rossinure More.

Hepaticæ.

Lejeunea patens, Lindberg—On *Frullania tamarisci*, Rossinure More.
Radula complanata, Linn., Dumort.—On the trunks of Alder, Heron Island.
Porella platyphylla, Linn., Lindberg.—On rocks, Poulaphuca.
Cephalozia bicuspidata, Linn., Dumort.—Banks about Knockmore.
C. curvifolia. Dicks., Dumort.—On decayed wood, Correl Glen.
Scapania umbrosa, Schrader, Dumort.—On decayed wood, Knockmore, Correl Glen.
Diplophyllum albicans, Linn., Dumort.—Knockmore.

Plagiochila asplenioides, Linn., Dumort.—On rocks, Rossinure More.

P. spinulosa, Dicks., Dumort.—On wet banks, Poulaphuca; Rossinure More.

Jungermania crenulata, Smith.—On moist banks, Knockmore; Correl Glen.

J. barbata, Schreber.—On wet rocks, Rossinure More.

Nardia scalaris, Schrad.—On moist banks, Correl Glen.

Blasia pusilla, Linn.—Wet bank, Heron Island.

Pellia calycina, Taylor.—On wet rocks, Poulaphuca.

Aneura multifida, Linn., Dumort.—Marsh on Heron Island.

A. pinguis, Linn.—Marsh, Rossinure More.

Metzgeria furcata, Linn., Raddi.—On rocks, Rossinure More.

M. conjugata, Lindberg.—On the trunks of trees, Poulaphuca.

WEST DONEGAL (SLIEVE LEAGUE.)

Mosses.

Sphagnum cymbifolium, Ehrh.—Boggy places, frequent.

S. rigidum, Schp., var. **compactum,** Schp.—On heathy banks.

S. acutifolium, Ehrh.—Boggy places.

S. cuspidatum, Ehrh.—Boggy places.

Polytrichum piliferum, Schreb.—On a ditch bank.

Ceratodon purpureus, Brid.—On a dry bank.

Dicranella squarrosa, Schp.—In a marshy place.

Campylopus fragilis, B. and S.—Peaty bank near One Man's Pass.

C. atrovirens, De Not.—Among rocks.

Racomitrium aciculare, Brid.—On stones in a stream.

Ptychomitrium polyphyllum, Fürnr.—On rocks, common.

Funaria Templetoni, Sm.—On a wet bank.

Philonotis fontana, Brid.—On a wet bank.

P. calcarea, Schp.—Marshy place.

Webera albicans, Schp.—Wet rocks and banks.

Bryum capillare, L.—On rocks.

B. alpinum, Huds.—On rocks.

Thuidium tamariscinum, B. and S.—Bank of a stream.

Eurhynchium rusciforme, Milde.—Marshy place.

Var. **atlanticum,** Brid.—On wet rocks within the spray of a waterfall, very luxuriant specimens.

Plagiothecium undulatum, B. and S.—On a damp bank.

Hypnum uncinatum, Hedw.—On rocks in a marsh near One Man's Pass.

H. falcatum, Brid.—Boggy place.

H. ochraceum, Turn.—Rocky stream.

HEPATICÆ.

Scapania subalpina, Nees, Dumort.—On wet rocks in stream near summit.
S. nemorosa, Linn., Dumort., var. **purpurea,** Hook.—Marshy place.
S. undulata, Linn., Dumort.—Marshy place.
Diplophyllum albicans, Linn., Dumort.—Common.
Lophocolea heterophylla, Schrad., Dumort.—On decayed wood on a wet bank, very scarce.
Jungermania crenulata, Smith.—On moist banks.
J. ventricosa, Dicks.—On a moist bank.
Nardia obovata, Nees, Carrington.—Bank of a stream.
N. scalaris, Schrad.—On moist banks.
Marsupella emarginata, Ehrhart, Dumort.—On wet rocks.
M. sphacelata, Gieseke, Dumort.—On wet rocks, very scarce.
Pellia calycina, Taylor.—Side of a stream.
Aneura sinuata, Dicks, Dumort.—On wet rocks.
Conocephalus conicus, Neck., Dumort.—On damp banks.
Reboulia hemisphærica, Raddi.—In the crevices of moist rocks.

Royal Botanic Gardens, Glasnevin.

ON SOME IRISH HAWKWEEDS.

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

I lately sent a number of hawkweeds from my own herbarium and also some from the herbarium of the late Rev. S. A. Brenan to Rev. E. F. Linton, who has kindly examined them. Some of the specimens were not well preserved, and could not be named with certainty, but I think notes on these may be of value and perhaps lead to better specimens being obtained for further examination.

Amongst those in my collection I am glad to record *Hieracium hypochæroides* (referred to by Mr. Praeger in the April number, *I. N.*, p. 81) from a new Irish locality. A friend to whom it was submitted at the time had given it a wrong name and thus it was overlooked.

Hieracium anglicum, Fr.—Cave Hill, Rev. C. H. Waddell; and Glendun, county Antrim, Rev. S. E. Brenan. Tollymore Park, co. Down, C. H. W. ——Var. **acutifolium,** Backh.—Ben Evenagh, co. Derry, July, 1900, Rev. H. W. Lett and C. H. W.; Tollymore Park, co. Down, C. H. W. (probably this var.).

H. iricum, Fr.—Lisoughter above Recess, co. Galway, June, 1895; Ballintoy, co. Antrim, June, 1893, Rev. S. A. Brenan.

H. argenteum, Fr.—Tollymore Park, co. Down, C. H. W.

H. Sommerfeltii, Lindeb.—Ben Evenagh, co. Derry, July, 1900, Rev. H. W. Lett and C. H. W.

H. hypochæroides, Gibs.—Carlingford Mountain, co. Louth, Rev. H. W. Lett and C. H. W., July, 1900. Mr. Linton says "these specimens show a leaning towards var. *saxorum*, but that may be caused by the geology of the situation. I put it under type." I submitted other specimens from limestone, Scout Scar, Kendal, collected in 1895 in Westmorland.

H. silvaticum Gouan, var. **cordigerum,** Norrl.—Ben Evenagh, co. Derry, H. W. Lett and C. H. W.—Var. **microcladium,** Dahlst.—Garvagh, co. Derry, June, 1895; Newtowncrommelin, co. Antrim, April, 1895, S. A. Brenan.

? **H. rubiginosum,** F. J. Hanb.—Glendun, August, 1886; Ballintoy, co. Antrim, May, 1895; Garvagh, co. Derry; Marble Arch, co. Fermanagh, July, 1872, all Rev. S. A. Brenan. Mr. Linton refers specimens from these localities with some hesitation to this species, and says that better examples should be collected and submitted to him for study. Mr. Brenan had them named H. *pallidum* and var. *cinerascens* or *lasiophyllum*, Koch. Unfortunately they are all in bad condition.

H. rivale, F. J. Hanb. var. **dasythrix,** Linton.—By Shimna River, Tollymore Park, co. Down, June, 1905, C. H. W.

H. euprepes, F. J. Hanb.—Cave Hill, co. Antrim, C. H. W.

H. tridentatum, Fr.—Marble Arch. co. Fermanagh, July, 1872, Rev. S. A. Brenan. This seems to be a very scarce species in Ireland.

H. gothicum, Fr.—Glendun, co. Antrim, July, 1886, S. A. Brenan.

H. corymbosum, Fr.—Ballintoy, co. Antrim; Tireren Glen, co. Derry, July, 1886, S. A. Brenan.

H. auratum, Fr.—Garron Point, co. Antrim, S. A. Brenan; another plant from Glendun may be starved *auratum.*

H. crocatum, Fr.—Antrim Glens, S. A. Stewart. Cave Hill, July, 1896, C. H W. Another plant labelled "Antrim Glens, vii.,'72, S. A. Stewart," may be the f. *basifolium*, Lindeb., of this species.

H. boreale, Fr.—A plant collected by me in Glenarm Park, co. Antrim, August, 1895, may be var. *Hervieri* Arv. Touv., but requires further study; while another from Cave Hill seems like var. *rigens* (Jord.).

H. umbellatum, L. var. **linarifolium,** Wallr.—Glenariff, co. Antrim, 1894, S. A. Brenan.—Var. **coronopifolium,** Fr.—Cushendun, co. Antrim, July, 1895, Rev. S. A. Brenan.

Saintfield.

LASTREA REMOTA IN IRELAND.

BY R. LLOYD PRAEGER.

In June, 1898, beside the stream in the woods at Dalystown, on the eastern slope of Slieve Aughty, in S. E. Galway, I gathered a fern which puzzled me at the time. It was clearly related to *Lastrea spinulosa* and *L. Filix-mas*, but would not fit in with either of these, nor with any abnormal form of *L. dilatata*. Out of one small clump found, I took a root to grow, and have had it under cultivation since. As it waxed in size and strength, both its similarity and dissimilarity to the species mentioned became more apparent, and for some years past I have been convinced that the plant was *L. remota* Moore (*Aspidium remotum* Braun). On more than one occasion I sent fronds to English specialists, but the replies showed that they had no special knowledge of this difficult group of Lastrea, and they generally came back labelled as a variety of *Filix-mas* or of *dilatata*. Lately, on the suggestion of Mr. Druce, I sent fronds to Dr. F. W. Stansfield of Reading, who has no hesitation in confirming the naming of the plant as *L. remota*.

Lastrea remota was first described as a variety of *L. rigida* (*Aspidium rigidum β remotum*) by its discoverer Professor A. Braun[1], who subsequently[2] raised it to specific rank; and this rank it has been allowed by most authorities, though put down by others under *L. Filix-mas*, *L. spinulosa*, or *L. dilatata*, as a sub-species or variety. But its hybrid origin has been long suspected, and even its describer afterwards[3] suggested as its parentage a cross between *Filix-mas* and *spinulosa*. Its curiously restricted range is in accordance with the idea of its hybrid origin. Braun discovered it in 1843 near Geroldsau in Baden, growing with *Filix-mas* and *spinulosa*, and subsequently between Aix-la-Chapelle and Altenberg. Other stations have been since reported near Freiburg, and in Alsace and Silesia.[4]

In 1854, Mr. Isaac Huddert found a fern growing in company with *L. Filix-mas*, *L. spinulosa*, and *L. dilatata* near

[1] Doell: Rheinische Flora, 1843.

[2] A. Braun: Betracht. üb. d. Ersch. d. Verjüng. i. d. Natur. 1850.

[3] Doell: Flora des Grossherzogthums Baden, iii., 1862.

[4] Koch: Synopsis der Deutschen und Schweizer Flora, iii. 2876–2877, 1907.

Windermere, to which he directed the attention of that well-known Lake District fern-hunter, Mr. Frederic Clowes, who noticed its peculiar characters, and grew it in his garden for some years without succeeding in identifying it. "I showed it to several good botanists, but they paid no attention to it."[1] However, in 1859 he sent a frond to Mr. Thomas Moore of Chelsea Botanic Garden, who recognized it as Braun's *Aspidium remotum*, and announced it as such before the Linnean Society at a meeting on December 15 of that year.[2] Only a few plants were found, nor did further search reveal more. Since that date, Mr. J. G. Baker[3] has recorded it as found by Mr. Coward in Brathay Woods, in the same locality. And quite recently, Mr. W. B. Boyd exhibited a specimen from the Ben Lomond district at a meeting of the Botanical Society of Edinburgh.[4]

From my own observations on the Galway plant in cultivation, I received the impression that *L. remota* is *L. Filix-mas* × *spinulosa*, and that seems to be the general opinion. Clowes says "It appears to be exactly intermediate between the two species above mentioned"[5] [*Filix-mas* and *spinulosa*], and Boswell quotes him as saying[6] "I have no doubt that L. remota of Moore and Braun is a hybrid. It has been sown over and over again, and always produced L. Filix-mas *var. paleacea*. I do not know whether L. dilatata or spinulosa has ever come up from its spores."

The Dalystown plant on the whole recalls *spinulosa* more than *Filix-mas*. It is sub-evergreen, the fronds falling down in autumn storms, but remaining fairly green and fresh through the winter. The scales are concolorous like those of *spinulosa*, and devoid of the dark centre band characteristic of those of *dilatata*. The caudex has the stout erect character of *Filix-mas*, but resembles the creeping rhizome of *spinulosa* in its rather rapid extension, so that, as Clowes has said, "a single crown of it, if let alone, will grow up like a tree-fern." The possibility of *L. rigida* being a parent is ruled out, as regards the Irish plant, by the non-occurrence of that species

[1] F. Clowes: Lastrea remota. *Phytologist*, iv., 227–229, 1860.
[2] *Journ. Linn. Soc., Botany*, iv., 192–194, 1860.
[3] Flora of the English Lake District, p. 240, 1885.
[4] *Trans. Bot. Soc. Edinb.*, xxxiii., p. 281, 1907.
[5] *loc. cit.* [6] English Botany, xii., 70, 1886.

in the country. On the other hand, both *L. spinulosa* and *L. Filix-mas* grow in the woods at Dalystown. The coloured plate in Lowe's *Our Native Ferns* (vol. 1, plate xxi.) gives a better general idea of the plant's appearance than that in *English Botany*. There is a rather extensive literature and synonomy of this fern, which it does not seem necessary to quote further than has been done above.

National Library of Ireland.

REVIEWS.

ORCHARD INSECTS.

The Insect and other Allied Pests of Orchard, Bush, and Hothouse Fruits, and their Prevention and Treatment. By Fred. V. Theobald, M.A. Pp. xvi. + 550, 328 figs. Wye (the Author), 1909. Price 21*s.* net.

This handsome volume must prove invaluable both to fruit-growers and naturalists. In it may be found an account, and usually a full account, of all the common animal pests of fruit-trees, and of many species which are only occasionally injurious. The insects and other creatures described are grouped under the plants which they respectively injure—Apple, Apricot, Cherry, &c., the arrangement under each plant being systematic. There is, in every case, a description of the insect in its various forms and stages, and a survey of its life history, followed by a discussion as to the best means of preventing its ravages. All who have followed Mr. Theobald's work in recent years will expect to find the subject dealt with in a manner both scientific and practical, and they will not be disappointed. An appendix with approved formulæ for insecticides will be found especially valuable.

Mr. Theobald has added greatly to our knowledge of the Aphidæ, and his descriptions of the various forms that live on the Apple and Strawberry contain much that will be new to many students of insects. In looking through the book, one finds frequent evidence that Mr. Theobald has not been content with repeating the statements of his predecessors, for records of original observation abound. The book is beautifully printed, and many of the illustrations—notably Mr. H. Knight's drawings—and most of the photographs, are admirable. In some cases, however, imperfect mounted specimens have been used for portraiture with unsatisfactory and disappointing results, and several of the photographs from good subjects are valueless owing to errors in light and printing. As a whole, however, it is hard to speak too highly of the book, which will be for many years to come the standard work on the subject for English readers.

G. H. C.

THE PLANTS OF THE WEST.

A Tourist's Flora of The West of Ireland. By Robert Lloyd Praeger. Dublin, 1909. Hodges, Figgis, & Co., 3*s.* 6*d.* net. Pp. xii., 253. 5 Coloured Maps, 27 plates, and other illustrations.

We have to thank Mr. Praeger for a most valuable and charming handbook, well and concisely written, brimful of information, clearly printed on good paper, and marvellously cheap. It will amply repay careful reading, is indispensable for all who wish to explore the botany of a very remarkable district, and should be bought and studied by everyone who is interested in the flora of the British Isles.

This work is compiled, mainly from statistics already published (full credit being given to other authors and observers), on a new plan; being divided into three sections, each with its own index:—1. Introduction, with a general account of the district, and of its physical and botanical characters; 2. Topographical, with brief accounts of over 100 selected areas; and 3. Systematic, dealing with the distribution of the separate species. These, native or fully naturalised, amount to just 1,000 (using the term species or subspecies in rather a wide sense), besides 84 casual aliens, and many varieties and hybrids; the average number at present recorded for each division being 665. The nomenclature is old-fashioned, but this is no drawback, as in all cases of difference the name adopted in the tenth edition of the *London Catalogue* has been appended. The photographic plates of rare plants *in situ*, taken by Mr. R. Welch, are of extraordinary merit and beauty; the other illustrations and the maps are equally good in their different ways.

The counties dealt with are Limerick, Clare, Galway, Roscommon, Mayo, Sligo, Leitrim, and Fermanagh; the other western ones (Donegal, Kerry, and Cork) belong respectively to N. and S. Ireland.

The whole of the Introduction deserves careful reading; perhaps the most interesting pages (24 to 31) are those which deal with the peculiar features of the flora and with its probable origin. As is well known, in this district northern, south-western, and American groups of plants occur, often together, in a way which has no parallel in Europe, if indeed anywhere in the world. Attention is rightly drawn to the fact that the fauna shows somewhat similar tendencies.

In the Topographical Section each of the 11 vice-counties is first briefly dealt with; this summary is followed by a more detailed account of the various areas in it selected for special treatment. Mr. Praeger has an unrivalled acquaintance with, practically, the whole of these; having for many years past spent the bulk of his leisure time in energetic exploration. Helpful notes are given as to the best centres for work, hotel accommodation, and the like; and attention is called, wherever it seemed desirable, to the need of further exploration. After all the work already done, there can be no doubt that many discoveries remain in store; and one of the most valuable points about this book is that it will serve as an excellent basis and guide for more minute research.

The Systematic Section gives all necessary particulars about the stations of species and varieties. A few remarks about special points may not be out of place here; the reviewer's personal knowledge of the district is, however, very limited.

Ranunculus scoticus, E. S. Marshall.—The local abundance of this Scottish-Highland plant, especially in Achill, is rather surprising; it has not hitherto been detected in S. Scotland or N. England. Still more decidedly northern or subarctic species occur in W. Mayo; viz., *Cochlearia grœnlandica*, L., and *Euphrasia foulaensis*, Towns.

Lavatera arborea, L.—It is most satisfactory to find this admitted as "without question native" on sea-cliffs and stacks in Clare, as its status in our Islands has been called in question by Mr. Rouy.

Saxifraga umbrosa, L.—Mr. Praeger says that "the vars. *serratifolia* Don and *punctata* Don are connected by many intermediates with the type, and in Ireland at least cannot be regarded as distinct." But does the type, with ovate-oblong, crenate-dentate foliage, grow wild in Ireland? Outside Cork and Kerry, the prevailing, if not the only form appears to be *punctata*. Where this is associated with *serratifolia*, there are many connecting links; but these are probably due to crossing, as *S. umbrosa*, *S. Geum*, and *S. hirsuta* evidently hybridize with great readiness. The crenate Pyrenean leaf-type of *S. Geum* is decidedly rare in Kerry, where the sharply-toothed var. *serrata*, Syme (*dentata*, Wats.) abounds.

Cuscuta Trifolii, Bab.—This is probably a true native on sandy coasts (growing on *Lotus*, &c), though introduced in clover fields.

Rhinanthus Crista-galli, L., var. *fallax*, must be expunged; *R. fallax*, Wimm., and Grub, being a hybrid with *R. major*, Ehrh. My Clonbur plant so named is *R. stenophyllus*, Schur.

Taxus baccata, L.—There is a valuable note on the var. *fastigiata* (Lindl.).

Habenaria albida, Br.—Our Mount Gable (W. Mayo) station is erroneous; the specimens are clearly *H. intacta*, Benth., growing off the limestone.

Allium Schœnoprasum, L.—There is no need to question its right to rank as a native, for we found it over about two miles of thoroughly wild ground, remote from cultivation. The summers of 1895-6 being very dry, it was quite dwarf and flowerless; but on removal to garden ground it at once increased to the normal size, and bloomed freely.

Carex aquatilis, Wahl.—The usual Irish and Scottish form (*elatior*, Bab., *Watsoni*, Syme) appears to be the Scandinavian type; at any rate, that is the opinion of Pfarrer G. Kükenthal, who is the best modern authority.

Agrostis vulgaris, With., var. *pumila* (L.) is not a starved state, but a diseased condition, caused by a fungus (*Ustilago*); it at once reverts to type when cultivated, as was proved by the late Rev. W. R. Linton.

As the above comments sufficiently indicate, the reviewer believes that this is a book of exceptional excellence. A short notice cannot do justice to its good qualities, which must be appreciated in detail. Its plan involves a certain amount of repetition; but nothing is lost by that, and Mr. Praeger has greatly increased the debt of gratitude which we already owed to his energy and enthusiasm.

EDWARD S. MARSHALL.

Taunton.

NOTES.

BOTANY.

British Vegetation Committee.

The Central Committee for the Survey and Study of British Vegetation met at Cambridge on April 24th to 26th. Present:—A. G. Tansley, M.A. (in the chair); M. Hardy, Ph. D.; F. J. Lewis, F.L.S.; C. E. Moss, M.Sc.; Prof. F. W. Oliver, F.R.S.; G. H. Pethybridge, Ph.D., B.Sc.: R. Lloyd Praeger, B.E.; W. M. Rankin, W. G. Smith, Ph.D.; Prof. F. E. Weiss, D.Sc.; T. W. Woodhead, M.A. The first day was devoted to committee work and to communications and discussions. On the two succeeding days excursions were held, in the company of various Cambridge botanists, and the members saw among other things the Oxlip growing and flowering in great profusion in woods on stiff clay, and various types of woods and of sandy heaths, which were studied with much interest.

Splachnum vasculosum L. not an Irish Plant.

This moss has no claim to be in the Irish List, although it was inserted for several County Divisions in the Catalogue published by the Moss Exchange Club. It is an alpine species found in Britain only in the Scotch highlands. I have made inquiries, and am told the error arose from a mistake of old synonyms, and that the records belong to *S. sphæricum* Swartz.

C. H. Waddell.

Saintfield.

Habenaria intacta in West Galway.

As a small contribution towards our knowledge of the distribution of that very interesting orchid, *Habenaria intacta*, Benth., which Mr. Praeger's recent explorations have done so much to define, I may record its occurrence on Gentian Hill, on Galway Bay. I found it there on May 30, a small colony of about sixteen plants, some of them still in bloom, but the majority going into fruit. It occurs on the west side of the hill, on the roughly terraced pasture, between the gorse zone and the summit level. This is an additional station for Galway West.

I may mention that, on the same occasion, I met with *Cerastium arvense*, var. *Andrewsii*, Syme, growing sparingly on a sandy spit of closely-eaten pasture, just above high water mark, by the narrow muddy inlet on the east side of Gentian Hill. This noticeable variety of the Large-flowered Mouse-ear, though frequent on the Aran Islands, and occurring also on the Clare side of Galway Bay, does not appear to have been recorded from West Galway before.

W. J. C. Tomlinson.

Belfast.

Do Rabbits eat Arum maculatum?

Ever since I was a boy parts of the spathe or sheath of the common *Arum maculatum*—as well as fragments of that portion of the spadix which bears the ovaries, stamens, and purple club-shaped cylindrical spike—may be seen at this time of year lying here and there along the hedgerows. The stem is usually bitten off at the base of the sheath, which is then apparently cut in pieces to get at the young green berries. I believe this is done by rabbits. By the way, have any of your readers ever chewed for 3 minutes portions of the leaf of *Arum maculatum*, and then spat it out? It burns almost like red pepper. Again, have any of them tested the curious evolution of heat said (see Syme's English Botany, vol. 7. pp. 14-15) to be felt even by the hands for some hours after the opening of the spathe?

RICHD. M. BARRINGTON.

Fassaroe, Bray.

In response to a request from the editors for comment on the above note, I may say that I once thoughtlessly put the cut end of the leaf stalk of *Arum maculatum* into my mouth, and at once experienced a violent sensation of burning. The membrane on the inner surface of my lips soon became considerably inflamed and the smarting was quite painful. The irritation, however, gradually subsided, and in four or five days the membrane had become normal again. Personally I shall not knowingly repeat the experiment, and I should not advise readers of the *I. N.* to try it either. Furthermore, it is a risky proceeding, for this plant contains a poisonous alkaloid allied to that found in the Hemlock (conine), and if portions of the plant or its juice be swallowed serious symptoms are set up, which may be followed by death if the quantity taken is fairly large. Formerly, the irritation was supposed to be due to the large number of minute, needle-shaped crystals of calcium oxalate (raphides) which the plant contains, but Lewin[1] has shown that this is not the case. The alkaloid is volatile, or at any rate dispelled by heating, for, after protracted boiling in water the leaves become harmless; and the tubers, which are very poisonous when fresh, can be used for making a kind of flour after roasting, which renders them harmless.

Lewin states that snails and rabbits try the leaves of this plant, but very quickly desist. He himself experimented with guinea-pigs, and found that after having eaten, the animals soon began to rub their snouts vigorously with their paws as if their mouths were irritated.

I have often noticed that portions of the leaves of this plant were eaten as if by snails or slugs, but have never actually caught either of these animals in the act. Perhaps a search after dark by lamplight might be rewarded with success. Stalking, in the case of rabbits, however, would probably be a more difficult matter. The brilliant red, ripe berries of this plant are certainly very poisonous to human beings (although birds are supposed to eat them), and so, I imagine, would the unripe fruits be,

[1] "Ueber die toxicologische Stelling der Raphiden." *Ber. d. deut. bot. Gesellschaft*, XIII., 1900, p. 53.

seeing that the tubers, leaves, and the stalks of the inflorescences have been shown to be so. What their effect on rabbits might be could only be ascertained by trial.

As regards the evolution of heat by the upper portion of the spadix, this was first recorded by Lamarck in 1777. This organ contains, when the spathe is unfolding, a large quantity of starch in its cells, and by the rapid oxidation of this starch by breathing, the temperature of the air within the spathe has been found at certain times to be many degrees above that of the surrounding atmosphere. The literature on this matter will be found fully referred to in Pfeffer's "Physiology of Plants."

GEO. H. PETHYBRIDGE.

Royal College of Science, Dublin.

ZOOLOGY.

Lankester's Treatise on Zoology.

In the June number of the *Irish Naturalist*, "R. F. S." in his appreciative review of Dr. Calman's volume on Crustacea in Sir Ray Lankester's "Treatise on Zoology," repeats a criticism that has been made by several reviewers of several volumes in this series, to the effect that the work does not deal sufficiently with geographical distribution, habits, and economic relations.

Having been made responsible by Sir Ray Lankester for the first volume that was published of his "Treatise," I think I may venture to say that his intention, which we contributors have followed out to the best of our ability, was that the work should be essentially a systematic zoology on modern lines, that is to say, taking into account evolutionary and phylogenetic principles, and necessarily incorporating the extinct with the living forms in one scheme of classification. Facts, whether morphological, physiological, bionomic, or economic, that have no obvious bearing on taxonomy, have therefore no place in such a work. Many habits or economic details of considerable interest and importance are found only in single species, and when the groups dealt with are so large that it is barely possible even to mention all the genera by name, it is clearly impossible to give specific details, however interesting to the general reader.

Another reason for the omission of the facts desiderated by "R. F. S." is that there was already in course of publication the admirable Cambridge Natural History, which made an account of such facts its chief aim. When my own volume was criticised for similar omissions, I did not think it worth while to repeat the explanation already given in the prospectus, but since such criticisms continue, it may once again be pointed out that, the object of the "Treatise on Zoology" is not to compete with but to complement existing "Morphologies" and "Natural Histories" in the English language.

F. A. BATHER.

British Museum.

Viviparus (dead shell) in Co. Limerick.

On the 11th February, while working the banks of the River Shannon below Limerick, I found a specimen of *Viviparus viviparus*, dead and somewhat eroded. The shell was underneath a stone, on a mud deposit amongst Bythinea and various Limnææ. A good search failed to reveal a further specimen, living or dead. The locality was in the range between high and low water, covered by about 4 feet of water at the top of the tide. How this shell, a purely English species, came here, is a question that needs some solution, which I will leave to the readers of the *Irish Naturalist*. I shall continue to search and any further finds I shall announce to the readers in due course.

HARRY FOGERTY.

Limerick.

Nests of Land-birds in Holes on Marine Islands.

I have been informed by Mr. H. M. Wallis, of Ashton Lodge, Reading, that on 3rd June, 1886, he ascended Illanaran, a lofty and precipitous stack off the S W. corner of Aranmore, in Donegal. 1½ miles from the mainland.

This stack is destitute of any bush or even a tuft of rushes, and is the home of Great Black-backed and other Gulls and of Cormorants. Mr. Wallis states that in burrows, in some of which he found Storm Petrels, he discovered three nests of land-birds, of white grass, without feathers, and containing eggs. One of these was a Wheatear's, but the other two contained eggs which are characteristic of the Reed Bunting (*E. schœnidus*) though no such bird was seen. Mr. Wallis has kindly presented two of these eggs to the Dublin Museum. He says that he found the nests at the ends of burrows, 2 feet deep.

In *British Birds*, vol. I., p. 94, Major Trevelyan records that on a small marine island, about a mile off the west coast of Ireland, he found two nests of Meadow Pipits containing eggs in holes in the ground, and that one of the eggs was identified at the South Kensington Museum.

I should not have been so much surprised if they had belonged to the Rock Pipit, which nests in small cavities, but such a site is a departure from the ordinary habits of the Reed Bunting and Meadow Pipit.

Mr. W. H. Turle stated (*Ibis*, 1891, p. 6.) that he found on Innishvicillane, one of the Blaskets, a Wren's nest containing six eggs at the extremity of the burrow of a Puffin, and that the nest was not domed.

The latter point is not surprising, for Dippers' nests when built in holes of bridges are not domed.

Nests found in holes on marine islands should be carefully examined, as this adaptation to circumstances is remarkable. The burrows afford shelter not only from the storms but also from the voracious gulls.

R. J. USSHER.

Cappagh, Co. Waterford.

The Snowy Owl—A Correction.

In the April number (p. 100, *supra*), I stated that a Snowy Owl was shot near the village of Ardagh, Co. Kerry, and received by Messrs. Williams and Son on 6th March, 1907. I find that Ardagh is in Co. Limerick, not in Kerry.

R. J. Usshér.

Cappagh, Co. Waterford.

Irish Stoat with Nine Young.

Mr. W. Williams brought me a week ago nine young Stoats which he had removed from the uterus of a female Stoat (*Mustelus putorius hibernicus*). As the latter had been sent to him dead for the purpose of preservation, it remains doubtful whether all these young Stoats could have been born alive. Such a large number is quite unusual. Mr. Lydekker gives the number of young as varying from five to eight. Prof. Blasius reports that the German Stoat has usually the same number of young. Taking eight, therefore, as the maximum of a Stoat family, the Irish Stoat had shown itself to be more prolific than its English and German relations.

R. F. Scharff.

National Museum, Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a White-handed Gibbon, and a Hoolock Gibbon, from Captain Cronin, a Grey Seal cub from Sir Henry Blake, a Malabar Squirrel from Dr. R. R. Leeper, two Rabbits from Mr. G. Doyle, two European Flamigoes from the Hon. A. S. O. Canning, and three Peafowl from Mr. H. St. George.

The Gibbons are in splendid health and condition, and their graceful gambols are the admiration of all visitors to the Monkey-house. They leap with agility and with the most perfect accuracy from branch to branch of their large cage, occasionally coming with marvellous lightness to the floor. With the three Chimpanzees and these two Gibbons the Dublin gardens are now exceptionally rich in Anthropoid apes.

BELFAST NATURALISTS' FIELD CLUB.

May 15.—Geological Section.—Excursion to Lyle's Hill and Templepatrick.—A large party walked from Templepatrick to Lyle's Hill, under the guidance of J. Strachan, where they examined the beds of iron ore and lithomarge lying below the Upper Basalt. Subsequently the quarry near Templepatrick railway station was visited, but was found to be full of water. This was a matter of regret, as a very interesting section was formerly visible, showing Chalk, Lower Basalt, and rhyolite, the rhyolite being intrusive in the Lower Basalt, while older than the Upper Basalt, as shown by the evidence of other sections.

THE USE OF DOMED NESTS.

BY C. B. MOFFAT.

Of the hundred and thirty-two kinds of birds which breed in Ireland only eight build (normally) the kind of nest known as "domed"—that is to say, with the top roofed over, and a hole in the side serving as entrance. Three of the eight are the closely related "leaf-warblers"—the Chiff-chaff, Willow-Wren, and Wood-Wren. The other five, though all passerine birds, represent as many distinct families—the Dipper the Cinclidæ, the Long-tailed Titmouse the Paridæ, the Wren the Troglodytidæ, the House-Martin the Hirundinidæ, and the Magpie the Corvidæ. Why these eight, and no others, should build domed nests is a question that must often have puzzled reflective ornithologists; and I do not think that a satisfactory answer is provided by the theory which that eminent thinker Alfred Russel Wallace put forward in one of his well-known essays in 1868, that those species of birds in which the *females* as well as the males are brightly or conspicuously coloured need and adopt a type of architecture that will make the sitting bird invisible. Dr. Wallace argues—and supports his case with facts drawn from a very extensive survey of the birds of the world—that such birds, as a rule, either construct domed nests or place their nests in holes. But even if we admit the entire truth of this theory it does not cover the Irish (which correspond with the British) cases. For of all our eight dome-constructing birds, only one—the Magpie—can be described as having a conspicuous type of colour; and it would, I think, be difficult to contend that the soberly-clad Wren and Chiff-chaff can, in consequence of their hue, stand more in need of a concealing dome during incubation than the hen Blackbird and Goldfinch, which are content with open nests.

I wish now to draw attention to one purpose which the domed nest in this country certainly serves, and which is probably of greater importance to most of our dome-constructing species than the small amount of additional concealment that the dome may give them.

Of our eight dome-builders, two, the Wren and the Long-tailed Titmouse, are notorious for the large numbers of eggs they lay to a clutch. Ten is no uncommon number for the former, and twelve or more for the latter, even in Ireland,

where, I think, the average clutches of most species are somewhat less than in Great Britain. Among the remaining six we have the Magpie laying about seven eggs, while her open-nest constructing relatives, the Crows, lay only five; and the three dome-making warblers each laying six or more, while the Whitethroat and other open-nest-makers of the Warbler family draw the line, as a rule, at five. There remain the Dipper and the House-Martin, which do not, I think, lay so many as six eggs in Ireland, and it will be necessary for me to return to the subject of these birds before concluding. We see, at any rate, that six of our eight dome-builders possess the distinguishing characteristic of laying large clutches of eggs compared with the builders of open nests.

Now, supposing that these six birds built open nests like those of the Whitethroat, Hedge-Sparrow, and Chaffinch, would it be possible for any one of them to rear in safety more than five young ones? It would certainly not be possible for the Wren and Long-tailed Titmouse to rear, as they do, broods of from ten to a dozen. I do not believe that it would be possible for the Magpie to rear seven, or even for the Chiff-chaff, except in those comparatively rare cases in which its nest is placed quite on the ground, to rear as many as six. As a rule, at any rate, birds that build open nests at a height above the ground limit themselves, though not with great strictness, to clutches of five eggs; and the reason for their doing so becomes pretty plain when the young have attained a size at which they are nearly, but not quite, ready to fly. A brood even of five then becomes almost too much for the open nest to hold; there is an ever-present danger of "bubbling over," as it is called, and much loss of life actually occurs through some of the little birds tumbling out. I think, therefore, that it must be extremely unusual for a brood *larger* than five to be successfully reared in a nest not protected in some special way against this "bubbling" danger. It is not, I admit, an uncommon circumstance for a bird whose normal clutch is five to "exceed," occasionally, into a sixth, perhaps even a seventh, egg. Any bird's-nesting boy may once or twice have experienced the surprise of finding as many as seven eggs in a Blackbird's or a Hedge-Sparrow's nest; and he is pretty sure to have met with a few cases of six. But it does not follow

that in any such case the bird would safely rear her six young ones. At any rate, the chances against her doing so must be heavy.

This danger does not occur in the case of a domed nest; and though it does not follow that the primary object of the dome is to avert "bubbling over," the dome at any rate serves that purpose, and enables dome-building birds like the Wren and Long-tailed Titmouse to rear families twice as large as it would be possible for them to rear without it. As regards the Magpie and the dome-building Warblers, the advantage is less marked, but it is still, I think, only a difference of degree.

If, now, we look at the birds which in this country habitually lay more than five eggs, we shall see that there is in every case some special provision either in the shape or the situation of the nest, or else in the state of development in which the young are hatched, which makes the efficient production of the larger number possible. The Wheatear and Redstart, the Great, Blue, and Coal Titmice, and the Tree-Creeper, Sand-Martin, Starling, Jackdaw, and Kingfisher secure this object by placing their nests in holes. The Stonechat, Whinchat, and Grasshopper-Warbler achieve it in a less perfect manner by nesting on the ground. In the case of this latter method it must be observed that though a young bird pushed out of a ground-built nest is not in the same extreme peril as if the nest had been in a tree—since in that case it could never hope to return—its situation is still somewhat unhappy, and the more so if the nest from which it has been squeezed out is still too crowded to permit of its easily finding its way back. Accordingly, none of our ground-nesting birds lay *very* large clutches except those whose young are able to quit the nest almost as soon as hatched. In those cases, illustrated by the various Ducks and by the Partridge, Corncrake, and Water-hen, we meet with clutches as large as among the nesters in holes and the constructors of domes.

Then there are a few cases that fall under none of the above heads. The Swallow lays six eggs in an open nest in an elevated situation. But the Swallow is, in the first place, so indifferent to concealment that she does not mind building a wide, roomy nest in which crowding is much less likely to

happen than in ordinary cases. In the second place, half-fledged young Swallows spend much of their time sitting on the edges of the nest, which, being of clay, afford them a firm, solid platform, with "elbow room" in abundance. These circumstances quite account for the additional latitude allowed herself by the mother Swallow. A different kind of exception is presented by the Golden-crested Wren. This little bird lays, commonly, about nine eggs, in a nest built at some height above the ground in a tree, and this nest is not domed. But, though not domed, it is "fenced" in a manner very nearly as protective. Suspended from an overhanging spray, it is attached at some six or seven separate points to the twigs above it, so that the fastenings form a string of posts, between any two of which there is room, as a rule, for the old bird to slip in and out, but hardly room to allow much danger (unless one of the fastenings breaks) of a young bird being squeezed out accidentally.

Thus I can find no real exception to the rule that five is the maximum number of eggs that a bird can prudently hatch in an open nest of the ordinary type. The use of the dome to those birds that lay larger clutches, as most of our Irish dome-builders do, is therefore obvious.

The domed nest of the Dipper and the "roofed" nest of the House-Martin may, I believe, serve an altogether different purpose. In these cases the natural situation of the nest has to be considered. The Dipper oftens builds where its nest is drenched by the spray of a waterfall, and the inmates would be equally drenched were it not for the cover afforded by the dome. The House-Martin, before the walls of human habitations were available for its use, must habitually have constructed its nest, as some colonies of that species still do, on cliffs facing the sea; and I think the roofed character of the nest must then have served as protection to the young against drenchings from the spray of high waves. I may here recall Mr. Barrington's note (*Irish Naturalist*, vol. vi., p. 224), on the nesting of this species at Bray Head, where he remarks that some of the nests seemed to be built within possible reach of waves; and I notice in Mr. Patterson's recently published "Ulster Nature Notes" (p. 51), a somewhat similar observation about a colony on the Antrim coast.

It does not, of course, follow because a domed nest serves a particular purpose that it was constructed for that purpose, or that it serves no other. The "concealment" theory is doubtless of application in some cases, whether these be many or few. But I would ask whether there can be any real probability that concealment is the end principally aimed at by this type of architecture, in view of the fact that so few species employ it at all, and that these, so far as our Irish and British instances of it go, are not distinguished by any greater need of concealment than the birds that build open nests; while the use of the dome itself is (at least in all the species using it under our own observation) capable of being quite differently explained.

And would a domed nest be a good means of concealment? This must depend more or less on the amount of reasoning power possessed by the creatures against whom concealment is needed. As against any *intelligent* enemy to bird-life, it must be very nearly as important to conceal the nest itself as to conceal the bird sitting in it; for any animal having sense enough to know that a nest is a nest would not be deterred from examining it by the fact that no bird was within view. The domed nest is, however, owing to its larger size, a good deal more conspicuous than the undomed; so that in the case of the intelligent enemy it would probably more often betray than protect. On the other hand, it would be a real protection against enemies of so stupid a type that the sight of the nest would suggest nothing to them till they also saw the contained bird or eggs. It has sometimes been suggested that this degree of stupidity does prevail in the brute creation, and that domed nests are consequently not liable to be rifled except by human marauders, who alone know such nests "for what they are." But I would suggest that this is evidently not the opinion of the dome-building birds themselves. They act on the principle that they have intelligent, and not merely stupid enemies to fear; for they try to make their nests as little conspicuous as possible by covering them over, in many cases, with assimilative material—the Long-tailed Titmouse covering hers with lichen, the Chiffchaff hers with withered leaves, &c. This shows that they know well enough that merely to conceal the sitting bird is

valueless if the nest itself is too freely exposed to view. In view of this consideration, the *concealing* value of the dome, to which so much importance has been attached, is seen to be really very limited—though it may suffice against certain types of enemies, including reptiles of low brain-power, and these may at one time have been the only type that needed to be considered, while they may still be a formidable factor to birds breeding in reptile-infested countries. Looking to our own land, and to the present day, I know of no more useful purpose that the domed nest is qualified to serve than that of enabling a bird to rear a larger family than it could rear in an open nest of the ordinary pattern.

Ballyhyland, Co. Wexford.

DUBLIN MARINE BIOLOGICAL COMMITTEE REPORT FOR 1908.

WITH SPECIAL NOTES ON THE MOLLUSCA.

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

During the last year the Committee continued its dredging and shore-collecting operations along the County Dublin coasts with considerable assiduity and with a fair measure of success, so far at least as the department of Mollusca is concerned. The dredgings were more exclusively confined to the inshore waters than in the preceding year, none of the trips extending farther seaward than a half mile eastward of the outermost of the Skerries islands on the north, or the same distance eastward of the Muglins rock on the south. Repeated visits were made at different seasons to some of the richer grounds, and altogether ten dredging trips were made by the Committee, the earliest on the 22nd April and the latest on the 11th November. In addition to the Committee trips proper, the writer of these notes made a couple of dredgings on his own account during a holiday passed at Skerries in July last. The results of these twelve dredging trips, and of some shore-collecting done by the writer at Skerries and at Bullock are summarised in this report. In spite of the usual

difficulties encountered in making up scientific crews, six members of the Committee, Miss Stephens and Messrs. Adams, Butler, Colgan, Nichols, and Southern were induced to take part in one or other of the trips and to share in the pains and pleasures of dredging.

It seems best to arrange the notes here given into three groups, one for each of the three districts worked—*i.e.*, (*a.*) Dalkey Sound and the Muglins; (*b.*) Malahide River and Creek; (*c.*) Skerries Bay and Islands. Four trips were made in each of the first two districts and three in the third. The twelfth trip, one from Bray Harbour northward towards Killiney, was entirely abortive, as the heavy sea met with outside the harbour made dredging from a small boat impossible.

Dalkey Sound and the Muglins.

APRIL 22nd.—The year's dredgings began with a short trip over this well-worked but by no means exhausted ground. Only three effective scrapes were made, two in ten fathoms off Bullock Harbour, and a third in fifteen fathoms S.E. of the Battery on Dalkey Island The results were rather meagre. The ten-fathom scrapes gave nothing of interest beyond the following:—

Tellina donacina, 2 valves.
T. crassa, 1 pair of valves united.
Leda minuta, do.
Cardium fasciatum, 3 living.
Psammobia tellinella, 3 living.
Pectunculus glycimeris, 1 valve.
Eolis tricolor, 1.
Trophon truncatus, 1.

With these was one large specimen of the Pea Urchin, *Echinocyamus pusillus*, measuring $\frac{3}{8}$-inch in its longest diameter. The fifteen fathom scrape gave one fine living specimen of *Pectinaria auricoma*, $2\frac{1}{16}$ inches long.

APRIL 28th.—Some small sea-weeds and corallines gathered this day at low water near Bullock yielded on examination a single specimen each of *Hermæa dendritica* and *Runcina Hancocki*. The first named, a lively little animal $\frac{1}{8}$-inch long, which floated freely foot upwards on the water surface while in captivity, is an addition to the marine fauna of Dublin and of East Ireland, the previous Irish records being all for the west coast. The Runcina was a large specimen nearly a quarter of an inch long when in motion.

MAY 2nd.—Another low-tide collection of small sea-weeds made this day on the same ground as had yielded *Hermæa*

gave a second opisthobranch new to the coasts of Dublin and of East Ireland, *Limapontia nigra*, of which eight specimens were secured. So far as I can discover this species was previously known as Irish only from Valentia Harbour, where it was discovered by Mr. F. W. Gamble in 1895 (*Ir. Nat.*, 1896, p. 132). The Bullock specimens were all found attached to the stiff, dull green, capillary sea-weed, *Cladophora rupestris*, tufts of which were gathered from the edges of rather stagnant pools at about half tide. The largest specimen was 4.5 mm. long in motion. Five living specimens of *Trochus helicinus* were gathered on the same ground.

Many of the Limapontias gathered on this day continued to live with me in watch-glasses of sea-water up to the 16th May. One deposited an egg-cluster on the 8th, two other clusters were deposited on the 13th, and a fourth on the 15th. The form of the egg-cluster was different from the usual ribbon of the nudibranchs. It consisted of a slightly curved, elongated, pear-shaped mass of yellow ova surrounded by a transparent and colourless envelope of the same shape.

May 16th.—Another gathering of Cladophora at Bullock yielded no less than thirty-two specimens of Limapontia and from the same pool, apparently amongst coralline, were taken twenty specimens of Runcina. Several of the Limapontias were kept alive up to the 29th May, and many egg-masses were laid. On the 28th and 29th the contents of several of the ova were observed to be in rapid motion.

While Limapontia was thus seen to deposit its egg-clusters very freely—in some cases branches of Cladophora enclosed with the living specimens were found after a few days to be studded all over with clinging egg-clusters—yet Runcina spawned very rarely indeed, although many individuals remained living with me for nearly three weeks. Vayssière, in his elaborate paper on Pelta and Tylodina,[1] which genera he had studied in the zoological laboratory at Marseilles, states that he had never seen any of his Runcinas deposit eggs. I was fortunate enough to see one of my specimens deposit its eggs on the 1st June last, more than a fortnight after its capture. On that day the animal was observed to be

[1] Recherches anatomiques sur les Genres Pelta (Runcina) et Tylodina. *Ann. des Sci. Naturelles*, xv., p. 1, 1883.

surrounded by a transparent mucous mass in which were embedded many perfectly globular, bright orange-coloured eggs of large size compared with those of Limapontia, but far less numerous. In a short time the animal moved away, leaving behind it the floating egg-mass which, unlike the spawn of most of the Nudibranchs, showed no approach to a ribbon formation. It was, in fact, amorphous. On the 3rd June segmentation was seen to be well advanced in several of these eggs, but, unfortunately, I did not succeed in hatching out any of them, nor, indeed, any of the numerous Limapontia ova deposited a few days earlier. Out of the scores of Runcina I have kept in confinement from time to time, and often for long periods, this is the only case of spawning I observed.

JUNE 4th.—A fourth visit to the Bullock shore gave five specimens of Runcina on *Corallina officinalis* and seven of Limapontia, the latter as before on Cladophora.

JUNE 13th.—On the Field Club excursion to Dalkey Island this day, in addition to *Actæonia corrugata* and *Limapontia* already recorded[1] three well-grown individuals of the rare cream-coloured *Doris Johnstoni* were found, the two largest being a little over two inches long. This Nudibranch does not appear to have been recorded for the Dublin coast since 1845, when Thompson included it in his Additions to the Fauna of Ireland[2] as found the previous year at Skerries by Mr. Hyndman.

JULY 31st.—During a second dredging trip in the Dalkey district on this date, a scrape in 17 fathoms east of the Muglins gave one specimen of the rare little crab *Ebalia Pennanti* with two of the far less rare, though, in Dublin waters, by no means common *Euronyme aspera*. A haul in 16 fathoms to the south of the Battery on the island brought up one good specimen of the rare *Trophon truncatus* and a single valve of the much rarer *Pecten similis*, first added to the Dublin marine fauna in one of the Committee's dredgings near the same ground in 1907. But the best result of the day's work was had in the Sound itself, where a haul in 8 fathoms produced one well-grown specimen of *Idalia aspersa*, a nudibranch new to the Dublin marine fauna, though recorded in 1855, from off Bray Head, a few miles to the southward (Ald. and Han., *Monograph, App.*).

[1] *Irish Naturalist*, 1908, p. 164.

[2] *Ann. and Mag. Nat. Hist.*, xv., p. 308.

September 19th.—A third dredging for this district gave from 9 fathoms off Bullock Harbour, 6 specimens of *Polycera occellata*, one of *Doris aspera* and one of the pretty and rather rare Sucker-fish, *Lepadogaster bimaculatus*. But the best yield of the day was from 9 fathoms towards the northern end of the Sound, where three specimens of *Antiopa cristata* were taken, one of them $\frac{5}{8}$ inch long, a very welcome confirmation of the first Dublin record for this rare nudibranch from almost the same spot, where a poor specimen was dredged in September, 1906.[1]

October 31st.—This day's dredging, the last for the year in the Dalkey district, was remarkable for a haul of very rich material made in 16 fathoms off the Muglins. We had evidently happened upon a hollow in the sea floor into which the strong tidal currents prevalent about here had swept myriads of dead shells, and with one lucky scrape the dredge had brought up an epitome of the marine mollusca inhabiting the neighbouring rocky shores and reefs. The examination of the material is not yet finished, but so far it has yielded me no less than 110 species of mollusca, the greatest number I have ever obtained from a single haul on any part of the Dublin coast. Though the shells were mostly dead, many were quite fresh, and perfect specimens of nearly all of the species were included in the fragmentary matter which formed the basis of the material. Amongst the 110 species identified were three new to County Dublin waters. These three are printed in italics in the following list, which shows the more rare or local species included in the haul, the number of specimens being added as a guide to relative frequency :—

Aclis supranitida, 1.
A. unica, 2.
Capulus hungaricus, 1.
Rissoa punctura, 152.
R. reticulata, 184.
R. semistriata, 519.
R. costata, 33.
R. vitrea, 2.
R. soluta, 205.
R. striatula, 1.
Adeorbis subcarinatus, 177.
Cæcum glabrum, 107.
C. trachea, 4.
Eulima bilineata, 20.
Odostomia Warreni, 1.
O. spiralis, 97.
O. insculpta, 42.
O. decussata, 10.
O. conoidea, 6.
O. albella, 15.
Eulimella acicula, 4.
Utriculus mammillatus, 5.
Leda minuta, 2, and 27 valves.
Lima Loscombi, 2 frags.
Astarte triangularis, 677.
Circe minima, 7 valves.

[1] *Irish Naturalist*, 1907, p. 160.

The numbers in the foregoing list indicate, for the univalves, the perfect shells found in the material, for the bivalves, the number of united or double valves. The predominant species were *Rissoa parva*, *R. striata*, *R. semistriata*, *Venus ovata*, and *Astarte triangularis*, single valves of the two last named being innumerable. In addition to the mollusca, this abnormally rich haul included one broken specimen of the well-known coral, *Caryophyllea Smithii*, and numerous specimens of another coral, the minute *Sphenotrochus Wrightii*, two of my largest specimens of the latter measuring exactly $\frac{1}{8}$ inch.

Malahide Creek and River.

May 30th.—The results obtained from the 1907 dredgings on this ground encouraged the Committee to continue its work here during 1908, and the first trip was made on this day. Dredging in the river below the railway bridge gave three interesting opisthobranchs, *Elysia viridis*, one specimen an inch long, *Runcina Hancocki*, three specimens, and *Limapontia nigra*, one specimen. The occurrence of the two latter species in 2 fathoms of water is worthy of note, as both species are usually quite littoral. Mr. Gamble dredged Limapontia in Valentia Harbour, from about the same or a somewhat greater depth; but it seems probable that both there and at Malahide this species was carried down by strong currents from some purely littoral habitat, so that its occurrence in these stations is no more indicative of normal habitat than is the presence of living alpine plants at low levels by mountain streams.

June 17th.—A second half day at Malahide was spent in dredging, partly in the Creek above the railway bridge and partly in the River below it. In the Creek, one specimen of *Chiton ruber* was taken along with three Runcinas and numerous living specimens of *Rissoa membranacea*; in the River, no less than 33 individuals of *Doto coronata* were found on *Hydrallmania*, and on the common sponge, *Halichondria panicea*, one specimen each of *Eolis Drummondi* and *E. aurantiaca*. The last-named Eolis is new to Dublin and to East Ireland waters, the only previous Irish records being for Valentia Harbour and Ballinakill Harbour on the West. The Malahide specimen was $\frac{1}{4}$ inch long, and showed bright red on

the yellow sponge. It agreed closely with Alder and Hancock's figure, save that its dorsal tentacles were much more wrinkled than is there shown, and the tips of its papillæ, at the time of capture, were almost colourless instead of orange. Yet the living animal, on the 21st June, showed distinct orange yellow blotches on many of the papillæ. There appears to be only one previous record for *E. Drummondi* in county Dublin waters, the record by Professor Haddon of its discovery in Kingstown Harbour, about the year 1881.[1]

July 27th.—A third dredging trip in Malahide River, though it added no mollusca new to the Dublin marine fauna, gave one specimen each of three interesting opisthobranchs, *Elysia viridis*, *Ancula cristata*, and *Eolis cærulea*. The specimen of *E. cærulea* was the second found in Dublin waters, the first having been taken in one of the Committee's dredgings, on the same ground, in 1907. Many large specimens of *Alcyonidium gelatinosum* came up in the dredge here, and on one of these five living individuals of the rather rare *Lacuna crassior* were found.

November 11th.—The last Malahide dredging of the year was made this day in cold and squally weather. The tide suiting, several scrapes were made on the Zostera beds in the creek. Three Runcinas and one *Chiton lævis* were taken on old oyster shells, and on the Zostera one living *Pleurotoma rufa* and numerous fine living specimens of the common *Lacuna divaricata*. The Lacunas offered an interesting example of what appears to be protective colouring. Observing that the individuals of this species, though large and numerous, were yet hard to detect on the living Zostera to which they clung, I examined the shell and animal closely and found that both were distinctly streaked or blotched with rather bright green. This colour appeared on the operculum of almost all the individuals and in various positions on the shell, while the head of the animals and the tentacles, when protruded in crawling, were found to be distinctly tinged with the same colour. The ground colour of the shell being tawny, with brown bands, the individuals, whether at rest or in motion, harmonized closely with the green and often mud-stained

[1] *Proc. R. I. Acad.*, 1886, p. 529.

Zostera. I have not observed this green colouring in any specimens of the species gathered on brown sea-weed.

In the River, *Eolis Drummondi* and *Elysia viridis* were again taken, one specimen of each.

SKERRIES BAY AND ISLANDS.

As already mentioned at the opening of this report, the writer took advantage of a month's holiday spent at Skerries in July last to do some shore collecting and to make a couple of dredging trips. While wading across to Shennick's Island at low water on this first day at Skerries, twenty-six large Sea Hares (*Aplysia hybrida*) were observed crawling about the roots of *Chorda filum* in less than a foot of water. A gravel causeway or mussel-bank, submerged at high water, stretches from the island towards the mainland, and on either side of this bank are small Zostera beds. In one of these a single specimen of the rare *Eolis Farrani* was taken, a species which does not appear to have been recorded for the Dublin coast since it was added to the Britannic fauna from Malahide by Alder and Hancock in 1843.[1]

JULY 2nd.—Some tufts of *Cladophora rupestris* gathered in pools on Red Island yielded several specimens of *Limapontia nigra*, showing this species to be distributed all along the Dublin coast. At low tide I again waded across to Shennick's Island, accompanied by my nephew, chiefly with a view to observing the Sea Hares. Keeping about 50 yards apart, as we crossed and closely scanning the sands and low-growing sea-weeds around us, covered only by a few inches of clear unruffled water, lit up by brilliant sunlight, we found, on comparing notes when we reached the island, that our separate counts of Aplysias made a total of 300 individuals.

A grand invasion of Sea Hares had evidently taken place since the day before, the animals having, no doubt, come in with the tide from deeper water to what is, probably, a favourable breeding ground. Nearly all of the individuals were of large size, some fully up to 7 inches long while in motion and the average little less than 5 inches. It was an almost uncanny sight to see the creatures crawling steadily shorewards over the tawny sands, with leporine ears erect, or lying in strings amongst the soft yellow sea-weeds. In colour, the

[1] *Ann. and Mag. Nat. Hist.*, xiii, p. 161.

animals varied from speckled citron, through light brown, to almost pure black. Some very juvenile naturalists, quite unconnected with the Marine Biological, or any similar committee, were observing the Sea Hares, too, as I waded across and, from one of these, I heard the opinion expressed with an accent of deep conviction, that the beasts were poisonous and dangerous to touch. So that nineteen centuries have not sufficed the Sea Hare to outlive its evil reputation.

The result of many observations made during July was to show that the Aplysias had undoubtedly decreased in number towards the end of the month. On the 7th, one of us counted 106; on the 21st, only 55 could be found, and on the 28th, but 50, and, as both of these latter days were sunny and warm, with unruffled water, so that the animals could be easily detected, it seems hardly open to doubt that a large proportion of their number had, by that time, returned to deeper water. No signs of spawning were observed on the seaweeds.

July 4th.—An almost blank day's dredging towards the north of the islands in new ground, which proved to be barren sand or mud, yielding abundance of *Philine aperta*, but nothing else of interest.

July 6th.—Shore-collecting, on the north of Shennick's Island, produced living specimens of the following species, the Opisthobranchs being all from a rather stagnant half-tide pool:—

Tectura virginea, 2.	Limapontia nigra, 2.
T. testudinalis, 4.	Utriculus obtusus, 1.
Actæonia corrugata, 1.	Philine catena, 1.

Three days later another specimen of Actæonia was taken near Loughshinny, this species, like Limapontia and Runcina, being thus shown to range all along the Dublin coast.

July 18th.—Another specimen of *Eolis Farrani*, one fully half-an-inch long, was taken on the Zostera beds off Shennick's Island. It agreed well with Alder and Hancock's figure, but the colouring was more diffused over the papillæ from the orange tips, so as to give the animal a generally orange hue. Two individuals of *Doris pilosa* were observed on *Fucus serratus*, and later on in the month this species became frequent, many examples being one inch long, and one reaching to one and one-eighth inch. It was always found adhering to the same

species of Fucus, which often bore numerous irregular spawn coils, sometimes forming a rude figure of eight. The hue of this Doris was very variable, ranging from mouse colour through pale lavender and tawny yellow to deep brown, those of the last-named colour being extremely hard to distinguish from the Fucus frond.

JULY 20th.—A second and more successful day's dredging was done on this date. The first scrape in 12 fathoms east of Church Island, brought up, along with *Cylichna umbilicata* (3 specs.), and *Rissoa vitrea* (1 spec.), a single *Eolis picta* alive and in good condition, and in all points agreeing with Alder and Hancock's figure. I am aware of only three previous Irish records for this species, the earliest being for Malahide, where it was discovered by Alder and Farran in 1843, and as all of these records appear to be for shallow water or even littoral stations, the Skerries record for 12 fathoms has all the greater interest. A second haul in 8 fathoms south of Church Island gave another addition to the Nudibranch fauna of the Dublin coast in a single specimen of *Doto fragilis*, and a third in about 2 fathoms in the channel between Colt and Church Islands gave one good specimen of *Sphenotrochus Wrightii*, the diminutive coral previously known as a Dublin species only from the southern parts of Dublin Bay.

JULY 23rd.—The last Skerries dredging for the year was made on this day, and although no new species was added to the Dublin molluscan fauna some interesting results were obtained. In 6 fathoms off Colt Island 8 fine specimens of *Eolis Drummondi* were taken, the largest $1\frac{1}{8}$-inch long, and with one of its longest papillæ distinctly branched, a monstrosity quite rare in the Nudibranchs. This is an extremely lively species, the long and almost serpentine tentacles and papillæ being in perpetual motion. One of the individuals, kept alive in a dish of sea-water, was found to have deposited its spawn on the 25th. The ribbon, or rather thread, which was found floating on the water-surface in a regular succession of loops forming a rude Greek key-pattern, was not quite one millimetre in breadth. It was tenacious and highly elastic, and when stretched into a straight line measured fully seven inches.

In 14 fathoms to the east of Church Island one specimen of *Eolis tricolor* was dredged, and in 10 fathoms to the southward of the island an example of the rare Sea Anemone, *Halcampa chrysanthellum*, a diminutive, free, pink ball about 4 inch in diameter, evolving at intervals into a cylinder about one inch long. But the most interesting fruit of this 14-fathom scrape was a small Galathea or Squat Lobster, 16 mm. long, bearing on its carapace a globular protuberance which proved to be the home of a parasitic isopod. A large family party was laid bare when the protuberance was opened. First came the conspicuous but amorphous and unlovely female, $4\frac{1}{2}$ mm. long by 3 mm. wide; then the neat and regularly formed male only $1\frac{1}{2}$ mm. by $\frac{1}{2}$ mm., completely sat upon by his better half, who carried him hidden away under her tail processes; and, finally, just visible to the naked eye, a "long family" of about 200 symmetrically formed youngsters snugly packed within the ovigerous pouch of the mother. Some of the offspring were lost in the course of a lengthy inquisition into their peculiar family arrangements, but I was able to count 150 of them, and have little doubt that the whole number reached 200.

A careful examination of male and female, and comparison with the plates and description of G. O. Sars, satisfied me that the parasite was *Pleurocrypta microbranchiata* of that author, a species which so far does not appear to have been observed in Irish waters. The male agreed perfectly with Sars's figure of the male of that species, the female agreed very closely with the figure of the female and differed from the figures of the females of all the other species of the genus given by Sars.

In both sexes of the Skerries parasite the eyes were quite apparent, and in both were oblong and obliquely placed with regard to the axial line of the animal. But the inclination was dissimilar in the two sexes. While it was forward in the female it was backward in the male, that is to say, the line of inclination in the female was such that, if produced, it would meet the axis in advance of the head, whereas in the male, if produced, it would meet the axis behind the head. Whether this character be constant, and whether, if so, it be of specific or generic value are points worthy of further inquiry.

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[1] Crustacea of Norway, vol. ii., p. 208, pl. 87.

The Galathea which served as the host of this interesting Isopod was somewhat mutilated when brought up by the dredge off Church Island, yet a careful examination proved it to be *G. intermedia* Lilljeborg, the species in which Sars found his *Pleurocrypta microbranchiata*, parasitical on the south coast of Norway.

JULY 28th.—A last visit to the Zostera beds on Shennick's Island gave me one fine specimen of *Eolis Drummondi*, one inch long, and two specimens of *E. Farrani*. In coloration these examples of *E. Farrani* agreed almost perfectly with Alder and Hancock's figure, the whitish papillæ being tipped with orange and the hepatic lobes showing through them light straw colour.

To sum up, the result of the Committee's activities during the year 1908 has been the addition to the molluscan fauna of the Dublin coasts of the following eight species:—*Hermæa dendritica*, *Limapontia nigra*, *Eolis aurantiaca*, *Doto fragilis*, *Idalia aspersa*, *Odostomia albella*, *O. conoidea* and *Eulimella acicula*. If we add to these the additions made in 1907, we have a total of 15 species of marine mollusca new to Dublin waters as the outcome of the Committee's two years' work. When the material collected by the Committee in other and less well-explored departments of marine life has been fully examined, results may be looked for of far greater interest and importance than any recorded in this report.

Sandycove, Co. Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include Patas Monkeys from Rev. W. P. Lowe and Mr. J. T. Gibbs, two Spiny Mice from Capt. Harding, Kestrels from Prof. R. J. Anderson and Mr. C. Carter, a Lapwing from Mr. G. Stony, six Yellow Fantails and two Lesser Redpolls from Surgeon-General and Mrs. Beatty, two Rock Sparrows from Mr. H. B. Rathborne, and a Rosy Bullfinch from Mr. H. W. Cutmere. A small Bonnet Monkey and a young Squirrel Monkey have been bought, and a Zebu bull-calf has been born in the Gardens.

BELFAST NATURALISTS' FIELD CLUB.

April 6.—The forty-sixth annual meeting was held in the Museum, College Square North, the President of the Club, (Robert Patterson, F.L.S., M.R.I.A.) in the chair. There was a large attendance of members.

The Secretary (Robert Welch, M.R.I.A.) read the annual report, which contained the following:—"During the past year thirty-one new members have been elected, of whom twenty-eight have qualified by paying entrance and subscription fees. There were 31 deaths and resignations, giving a net decrease of three. Eight committee meetings were held during the year, the average attendance being eleven out of a possible sixteen. The programme of the summer session was carried out, and the excursions, which were carried out under the conductorship of various members of the Committee, were fairly well attended, the average number being fifty-three. Mrs. Hobson was nominated to represent the Club at the British Association conference of delegates held in Dublin in September. Mrs. Hobson attended and submitted her report, which will be found in the Proceedings. The Treasurer's statement of accounts, shows a balance of £12 1*s.* 7*d.* in hands.

The report of the Botanical Section was read by N. Carrothers, the Geological report by J. L. S. Jackson, the Zoological report by N. H. Foster, M.B.O.U., the Archæological report by Mrs. Hobson, the librarian's report by J. L. S. Jackson, the report of the Sub-committee appointed to adjudicate on the collections sent in for Club prizes by N. H. Foster. M.B.O.U., and the Treasurer's statement of accounts by W. H. Phillips. The adoption of the various reports was moved by the President, seconded by the Vice-President, W. H. Gallway, supported by William Gray, M.R.I.A., and passed.

E. J. M'Kean, B.A., B.L., moved, and C. J. Robertson seconded, that N. H. Foster, M.B.O.U., be elected president for the ensuing year. This was passed with hearty acclamation. W. H. Gallway was re-elected vice-president, W. H. Phillips was re-elected treasurer, J. L. S. Jackson was re-elected librarian. Miss Agnew and Arthur W. Stelfox were appointed honorary secretaries.

The following ten members were chosen to serve on the Committee:—R. Bell, F. Balfour-Browne, M.A., F.R.S.E.; N. Carrothers; W. J. Fennell, F.R.I.B.A.; W. A. Green; H. C. Marshall; H. L. Orr; Robert Patterson, F.L.S.; W. J. C. Tomlinson; and R. Welch, M.R.I.A.

Suggestions of places to be visited during the summer excursions were then received, and a new member having been elected, T. E. Farrington moved, and Walter Chambers seconded, a vote of thanks to the retiring President, Robert Patterson, F.L.S., both gentlemen alluding eloquently to his services to the Club during his term of office. Mr. Patterson replied to the motion, which was passed in the most enthusiastic manner. A very cordial vote of thanks was also passed to the retiring Secretary, Robert Welch, M.R.I.A., on the motion of T. Anderson, seconded by G. Donaldson. Mr. Welch having replied suitably, the meeting terminated.

MAY 22.—EXCURSION TO THE BOYNE VALLEY.—Fifty members and friends left Belfast by the 7 30 a.m. train for an archæological exploration of the Boyne Valley, under the guidance of W. J. Fennell. Drogheda was reached at 9.40, and vehicles were taken for the drive. The party visited Newgrange, Mellifont, and Monasterboice. After tea in Drogheda the usual business meeting was held—the Vice-President, W. H. Gallway in the chair—and the 6.40 train was taken for Belfast. Water beetles received special attention from the zoologists. Previously there were only two or three species recorded for County Meath. On this occasion about forty-six species, practically all of which were common ones, were noted. One noteworthy fact was that certain species which are scarce in County Down were exceedingly common. The conchologists were well rewarded by finding *Vitrina pyrenaica* at Mellifont, Monasterboice, and between the latter place and Collon, where it was first taken in Ireland by P. H. Grierson some few years ago. Only dead shells were found, except at Monasterboice, where two living specimens were picked up after a vigorous search. This species as yet in Ireland has only been taken in County Louth, all the above localities being in that county, but it seems probable that it may have a much wider distribution. It may be well to mention that this is a Pyrenean and Alpine species, and, provided that our Irish shell is true *V. pyrenaica,* presents one of the most interesting examples of discontinuous geographical distribution in the European fauna. The ornithologists noted 41 species of birds. The President's prize for the best collection of wild flowers was won by Miss Anna M'Connell, who had 72 species. The Vice-President's prize for photographs was won by Mr. Holland.

JUNE 12.—EXCURSION TO DERRYADD BY LOUGH NEAGH.—Eighty-two members and friends travelled in specially reserved carriages by the 1.50 train from the Great Northern Station to Lurgan, where brakes and cars were in waiting All were soon driving through the pleasant level lands that lie to the south-east of Lough Neagh. Shortly after three o'clock the party arrived at the shores of Derryadd Bay, and leaving the vehicles, proceeded on foot along the shores of the lake. Here the party scattered. The ornithologists of the party reported having noticed thirty-two species about the shores of Derryadd Bay. Of these, the most interesting was the Yellow Wagtail, *Motacilla Raii.* The conchologists found the dry-weather conditions most unfavourable for collecting land shells, but, along the lake shore, nice specimens of the elegant amber shell—*Succinea elegans*—were abundant in certain damp muddy spots, where it was feeding in company with a fresh water species—*Limnæa palustris*—the marsh shell. The latter was the short, malleated and obese form for which Lough Neagh is noted. Several *Planorbis marginatus* were also collected—that curious non-typical form found in Lough Neagh and Lough Beg and the canals and rivers connected with both. This is the form so puzzling to English conchologists, who often confuse it with *P. carinatus* owing to the fact, amongst others, that the keel is almost as central and the shell as flat as English and Continental specimens of the

same species. Well-known authorities consider that our Irish specimens belong to a more primitive race than the British forms, where the separation between the two species is very well defined. After a pleasant afternoon, spent in these varied pursuits, the party left the bay at 5.45 for the return drive to Lurgan, where tea was provided, After tea a short business meeting was held—the President, N. H. Foster, M.B.O.U., in the chair—when three new members were elected, and the party returned by the 8.20 train.

26th JUNE.—EXCURSION TO THE ROE VALLEY.—A party of fifty-two members and friends travelled to Limavady by the 8.25 a.m. train, where they were met by H. C. Marshall, who had gone down the night before to complete arrangements. Cars were taken for the Dog's Leap, where the party remained for over an hour, and then the walk through the Deer Park woods on the west bank of the Roe commenced. O'Cahan's Rock and the Holy Well were visited, and then Mrs. Ritter welcomed the party at Roe Park House. A business meeting was held on the historic hill known as Drumcatt, when four new members were elected. The President and Mrs. Foster entertained the party to tea in the Alexander Arms Hotel, a cordial vote of thanks being passed to them. The members left Limavady at 5.40, and Belfast was reached at 8.40 The homeward journey was appropriated by some to the discussion of the results of the day from the natural history point of view. From the conversations it could be gathered that very few birds were observed, the day's list for the Limavady neighbourhood only totalling thirty. As was expected, the Dipper and Kingfisher were both observed on the river. One member reported finding three or four species of water-beetles new to the county. Four common species of woodlice were seen, and a few rarer forms were collected for further examination. Among the discoveries of the conchologists were—*Hyalinia excavata*, var. *vitrina*, *Limax flavus*, and *Helix aculeata*. The botanists saw apparently many interesting plants, but had nothing new in the way of records to add to the known flora of the area visited, The Golden Rod (*Solidago Virgaurea*) and the Wall Pennywort (*Cotyledon Umbilicus*) grew profusely on the rocks at the Dog's Leap, as did also a variety of mosses and hawkweeds. In the Deer Park woods the four most notable species observed were *Melampyrum pratense*, *Viburnum opulus*, *Melica uniflora*, and *Lastrea æmula*, all of which occurred profusely; *Prunus Padus* and *Salix pentandra* were seen lower down the valley. The geological members of the party gave a good account of themselves as exponents of the bearings of geology on the wonderful scenery of the area as a whole, scenery which comparatively few places in our islands can surpass in its combination of rugged grandeur and pastoral sweetness.

REVIEWS.

LAMPREYS AND FISHES.

A Treatise on Zoology. Edited by Sir Ray Lankester, K.C.B., LL.D., F.R.S. Part IX. Vertebrata Craniata, first fascicle **Cyclostomes and Fishes.** By E. S. Goodrich, M.A., F.R.S. London: A. & C. Black, 1909. Pp. xvi. + 518. Price 15s. net.

In passing some adverse criticisms on the inadequate treatment of the mode of life and distribution of animals in previous volumes of this treatise, we were unaware that this great work was intended to complement the well-known Cambridge Natural History. In a note printed in last month's *Irish Naturalist* (July, 1909), Dr. Bather gives us to understand that the scope of the treatise is limited to "systematic zoology on modern lines." His statement that this was clearly indicated in the prospectus cannot be easily verified by the student who would naturally turn to the first volume for such an explanation.

A discussion of "facts that have no obvious bearing on taxonomy" would no doubt have made the treatise somewhat unwieldly, but we are of opinion that it would have been desirable to include certain features in the direction indicated that certainly have a bearing on taxonomy.

Ten pages of Mr. Goodrich's volume on Cyclostomes and Fishes (pp. 73-82) are devoted to a description of the origin of paired fins. Few zoologists probably are more competent than he is to give us such a brief and yet masterly exposition of the complex problems connected with this subject. The identification and enumeration of the segments of which the head of a vertebrate is composed constitutes another and possibly still more intricate topic. For it is now recognised that the remote ancestor of those vertebrates (craniata), which possess a skull, must have been segmented right to its anterior extremity. The great difference in structure between head and trunk is probably due to divergent specialisation of two regions of the body which primitively resembled each other. Mr. Goodrich supplies a careful description of the nervous system and sense organs, the mesoblastic somites, and the gill arches and slits, which are the three chief sets of structures to be studied in connection with this identification of the head-segments. Thus the early history of the skull is gradually being elucidated. Much more work, however, is needed in this direction. Two papers—one by H. E. Ziegler[1], the other by P. Brohmer[2]—on the origin of the head of vertebrates, have been published since Mr. Goodrich's volume went to press, and have thrown fresh light on some obscure points.

Lampreys and Hagfishes have for some time been entirely separated from the class Pisces. They can no longer be looked upon as true fishes since they differ from the latter in many salient structural characters. The strongest evidence of their primitive position is to be found in the larva of the Lamprey, which has certain features of resemblance with the

[1] *Zeits. f. Naturwissensch.*, xliii., 1909. [2] *Ib.*, xliv., 1909.

Tunicates and the Cephalochorda. Mr. Goodrich concurs with Dr. Gaskell in regarding Lampreys as not being degenerate. Yet the theory of the origin of vertebrates, according to Dr. Gaskell's fascinating studies, is not alluded to. Palæospondylus, in spite of Professor Sollas' reconstruction, is still relegated to "incertæ sedis" in the classification.

Otherwise the example of Cuvier, Valenciennes, and Duméril is followed by Mr. Goodrich rather than that of the more modern ichthyologists in dividing all living fishes into two main groups—the Chondrichthyes and the Osteichthyes. The Dipnoi, that extraordinary order of fishes which has so many points of resemblance to the Amphibia, is thus united with all our common freshwater fishes, though they seem so different in almost every respect. The argument that the Dipnoi represents a degenerate section of fishes, is negatived by their fin structure.

The two old divisions of fishes—the Ganoidei and Teleostei—which were supposed to be readily distinguishable by their scales, have also been cast into the melting pot, and we no longer discriminate between them as clearly as formerly. The work of Cope, Smith Woodward and others on extinct fishes has resulted in breaking down the distinctions which we once relied upon.

A useful list of works on fishes is given at the end of the volume. Some names, such as MacIntosh, which we certainly should have expected to find among the authors quoted, are omitted.

Mr. Goodrich's work is a book for the serious and advanced student, its perusal being greatly facilitated by an admirable series of original diagrams; while some of the previous volumes are especially noteworthy for their erudition, conciseness, and novelty, this one stands foremost amongst them for the abundance of excellent illustrations.

R. F. S.

PALÆOBOTANICAL PHOTOGRAPHS.

Fossil Plants. Sixty Photographs illustrating the Flora of the Coal Measures. By E. A. Newell Arber, M.A., F.L.S., F.G.S. London: Gowans and Gray, Ltd., 1909. Pp. 76. Price 6*d.* nett.

This little book, No. 21 of Gowan's Nature Books, contains reproductions of photographs of the more important plants belonging to the Coal Measures of Britain, and gives the reader in a charming manner an insight into the peculiarities of the flora of that remote period. At the end are some dozen pages of notes explanatory of the plates. These are prefaced by a brief account of the manner of fossilization of plants, in which the writer, by avoiding all technical terms, makes the subject interesting for the ordinary reader.

I. S.

NOTES.

ZOOLOGY.

White Wagtail on the East Coast.

Regarding Mr. Williams' statement (*Irish Nat.*, vol. xviii, page 121), that no occurrence of the White Wagtail (*Motacilla alba*) has been authenticated from the east coast of Ireland, I would refer him to the *Irish Naturalist* for 1902, page 221, where he will find that Mr. Nevin H. Foster and I saw a White Wagtail on the River Lagan on the 21st May of that year.

ROBERT PATTERSON.

Holywood, Co. Down.

Golden Oriole in Co. Cork.

On the 26th April we received a very fine specimen (adult male) of the Golden Oriole for preservation. The bird was shot on 24th inst. on the Bantry road, three miles outside Dunmanway, and was in faultless condition, hardly a feather of the beautiful saffron colouring being disturbed. It is now some years since one has been recorded in the South, and we certainly think that a finer specimen has not been obtained.

F. R. ROHU.

Cork.

The Little Gull.

Regarding Mr. Barrington's reference to the Little Gull, reported from Cork, we might state that this has been verified beyond question; the bird was shot last year at Tralee by a Mr. Mabbs, and was also seen in the flesh by several ornithologists. The bird was purchased and set up by us, and is still in our possession.

F. R. ROHU.

Cork.

I much regret that the short note on the occurence of the Little Gull at Laytown, which appears in the *Irish Naturalist* for April over my name, is incorrect. It is an immature bird and not an adult as stated, and the date should have been February 7th and not March 7th. A mistake, whether the explanation of it be good or bad, is still a mistake, and excuses are not good remedies; therefore I shall only observe that nobody is to blame except myself, and that the distinction between the immature and adult in *Larus minutus* is so well marked that it could readily be detected, even on the wing, within gun-shot range, and it is as readily perceived as the difference between the young and old Black-headed Gulls seen almost daily on the Liffey,

RICHD. M. BARRINGTON.

Fassaroe, Bray.

Turtle Doves in Co. Waterford.

1882—May 22, one shot at Seaview by Mr. Gerald Fitzgerald.
,, "During summer" one seen several times at Curraghmore.
1883—June 17, one seen Portlaw woods. Rev. W. W. Flemyng.
1884—September 15, one seen at Seaview. G. Fitzgerald.
1886—May 9, one seen near Seaview. G. Fitzgerald.
,, ,, one seen at Summerville. Calthorpe Gardiner.
1887—May, one seen at Summerville. Calthorpe Gardiner.
1888—May or June, one seen at Seaview. G. Fitzgerald.
,, ,, one seen at Gardenmorris feeding with fowl.
1889—May and June, four seen separately in district round Cappagh.
1890—April 4, one seen in district round Cappagh.
1892—May 3, one seen at Cappagh.
,, May 12, one seen at Cappagh. R. J. Ussher.
1893—May 21, one seen at Carriglea. W. Odell.
1894—May 15, one seen at Cappagh.
,, September 13, one in immature plumage, shot at Shandon, seen by R. J. Ussher.
1895—July 6 and 7, two seen near Carriglea. W. Odell.
1897—May 21, one seen near Glenshelane. R. J. Ussher.
,, June 9–20, one seen several times near Carriglea. W. Odell.
1899—May 31, ,, ,, ,, ,, ,,
1900—September 8 or 9, one shot near Waterford, by Mr. J. T. White.
Since 1900, about June, one seen at Belleville Park. A. J. P. Wise.
1903—May 12, one seen near Carrigtea. W. Odell.
,, June 6, one seen near Clonea. R. Warren and R. J. Ussher.
1904—May 20, 21, one seen near Cappagh House. R. J. Ussher.
1907—May 26, ,, ,, ,, ,, ,,
1908—June 3, two seen between this and Cappoquin. J. Power.
,, June 9, two seen near Ardmore. Mr. F. Keane.
1909—May 14, three seen between this and Dungarvan. R. J. Ussher and J. Power.
,, Early in May, two seen at Monea, Ardmore. Captain and Mrs. Wm. O'Dell. (One of these must have been killed by a hawk; its feathers were brought to me.)
,, May 19, one seen at Lissaroe, north of Ardmore. Captain and Mrs. Wm. Odell.
,, June (early part), one seen near Dungarvan for four or five days. Dr. E. Williams.

From the above it may be concluded that the Turtle Dove is an increasing annual visitor to the Co. Waterford, and it appears to visit Co. Cork in the same way. It is not, however, known to remain through the summer, nor has it been found with nest or young. Still, its many occurrences lead one to expect that it may breed here eventually, if it has not already done so. This beautiful and harmless bird should be protected.

R. J. Ussher.

Cappagh, Co. Waterford.

THE ORNITHOLOGY OF SKERRIES, CO. DUBLIN.

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

In selecting Skerries last September as a holiday resort I had the good fortune to have, as my next door neighbour, Mr. Edgar Wilkins, whose knowledge of the birds of the locality is extensive and accurate, a knowledge acquired during many annual visits. We had many delightful rambles together, and I am much indebted to Mr. Wilkins for several interesting notes, and for the long list of birds with which he has furnished me, and which I append at the end of this paper. I am especially glad to have the opportunity of publishing this list, which incorporates so many land-birds, as my observations were chiefly confined to the birds of the coast. As the first week of my time was largely taken up in attending the meetings of the British Association in Dublin, a daily journal was not commenced until September 9th, from which date until the end of my holiday it was kept regularly. Opportunity, however, was afforded of making some notes three days earlier, and with a good beginning, for I had the pleasure of the company of Messrs. Robert Patterson and Nevin Foster.

Sunday, September 6th.—In charming summer weather we started in the afternoon for a ramble along the coast hoping to reach Balbriggan. But our attention was so long concentrated on the birds on the reef of rocks known as "the Long-Leg" that time did not permit of our proceeding further. It was high tide, and as part of the reef was covered and the rest converted into an island, we were prevented from going on to it. We, therefore, decided to watch the birds from the low grass-covered cliff—a comfortable and an excellent observatory. Even before using our binoculars the melodious piping which fell on our ears with wonderful distinctness in the calm, sunny evening told us how pregnant with bird-life was this rocky resting place. From their voices alone we learned of the presence of great flocks of Curlews,[1] while the constant cries of Lapwings, Redshanks, and Ringed Plovers told us

[1] So thickly studded were the rocks with Curlews that the birds were constantly fighting for perching room.

how plentiful were these species. At less frequent intervals the tuneful piping of a Greenshank or the whistle of a Whimbrel could be detected, strangely mingled with the discordant bassoon-like croak of a Cormorant, the short, snapping bark of a Heron, or the hoarse yells set up by more than one species of Gull. Between the reef-island and the beach the sea was thickly covered with Terns fishing. Over the glassy waters we could see in the clear atmosphere, with the aid of our binoculars, the Terns below us dip to the water, and without touching it, snap up flies which swarmed over its surface. For quite a long time we watched the birds getting food in this way, while above us were numbers of Swallows and Martins also "hawking" for insects. Presently a little steam-launch, passing close to the island, blew its whistle, and as the startled birds took wing with cries of great excitement, we were afforded a splendid view of the enormous throng which were seeking a resting-place during high-water. The rapidity with which the birds again alighted and the incessant chorus which they kept up were features of interest as showing that serious disturbances from the presence of shooters seldom took place. Mr. Patterson informs me that in Belfast Lough, for instance, silence to a large extent prevails among the flocks which are constantly harassed by the gunner.

Next we were interested in watching quite a procession of Herons leave the island and wing their way leisurely to the shore, where in the rock-pools they demolished the fry which swarmed in countless numbers.

Gulls, also, were beginning to congregate at the rock-pools, but now as the tide was just turning we were obliged, for want of time, to leave our observatory and return homeward. At different points along the coast between "Long-Leg" and Skerries we noticed numbers of Terns "hawking" for flies over the water.

Wednesday, September 9th.—As the day was wet and stormy I did not walk more than about half-a-mile from the house along the north strand. Numbers of Common Terns streamed past me fishing in the rough waters. Guillemots and Razorbills were numerous, but owing to the heavy breakers they kept at a considerable distance from the shore. On the

rocks I noticed an adult Wheatear with two others which were immature, and during my whole stay these remained on the beach at the back of the house. They were tame little creatures and their sprightly movements and pretty plumage enlisted our interests considerably. It is noteworthy how strongly littoral the Wheatear becomes in some localities during the autumn prior to migration, and it seems to me that it would be an interesting investigation to find out what food attracts this species to the sea-shore. The Pied Wagtail, another land bird, was a daily occupant of the beach. Its alarm note, not unlike that of the Swallow, was frequently heard when the Sparrow-Hawk was about, and it was then that the Wagtail kept closely to the rocks. The Rock-Pipit, so familiar along the coast in some localities, was absent,[1] its place being taken by its congener the Meadow-Pipit. This species as well as flocks of Linnets no doubt kept to the rocks at times to avoid the attack of the Sparrow-Hawk, which seemed to take its quarry almost entirely from the adjacent cornfields. On this day and almost every day during my visit I met the Sparrow-Hawk, and on several occasions saw it dash into a flock of small birds, generally Greenfinches or Linnets, and secure its prey. Immediately afterwards I often noticed numbers of small birds on the beach, where they remained for some hours. It thus struck me how beneficial the Sparrow-Hawk can be to the farmer. Here, at all events, it was not the number of the birds killed, amounting to only three or four a day, that saved the crops from being devastated, but instinctive fear that the marauder would soon be back again acted as a deterrent in keeping the small birds from incessantly consuming the crops.

Thursday, September 10th.—The weather was fairly fine. Near the pier which separates the north from the south strand I observed a Herring-Gull feeding a young one which was not very strong on the wing, and which kept up a melancholy squeal. It was evidently one of a late brood, probably hatched out on Lambay or Ireland's Eye.

Friday, September 11th.—The Gulls swarmed on the north strand and along the road in company with great flocks of Rooks.

[1] Mr. Wilkins includes this bird in his list. I probably overlooked it.

Saturday, September 12th.—This day was fairly fine, but cold. In the forenoon I watched a party of seven Stonechats, parents and five young, feeding on the road near the house; they were accompanied by Sparrows, Linnets, and Meadow-Pipits. At 2.30 p.m. my wife and I started for a walk to Barnageara Bay. On our way we noticed enormous numbers of Rooks and Daws, some picking on the strand, others perched on the rocks. The tide, which had been full at about 11 a.m., had ebbed considerably, and great quantities of sea-weed were cast up on the beach. Searching amid the weed my wife poked out with the pole of a tent a fine specimen of a Guillemot. Having picked the weed off, it seemed to me that the bird was larger than the average; I was also struck by its dark, almost black, glossy back, much more like that of a Razorbill than of a Guillemot. On opening the wings I further noticed with interest the profuse handsome chequering of the axillaries and under wing-coverts. These feathers were beautifully marbled with black and white. The very dark and glossy back answered to the description given of Brunnich's Guillemot, but the beak, though stouter than that of the average Common species, hardly corresponded to that of the rare western form. However, to remove all possibility of doubt I decided to compare it with the skin of a Brunnich's Guillemot in the Dublin Museum.

Sunday, September 13th.—At 10 a.m. Mr. Wilkins and I started on a tandem bicycle for Barnageara to look for a Curlew-Sandpiper which my companion believed he heard the previous evening. On our way we noticed Razorbills and Gulls in conflict. When the former came to the surface amid a flock of Gulls they were immediately set upon, and were obliged to dive; however the Gulls were not to have it altogether their own way, for frequently they received severe bites in their feet inflicted by the stout beaks of the divers. Regarding this interesting habit, Mr. Wilkins writes me:—"One Sunday in the summer of 1908, when out boating, we saw a flock of Gulls and great numbers of Razorbills and Guillemots all swarming after the herring-fry just off Barnageara. As we drew near we noticed Black-headed Gulls constantly springing out of the water, with the same suddenness as one would spring off a nettle barefooted. We learned that

the Razorbills, swimming under the water, often nipped the Gulls' feet in their beaks. Once or twice we saw a Razorbill in the act of releasing its hold as the Gull's foot came above the water. We further noticed that a Razorbill always appeared on the surface when a Gull sprang out of the water. The Gulls never then took the offensive nor tried to defend themselves in any way: they just then went back to the water and got bitten again." Reaching Barnageara we carefully scanned all the flocks of wading birds, but failed to discover a Curlew-Sandpiper among them. On our return we had a splendid view of two adult Gannets fishing only about two hundred yards from the shore. The swarms of old and young Razorbills and Guillemots did not seem to mind these great birds precipitating themselves head foremost among them from a height in the air into the water.

Monday, September 14th.—The greater part of the day was spent in the National Museum, Dublin, comparing the skins of Guillemots with the specimen which I obtained at Skerries two days before. I am much indebted to Dr. Scharff and Messrs. Nichols and Halbert for the kind assistance they gave. In none of the Museum specimens were the axillaries and under wing-coverts chequered boldly; indeed, the dark markings were very faint or entirely absent, leaving these feathers wholly white, nor were the feathers of the upper parts black and glossy. I found that, in my specimen, the beak was a little longer and stouter, while the wing measurement also exceeded that of any of the Museum birds. However, in a specimen labelled Brunnich's Guillemot, the beak was much shorter and thicker than in my specimen. Other differences in the plumages could be made out, but the details hardly concern us in the present paper. To put it shortly, I may say that I formed no definite conclusion regarding my specimen, though I lean to the notion that its peculiarities of plumage represent a certain phase rather than a variety or race form of the Common Guillemot. Later on I hope to write further on the subject. On showing the bird to Mr. W. Williams, of Dame-street, he informed me that a few like it had passed through his hands, though he had not a specimen at the time to compare it with. He suggests that the glossy black back may be the new winter plumage, which afterwards

fades to a brownish black, as one is accustomed to see in Guillemots obtained in winter. It is true that I got my bird just at the end of the moult, and the glossy black feathers showed signs of having been only lately assumed, nevertheless further data on the question are required.

Tuesday, September 15th.—The day was cold, windy, and unsettled, and, at frequent intervals, there were sharp showers. At 2.30 p.m. a party of us started for "Long-Leg," with a view of observing the Gulls and other birds feeding in the rock-pools at low water. As we wended our way along the beach we observed some interesting groups of Herring-Gulls, in different phases of plumage, resting on the rocks. On one rock, in particular, all the available room was occupied, the gulls being massed in company with Oyster-catchers, Redshanks, Ringed Plovers, and a small flock of immature Dunlins, but the Curlews were already astir searching for food among the Fucus. Passing Barnageara we found a great company of Terns fishing, while numbers of Redshanks, Turnstones and Ringed Plovers were busily racing along the edge of the ebbing tide in search of food. On approaching "Long-Leg," by way of the road and cliffs, we were attracted by the familiar discordant wail of the Black-headed Gull. When this is produced in chorus by thousands of voices, it becomes fairly bewildering; it seems to permeate the atmosphere and deaden all other bird notes around. At intervals, however, the more highly-pitched and penetrating call of the Herring-Gulls resounded from out the chorus, and, as we appeared, the clamorous throng practically ignored our presence, so intent were the competitors in securing food. Seating ourselves on the cliff we watched, through our binoculars, the manners of the Gulls, which, if a trifle rude, were highly entertaining. The birds collected in such crowds that the water of the rock-pools could not be seen. Those which secured a place by swimming, stuck to their position, but their attempts to demolish the myriads of fry, which lay beneath their feet, were constantly frustrated by the sudden descent of some of their comrades which fluttered over their heads. It was a common thing to see a Gull in the pool on trying to lower its head to seize a fish, receive instead a stab in the back of its neck from the beak of another bird, which,

tired of aimlessly fluttering above, plunged headlong on the chance of getting its beak under water. In the centres of less crowded pools were small groups of Herring-Gulls, which, in their eager pursuit after food, rotated on the water in such regular half-circles as to give one the idea that they were being blown by currents of wind coming from opposite directions. But it was when the fighting became fierce that the Herring-Gulls usually slipped into the pools, and, with a few well-directed strokes of the beak, drove their smaller congeners into the air. It was remarkable to see the keen competition that was kept up, and the perseverance with which the Black-headed Gulls in the air endeavoured to reach the water. They persisted in precipitating themselves through the air with closed wings after the fashion of Terns, and as often as not managed to catch fish in a dive. Only in special circumstances, as above described, is the Black-headed Gull given to such anomalous habits. Several of the rock-pools were visited also by Herons, which snapped up fry with great voracity. As the Herons threaded their way through the Fucus-covered rocks we noticed how the long axis of the body was practically horizontal, the neck coiled between the shoulders and the throat thrown well back. This attitude contrasts markedly with that of the bird when standing at rest, the long axis of the body being then nearly vertical. At this juncture our observations on the feeding habits of Gulls were brought to an end rather abruptly by the presence of a man who, attracted by the cries of the Gulls, went down to the pools, and, throwing stone after stone, succeeded in driving off the feathered throng. When the first stone was hurled into the thick of the largest numbers the birds did not seem to realise the onslaught, but when the second and third stones reached them they rose with one accord and, flying out to sea, alighted on the water about a hundred yards from the reef. We then visited the pools and found them still swarming with fry, and the surrounding seaweed when examined contained numbers entangled. Before leaving the spot we scanned the reef with our binoculars; a row of over seventy Cormorants stood at the fringe of the breakers. Next a Whimbrel's whistle attracted our attention; it proceeded from a bird flying over the sea, and scarce had we spotted it when a flock left the reef

for the shore. Curlews, Oyster-catchers, Green, Golden, and Ringed Plovers, and Redshanks were present in large numbers, and as we proceeded homeward along the rocks we were attracted by an erratic Redshank which persisted in flying round our heads uttering a screeching note quite unlike the usual pipe. It was a tame innocent bird, evidently unaccustomed to man's presence, and with the glass we could make out that its legs were yellowish. I took it to be an immature bird, of a late brood, which was crying in loneliness for its parents. We noticed Wood-pigeons at different points rise from the strand; what brought these birds here I found out some days later. As we clambered over the slippery rocks near Barnageara we observed three Grey Wagtails. Having reached the sandy beach of this locality we made for the road, reaching home at 7.30 p.m., after a most enjoyable outing.

Wednesday, September 16th.—Rain fell heavily almost all day, and no further notes on birds were added to my journal. I spent my time preserving the skins of some Guillemots and Razorbills.

Thursday, September 17th.—I observed immense numbers of Terns fishing off the shore near Holmpatrick and round Shinnick Island.

Friday, September 18th.—At 7 a.m. I observed a Sparrow-Hawk fly over our house and then descend toward the rocks. A startled Pied Wagtail flew out to sea and escaped being pursued. The hawk disappeared over the fields. The day turned out wet, and I added nothing further to my notes.

Saturday, September 19th.—I was pleased to hear the cry of a Greenshank at 11.30 p.m. The bird was quite close on a rock behind the house, but the night was too dark to locate its form. It was the only Greenshank which I recorded from Skerries during my visit.

Sunday, September 20th.—The day was warm but rather misty, but it cleared up in the afternoon. The sea was as smooth as a sheet of polished glass. Between our house and 'Lady-Bay' great numbers of Terns were fishing. It was interesting to see these birds now and again plunging between little gatherings of Razorbills, which they scattered. In 'Lady-Bay' the Razorbills came quite close to the water's edge, and so clear was the water that we could see the birds descending

to the sea-floor in search of small crabs and other creatures. The old Terns were very astute in knowing the nearest spot where fish could be obtained. When a fish was captured it was conveyed in the beak of the parent to the young bird; the latter remained seated and kept up a continuous chattering which sounded as *teck-teck-teck-teck-teck*. Directly the young bird got the fish in its mouth the parent hastened back to the same fishing spot, and, capturing a fish, fed another of its brood, and so on until about twenty fry were captured. Some of the more advanced young birds fished for themselves, others rested on the sea and were fed by their parents. Presently a bird, which looked very little smaller than a Black-headed Gull, appeared. Its flight was almost as slow and even as that of a gull, but its voice seemed unfamiliar. The cry, though much harsher, seemed like the wailing *yāā-wāh* of the Black-headed Gull when broken up into more syllables with the consonant *t* attached to each, thus: *yāt-ăt-wăt, yāt-ăt-wăt*. This gave one the idea that the sound proceeded from a Black-headed Gull, with a very hoarse and choking voice. Another of the same species soon appeared, and watching both with my binocular I was pleased to identify them as Sandwich Terns. Hitherto I had not noted this species from the Dublin coast. In the midst of the Guillemots and Razorbills I observed a Great-crested Grebe. It was an adult bird, but with most of the 'frill' moulted off. The graceful form and carriage of this species attracts the observer. When not diving (and sometimes quite a long time elapsed before the bird went down) the slight arching of its long slender neck gave the bird a graceful, almost swan-like, appearance on the water. Just before diving, the neck was occasionally retracted and coiled, and the bird looked intently on the water as if endeavouring to follow the movements of a fish below. But the moment the body was tilted, and just as the head disappeared, the neck was put on the stretch. Only a few faint ripples indicated the spot where the Grebe went down. On looking out to sea I next noticed a dark brown bird flying towards the land. The flight was rapid, resembling that of a Peregrine, and as the bird struck at a Redshank in a most determined manner, I thought for a moment it was a bird of prey. However, the Redshank was not seized, and with my glass I made

out that the tormentor was only a Skua, which on that occasion at all events was unsuccessful in forcing the Redshank to eject its food.[1] Finally the Skua flew out again to sea and disappeared.

Monday, September 21st.—I watched the Great-crested Grebe swimming about quietly on the water at the back of the house. During my bathe to-day several Razorbills and Guillemots dived and rose to the surface, so close to me that with a camera I could have secured interesting snap-shots.

During luncheon the 'cheeping' of Meadow-Pipits, mingled with the alarm cries of several other small birds, suggested to me that a hawk was about. On going to the front door I saw a Kestrel perched on a hay-stack, and flitting over its head was a little company of Greenfinches, while the Pipits were flying to and fro agitated, but not to any great extent. Presently the Hawk left the stack and poised in the air over the corn. The group of finches followed closely above, and when at last the harmless little falcon alighted on a telegraph wire, with a row of small birds on either side, many persons looking on were much surprised at the curious fraternity. That the Kestrel seldom molests small birds is well known, and this is only one of many instances which have come under my personal notice illustrating the remarkable absence of fear which small birds evince in its presence.

Tuesday, September 22nd.—Mr. Wilkins and I started in the forenoon for Balbriggan. The day was beautifully fine, and taking the coast we were fortunate in being able to add several more birds to our list. We noticed only an odd Tern near the house. The large company were fishing near Barnageara. Among them we observed a Sandwich Tern, which allowed us close enough to identify its long, stout, black beak. On this occasion we heard no voice, hence the necessity of a careful examination with a binocular at close quarters. Apart from its larger size we made out that proportionately the sweep of the wing is less than in the Common Tern, and that in flight the latter shows higher and more prominent shoulders. Here also we noticed three Sheldrake and two Red-breasted

[1] Perhaps the Redshank had no food in its gizzard to eject. This I think was unlikely, as there is reason to believe that the Skua seldom attacks birds other than those which have been recently feeding.

Mergansers flying at some height over the sea, while only a hundred yards from the edge of the rocks (the tide being out) we had a fine view of a Great Northern Diver. We took the time of several immersions and found 20 seconds as the average. This large, heavy bird, on tilting its hind quarters well upwards, plunges with great suddenness, but makes far less splash than the Cormorant. This was easily observed, as several of the latter were fishing close by. Proceeding onward we explored the great slabs of rock near 'Long-Leg.' From off these several Wood-Pigeons rose. Our curiosity then became aroused as to what brought these birds there. We soon discovered; on the slabs were strewn numbers of pellets of Herring-Gulls, which contained undigested grains of oats and wheat. The pellets had been opened by the Pigeons and the wheat picked out to a large extent. Reaching 'Long-Leg' we descried an immense flock of Lapwings and Golden Plovers rise to a great height from the reef and disappear. A Redshank indulging in a bath in a little pool on the strand indignantly gave chase to a Black-headed Gull which came too close. We noted in several cases how Redshanks etched the sand in short curved lines by drawing their beaks from side to side. These lines, therefore, as the birds ran along, intersected the long track of foot-prints almost at a right angle. On 'Bower-Rock,' beyond 'Long-Leg,' numbers of Cormorants were perched on the pointed peaks. Here we saw five Scoters flying over the waves, their wing-movements being very rapid. Near Balbriggan another large 'diver' appeared off the shore. Examined with the binocular we were very interested to discover that it was a Black-throated Diver, still retaining on the throat the conspicuous black marking of the adult nuptial plumage. We watched the bird in the calm water for some time, and as it remained close to us we were afforded ample opportunity of examining it critically. Its average time under water was 30 seconds. Close to where the bird was diving a seal put up its head, and a porpoise was rolling about. The tide was now quite low, and, scanning the rocks, I caught a glimpse of a hawk's head. We rapidly sought more elevated ground, from whence we had a full view of the bird. With the aid of the binocular we found it was a Merlin in immature plumage. There stood, bolt upright, the spirited little falcon,

his bright eye observant of all around him. Presently he skimmed down and shot along with great rapidity over the rocks, alighting about two hundred yards off, ready to pursue the incautious shore bird which perchance came his way.

Wednesday, September 23rd.—A beautiful bright calm day tempted Mr. Wilkins and me to engage a boat and scull round the islands. On the pier we picked up a young Guillemot stoned to death, its legs being broken in several places.[1] We had hardly left the pier when we observed great numbers of Common Terns fishing. The rocks which fringe the islands were also tenanted by vast quantities of these birds, which were accompanied by Black-headed and Herring Gulls. Kittiwakes were also present, but in much smaller numbers. Our interest was soon aroused by the presence of a Skua, and we witnessed some exciting chases after Gulls and Terns. Several times we saw the ejected fish snatched up in the air by the pursuer. As I purpose giving a detailed account of the feeding-habits of this 'pirate' gull in a separate paper, I now pass on without further reference. Suffice it to say that the species in question was the Arctic Skua, and from its sooty brownish-black upper parts and white throat, breast, and abdomen (these contrast colours being clearly defined), I considered the bird was an adult and belonged to the light-breasted form. After spending four hours in watching chiefly the feeding habits of this bird, we turned our backs on the island and made for the pier, not, however, until we had made friends with a big seal which, seeing that we did not intend to harm him, came closer and closer to the boat until his snorting became distinctly audible. On the rocks near the pier were perched numbers of Terns. Among the immature birds we could discern two plumage-phases: those birds in which the chestnut markings were still retained on the back and shoulders, and those which had lost these markings and were replaced by

[1] On our way back we picked up a Razorbill with its wings fractured, and several other specimens were also picked up with similar injuries during my visit. The detestable practice of stoning these innocent birds when they come close to the rocks should be strongly deprecated. On several occasions I hunted the boys away, but I fear the practice is indulged in to a large extent. I hope that bird-lovers, who may be at Skerries when the Razorbills and Guillemots are in numbers about the rocks, will exercise their influence in stopping this cruelty.

'french grey' as in the adult plumage, but unlike the latter the wings were still chequered with greyish brown. Many of the adult birds had assumed the white marking on the forehead, characteristic of the winter dress. Just outside the pier opposite the bathing-place called 'The Captain's Hole' we observed two Puffins on the water. They were feeding actively judging from the very brief time they remained on the surface.

Thursday, September 24th.—The greater part of the day was spent in preserving the skins of Guillemots and Razorbills, which had been picked up on the beach. One interesting note I made, however, on the movements of a Sparrow-Hawk. I was sitting on a rock watching Curlews and Oyster-catchers foraging in the seaweed when a Sparrow-Hawk swept through a flock of finches which rose from the adjacent corn-field; other small birds rose and pursued him, but evidently he was not hungry, for more than once his opportunity came to snatch up his quarry, which he now deigned to discard. It was amusing to watch the audacity of the small birds; however, a more serious mobbing awaited the Hawk, for as he crossed the road towards the beach he was so set upon by three Rooks that they drove him to the ground, his only mode of ridding himself of his tormentors being to skim out to sea. The rooks being unable to keep pace with him pursued only a short distance. When the hawk found himself once more unmolested he rose in graceful circling flight to a height in the air and was soon out of sight.

Friday, September 25th.—A wet stormy day spent indoors. I made some more bird-skins. In the afternoon I went out for a short time and noticed that there was a great scarcity of Swallows. The previous night the wind raged high. A few Guillemots were coping with wind and wave; the numbers of Terns had greatly thinned out, but Curlews and Oyster-catchers were present in increasing numbers.

Saturday, September 26th.—The exodus of Swallows is still more evident to-day. The weather being fine, opportunity was afforded of looking out for these birds at different points, and they seemed to be decidedly scarce. Roughly estimated I would say that seventy-five per cent. of the Swallows seen were immature birds.

Sunday, September 27th.—Only a few Terns and Swallows about the house. At 2 o'clock my wife and I left Skerries for

Balbriggan. We took the road as far as "Long-Leg," the remainder of the walk being along the cliffs. At different points before reaching "Long-Leg" we noticed groups of very tame Turnstones, which continued to forage among the pebbles and weed of the beach within fifteen yards of passing pedestrians and vehicles. These birds were in immature plumage. Four Wheatears, in addition to the birds which daily frequented the rocks near our house, appeared. Of these two were in adult plumage. They were likely a family group in which the rest of the brood had scattered. On this point one might briefly refer to the fact that one or two immature birds of a brood already quite strong on the wing and well able to take care of themselves, commonly follow their parents for a considerable time after the nesting-season is over. One often sees a young Black-headed, Lesser Black-backed, or Herring Gull, following one parent for quite a long time after it can fly. It is an interesting point, and the pertinent question arises: Are some young birds imbued with the faculty of independence at an earlier age than others, which makes them desert their parents, or is it that the parent, no longer able to support her grown family, continues to feed only the one which appears backward developmentally? In many instances no doubt, part of the brood is lost by the ravages of birds of prey and other fatalities. We kept a sharp look-out for Swallows and Terns, but found them scarce all the way between Skerries and Balbriggan. What Swallows we noticed were birds of the year.

Having had tea at Balbriggan we returned by the road arriving at Skerries at 7.20 p.m.

Monday, September 28th.—I made another expedition to "Long-Leg" in company with Mr. Wilkins. Looking over the grass-grown cliffs of Barnageara we observed hundreds of Black-headed Gulls, and, in much less numbers, Terns, "hawking" for flies and small beetles. With our glasses we plainly saw the birds opening their beaks and capturing the insects in the air. When about to snap up an insect the Gull assumed a curious attitude; it allowed it legs to dangle, its neck at the same time was thrown back between the shoulders and its head pointed upwards, this attitude being associated with a momentarily suspension in the air. It was a very different movement to that adopted by Swallows and Swifts when feeding.

Despite the slow and awkward attitude assumed, it was remarkable what a number of insects were consumed. The white birds were thrown out in bold relief against the dark cliff, and so thickly were they massed that at a distance they reminded one of a snow shower. Now and again the insects were snapped off blades of grass and blackberry bushes. I may remark that I have seen a Kestrel hovering within a foot of the same bushes, and as I doubt that the minute flies which the Gulls captured were taken, it is probable that the Hawk picked off the spiders which in numbers had spread their nets on the bush. Proceeding, we passed "Long-Leg," entering the cornfields half a mile further on. Here we remained some time looking for Wood-Pigeons. Having crept over to the edge of the low cliff we watched numbers of Herring Gulls pass us on almost motionless wings. Suddenly, however, the cries of Curlews, Redshanks, Lapwings, Gulls, and other birds attracted our attention. The noise proceeeded from "Long-Leg," where we beheld a great disturbance. The Redshanks were speeding off over the water; Lapwings were making for the higher regions of the atmosphere with all haste. The majority of Curlews made off; those which attempted to return took fright anew and hurried away with double haste. In short, the reef became desolate of bird-life in a very few seconds. Not altogether desolate, however, for after carefully scanning it with our glasses we detected the dark form of a bird standing upright on a rock. Had we not a powerful binocular at our disposal I doubt if, at such a distance, we would have made this discovery, for to the naked eye the bird might well have passed for one of the hundreds of loosely-scattered and superposed boulders which characterise the structure of the reef. But there he was, and with our glasses we proved him to be a Peregrine, whose sudden advent had struck such terror into the occupants of the spot he now chose to monopolise. For several minutes we enjoyed the treat with which we were presented. The falcon kept motionless, save for an occasional slight turn of the head, but his bold, piercing black eyes seemed to tell us that if in his swoop to the reef he had missed his quarry, his chance again was near at hand to enter an unwary flock, single out his victim, and bring it to earth with unerring aim. Here an amusing incident occurred; two Cormorants were winging

their way over the waves towards the reef. Suddenly they stopped short and dropped like stones into the water, and with stretched necks and peering looks showed with what terror they had been struck at the sight of the falcon. After a little time we decide to approach the reef, not without a long and tedious scramble; half crawling, half walking, we nearly reached the spot unknown to the bird, who, when about ninety yards distance, rose and went off, affording us a splendid view of his powerful flight and form in the air.

Here then my notes practically come to an end, for the next day saw me *en route* for Scotland, and though I was able to return on Friday morning, October 2nd, and remained till Monday forenoon, October 6th, when we took our final departure from Skerries, I was prevented from adding much more to my journal. When leisure allowed I watched for the Swallows and noted a steady decrease daily. The same may be said of the Terns; but our little friends, the Wheatears, were there to the end to receive our good wishes for a safe journey across the sea.

Summary.

If the reader of this paper compares its contents with what I published last October in the pages of the *Irish Naturalist*, in an article entitled "Rambles on Achill Island," he will see what a great difference there was in the nature and amount of country explored. In Achill my rambles were by no means confined to the sea-coast, which in itself was very diversified in nature. On that island I explored mountain, bog, low-lying slobland, and precipitous cliff-bound shores, and often in a day's outing many miles were walked. In Skerries, on the contrary, I never wandered more than a few miles from the house, and the low, rocky coast, with its coarse pebbly beach, constituted the unvaried nature of my hunting-ground, the only diversity being the patch of sand at Barnageara. Even the reef known as "Long-Leg" was but an extension of the rocks of the beach. And yet, within this limited area, a richer avifauna presented itself not only in the greater quantity of given species but also in a greater variety of species. This is particularly noticeable when Mr. Wilkins' list is included, even when due allowance is made for the birds overlooked by me at

Achill. To the ornithologist it is at once manifest that the sea and its beach between Skerries and Balbriggan, with which may be included the islands, teem with bird-life. In the present article I have endeavoured to bring to light as many new facts as could be obtained regarding the habits of many of our familiar coast-birds; also to emphasise what may have already been noticed but perhaps too casually. Lastly, I have succeeded in adding a few new records of occurrences of species along this particular part of the Dublin coast.

In conclusion let me say, that the question often arises in my mind, shall I, after so many years' observations on the habits of our common shore birds, continue to gather new facts? By patient observation I believe I shall, for it seems to me that the more diligently one studies these attractive creatures the more one is convinced that they possess the faculty of elaborating their lives, according as circumstance suggest, to a far greater extent than many of us dare conceive.

The University, Sheffield.

THE AVIFAUNA OF SKERRIES

LISTED BY MR. EDGAR WILKINS.

Song-Thrush.
Missel-Thrush.
Blackbird.
Redbreast.
Wheatear. In autumn common on the beach, on the Islands and at the "Bog of the Ring."
Sedge-Warbler. Frequent.
Willow-Warbler.
Chiffchaff.
Whitethroat.
Hedge-Sparrow.
Goldcrest.
Wren.
Blue Titmouse.
Coal-Titmouse.
Long-tailed Titmouse.
Great Titmouse.
Grey Wagtail.
Pied Wagtail. Much more common than the Grey Wagtail.
Rock-Pipit. Frequent.
Meadow-Pipit.
Spotted Flycatcher.
Chaffinch.
Goldfinch. Fairly frequent.
Greenfinch.
Bullfinch. Much less common than the Goldfinch.
Linnet.
Lesser Redpoll. Rather uncommon.
Reed-Bunting. At the "Bog of the Ring."
Corn Bunting.
Yellow-Bunting.
House-Sparrow.
Skylark.
Starling.
Rook.
Jackdaw.

* No remark following the name signifies that the species is common in the locality.

Magpie.
Swallow. On August 7th, 1905, I saw two pure white ones about Barnageara.
House-Martin.
Sand-Martin.
Swift.
Cuckoo.
Kingfisher. Once seen flying across the railway station towards the sea; seen also flying along the shore.
Long-eared Owl } Often seen about
Barn-Owl } Ardgillan by day.
Peregrine Falcon. Frequently seen.
Kestrel.
Sparrow-Hawk.
Cormorant.
Shag.
Gannet. Occurs from the second half of July onward; one seen in June, 1909.
Heron. Numerous Breeds in Hampton Demesne.
Swan. On July 11th, 1907, I saw three large white Swans flying high over Skerries in a northerly direction. Flight very swift; in long graceful curves, now to the right, now to the left. Wing movement comparatively slow, but very strong, making a loud whistling noise.
Sheldrake. For several years a pair nested on Church Island.
Mallard. At the "Bog of the Ring."
Common Scoter. Swarms along the coast from the end of September onward.
Ring-Dove.
Rock-Dove. Occasionally crosses from Lambay.
Pheasant. Preserved in Hampton.
Land-Rail.
Water-Rail. Nested at the "Bog of the Ring" in 1908.
Moor-Hen.
Ringed Plover.
Grey Plover. Occurs on the shore in September and October.
Green Plover.
Golden Plover. Fairly common, seen usually in flocks with Green Plovers.
Oyster-Catcher.
Turnstone.
Snipe. Frequent in suitable localities.
Dunlin. Frequent on the sea-shore.
Curlew-Sandpiper. Cry heard at 10 p.m. at Barnageara, September 12th, 1908.
Sanderling. One seen in September at Barnageara.
Common Sandpiper.
Redshank.
Greenshank. Only very occasionally heard, not yet seen.
Bar-tailed Godwit. Frequent.
Curlew.
Whimbrel.
Common Tern.
Arctic Tern.
Little Tern. Much less numerous than the preceding two species.
Black-headed Gull.
Common Gull. Not by any means common.
Kittiwake. Frequent.
Herring-Gull.
Great Black-backed Gull. Frequent.
Lesser Black-backed Gull. Frequent.
Razorbill } Swarm along the coast in Aug. & Sept.
Common Guillemot }
Puffin. A few seen about the Islands.
Red-throated Diver. Occurs along the coast from September onward.
Little Grebe. At the "Bog of the Ring."
Manx Shearwater. Frequently seen on the sea between Lambay and Skerries.

NOTES.

BOTANY.

Truffles in Co. Kildare.

My gardener dug up two Truffles here in my garden in June. To make sure, I forwarded them to Kew, and I was informed that they were specimens of "*Tuber aestivum*, Vitt. (our best edible truffle.)" I had not previously heard of Truffles being found in Ireland, believing that they only grew on chalk soil and under beeches. Where these were found here was on limestone soil running into gravel, and on the edge of a garden walk.

On getting the Kew report I wrote to Mr. R. M. Barrington, of Fassaroe, Bray, who tells me that Truffles have been found in Limerick and Galway, but are "certainly anything but common" in Ireland, and suggesting my writing and reporting the find. I shall be glad to know if there is a likelihood of more being found in the same spot.

EGERTON HAMMOND.

Ballytore, Co. Kildare.

Campylopus brevipilus in Fruit.

In the *Journal of Botany* for April Mr. H. N. Dixon records the finding in fruit, by Mr. J. Hunter, at Ballyliffin, Co. Donegal, of this moss; there is only one previous record (from Norway) of the fruit having been obtained.

Do Rabbits eat Arum maculatum?

In my shrubberies are many plants of this species, and of *A. italicum*. I have never noticed any part of the plant to be eaten that is above ground, but in the winter the tubers, especially if near the surface, are scratched bare and eaten. I have always supposed this was done by rabbits or pheasants. Certainly something eats them.

SPENCER H. BICKHAM.

Underdown, Ledbury.

I have noted with interest the query raised by Mr. Barrington in the last issue of the *Irish Naturalist* as to fragments of the Wild Arum being found, and also the interesting comments by Dr. Pethybridge regarding the poisonous nature of this plant. My object in writing upon this subject is to record the fact that I have recently observed the adult Oil Beetle (*Meloë violaceus*) feeding ravenously upon the leaves of *Arum maculatum*, and an entomological friend who hunts for Lepidoptera informs me that some kinds of larvæ also feed upon the leaves. I have found primrose blossoms nipped off in pieces in the spring, and often wondered who were the culprits. Can readers of this Journal throw any light upon the matter?

W. PERCIVAL WESTELL.

Letchworth, Herts.

The Botanical Analysis of a Feeding Stuff.

The following analysis of a feeding stuff which was sent up from Greystones to the Public Health Laboratory this year may be of interest, as showing how foreign species may be accidentally introduced into this country. Seeds were contained in it belonging to the following 24 species :—

Anthemis Cotula, Avena sativa, Brassica arvensis ?, Camelina sativa, Centaurea melitensis, Ceratochloa australis, Chenopodium album, Geranium dissectum, Linum usitatissimum, Lolium remotum, Medicago sativa, Panicum capillare, Phalaris arundinacea, Polygonum aviculare, P. Convolvulus, Rumex conglomeratus? R. crispus, R. obtusifolius, R. pratensis ? Secale cereale, Setaria viridis, Silybum Marianum, Triticum sativum, Verbena officinalis.

Of these, *Centaurea melitensis* and *Setaria viridis* are found in Eastern Europe ; *Lolium remotum* is a native of Europe and Western Asia ; *Panicum capillare* occurs in North America, and *Ceratochloa australis* in South America. I am indebted to Miss Hensman and Miss Knowles for the identification and the distribution of the above species.

J. Adams.

Royal College of Science, Dublin.

ZOOLOGY.

Additional localities for the new Irish Vitrina.

It is now two years since Mr. J. W. Taylor, F.L.S., at the Cork Triennial Field Club Conference, announced the discovery of a second species of Vitrina to the Britannic area, from specimens sent him by Mr. P. H. Grierson from Lord Massareene's demesne at Collon, Co. Louth.[1] Until May of this year no further locality for the species was discovered, but in this month when on my way from Drogheda to Collon I found a number of specimens, all dead, at the roots of grass around the ruins of some cottages by the roadside about a mile and a half east of the original habitat. A few days later, when the Belfast Naturalists' Field Club were visiting the Boyne Valley, the shell was found in two additional localities by Mr. R. Welch, first at Mellifont Abbey, where one dead shell was collected, and secondly at Monasterboice, where two full grown live and about a dozen dead specimens, including those found by Mr. J. N. Milne and myself, were obtained. Moss growing at the roots of grass was in all cases the habitat and the species was associated with *Vitrina pellucida, Helix rotundata, H. hispida* and *Cochlicopa lubrica* in all three localities, while *Hyalinia pura* also occurred with it at one of them. All the new stations are also in Co. Louth, though at Mellifont the find was made within a few yards of the Mattock River which here divides the counties of Louth and Meath.

A. W. Stelfox.

Belfast.

[1] J. W. Taylor in *Ir. Nat.*, August, 1907—*Vitrina elongata.* Rev. E. W. Bowell, in *Ir. Nat.*, May, 1908—*Vitrina pyrenaica.* J. W. Taylor in Mon. L. & F.-W. Moll. of the British Isles, Part 15, Oct., 1908—*Vitrina hibernica.*

Vertigo moulinsiana in Queen's County.

While botanizing near Durrow, Queen's Co., in May last I discovered this interesting little mollusk in a swamp by the Erkina river. A few of the specimens seen were adult, the remainder, and more numerous, being only about half-grown. This species apparently spends its juvenile state during the early summer months feeding low down among the marsh debris. Later on, towards the autumn, when fully grown, the animals ascend the grasses, reeds, and other plants, and finally hibernate on the stems and withering leaves that during the winter months stand stiff and well out of reach of the stagnant waters of the marsh. In October, 1908, I saw at Tinnahinch, Co. Carlow, its only other known Irish station, over fifty fully-grown individuals on a single leaf of the Hemp-Agrimony.

R. A. Phillips.

Cork.

Limnæa involuta in Co. Cork.

This very rare little water-snail, hitherto known to exist only in Crincaum Lake, near Killarney, was found by me in August last in Barley Lake, a mountain tarn in West Cork. The specimens, which have been verified by several authorities, differ from the Killarney ones in being rather smaller and slightly narrower in outline; in the intorted spire and texture of the shell they are indentical.

R. A. Phillips.

Cork.

Helix hortensis in Co. Down.

A third north-eastern locality must be recorded for this land-shell, Mr. J. N. Milne having found it living on Mahee Island, Strangford Lough. To make certain that it was this species and not one of the small white-lipped forms of *H. nemoralis*, so common on the west Donegal coast (and which turn up occasionally in inland localities), we had the animal dissected by the Rev. W. W. Bowell, who reports that it is undoubtedly *H. hortensis*. Though fairly common in many places in eastern and south-eastern Ireland, this is an excessively local and usually rare species in Ulster; four localities only[1] being hitherto known, including one each in Down and Antrim.

R. Welch.

Belfast.

The Nudibranch Genus Lomanotus.

In a recent paper (*Ann. Mag. Nat. Hist.* (8). vol. ii., Aug., 1908, pp. 208-215), N. Colgan gives an interesting summary of our knowledge of this rare genus of nudibranchs, mentioning a number of Irish records, and reducing the six species hitherto recognised to two, viz., *L. marmoratus*, Alder and Hancock (with *L. Genei*, *L. portlandicus* and *L. Hancocki* as synonyms) and *L. Eisigii*, Trinchese. The former variable species ranges from the Mediterranean to the Shetlands, while the latter is confined to the Bay of Naples.

[1] See *I.N.*, vol. xvi., p. 251, 1907.

Locomotion and the Use of Slime threads in Irish Marine Mollusca.

In a valuable paper (*Ann. Mag. Nat. Hist.* (8), vol. iii., April, 1909, pp. 354-362), N. Colgan gives the results of his observations on the locomotive powers of some species of marine Mollusca, chiefly Gastropods, and more especially on the use made of the slime-threads as an aid to locomotion. Mr. Colgan begins by remarking that "every student of the marine Mollusca is familiar with the fact that the Gastropods in general have a strong propensity to float foot upwards on any still-water surface they may be enabled to reach by crawling, and that many of them are accustomed to suspend themselves beneath that surface by means of slime-threads or attenuated strings of the mucus which all of them so freely secrete."

After referring to Gray's and Wallis Kew's statements on the power possessed by a few of our native species of marine Mollusca of re-ascending to the surface of the water by means of these slime-threads, Mr. Colgan states that out of eighteen County Dublin species placed under observation last year no less than ten were seen to climb up along their suspensory slime-threads to the surface of the water from which they had descended; he has moreover little doubt but that further observations would have shown many others of the eighteen to possess the same power. He then proceeds to give details of the behaviour of the ten species observed to climb by their suspensory threads.

Mr. Colgan also noted the rates of vertical travel up the sides of graduated glass tubes of 16 out of the 18 species placed under observation; the slowest rate of travel was observed in two species of Rissoa, which took 3 minutes to travel 1 inch, and the quickest rate in two species of Eolis (*E. Farrani* and *E. Drummondi*) which took only 15 and 13 seconds respectively to do the same distance.

The Char of Lough Currane.

I am indebted to Mr. W. M'Elligott, of Waterville, for a Char caught by him in Lough Currane. The specimen is of interest, as it belongs to the form named *Salvelinus Colii*, previously known to occur only in Galway and Southern Donegal, and differs considerably from the Coomasaharn fish (*S. fimbriatus*), or the Char of Acoose and Killarney (*S. obtusus*). The Currane fish presents all the characters mentioned by me as distinctive of *S. Colii* (*Irish Naturalist*, 1909, page 4), and appears to be absolutely identical with examples from the type locality, Lough Easke, in Donegal. The wide range of *S. Colii* is in harmony with my supposition that it is the most generalized type of Irish Char.

I shall be very glad to have Char from any part of Ireland, and I hope that readers of the *Irish Naturalist* may be able to send me some.

C. Tate Regan.

British Museum (Natural History).
London, S.W.

Blackbird eating Ivy Berries.

In a previous number of the *Irish Naturalist* I referred to the occurrence of numerous Ivy seedlings in my garden. The seeds formed part of the excreta of some bird, but I was unable to say what species. On the 16th of April of this year I observed a female Blackbird devouring eighteen ivy berries at one meal. In his important pamphlet on "The Food of some British Birds," Newstead mentions the Mistle-Thrush as eating ivy berries, but he does not appear to have observed the Blackbird feeding on the same species of fruit.

J. Adams.

Royal College of Science, Dublin.

A Summer Fieldfare in Co. Down.

On the 8th, 21st, and 26th July I saw a Fieldfare on a rough hill called Moneyscalp, in this neighbourhood. The part of the hill on which I saw the bird is covered with bracken, and on each occasion the bird was hiding in the fern, as if it knew that it had no business to be in these parts at this time of the year. I should be glad to know if Fieldfares often remain in this country during the summer.

Ross L. Langtry.

Bryansford, Co. Down.

Wood Wren at Londonderry.

I believe I can record the occurrence of the Wood Wren (*Phylloscopa sibilatrix* Bechstein), at Londonderry. On 17th April, at 7 a.m., I heard the song under my bedroom window in our garden at Templemore Park. Then at 5.55 a.m. on 18th April I heard it again from my neighbour's garden. I hurried out and saw the little bird flying from a sycamore tree but too far off to judge more than that it was a small warbler. I had heard the Wood Wren singing at close quarters in Yorkshire and recognized the song, "Cheep, cheep, cheep, *tzie, tzie, tzie, tzie.*" It cannot, I think, be confounded with that of any other local bird. I heard the song once or twice on later dates but never managed to get a sight of the bird.

Londonderry. D. C. Campbell.

Long-tailed Field-Mice.

I should be very much obliged if readers of the *Irish Naturalist* taking an interest in Mammals would catch as many Long-tailed Field-Mice—(*Mus sylvaticus*)—as they conveniently can, pickle them, and send them to the British Museum or to the National Museum, Dublin, for examination.

The reason I want this done is that hitherto no specimen of any representative of the larger Yellow-necked Mouse (*Mus flavicollis*) has been taken in Ireland, and I should like to make sure that it does not occur over here. Its absence from Ireland suggests many theoretical considerations concerning the mode of arrival of the Field Mice in this country, and its discovery in Ireland would be of importance.

G. E. H. Barrett-Hamilton.

Kilmanock, Co. Wexford.

The Irish Otter.

I am interested to find that "as far as the skull is concerned" Dr. Scharff thinks the Irish Otter is not specifically distinguishable from the British, because this conclusion was independently formed at the British Museum, and by no less an expert in the discrimination of species and subspecies than Mr. G. S. Millar, Junior, Curator of Mammals, Smithsonian Institution, Washington.

G. E. H. Barrett-Hamilton.

Kilmanock, Co. Wexford.

Number of Young of Stoat.

I fear my friend Dr. Scharff's conclusion that the Irish Stoat is more prolific than the English and German can hardly be sustained on the evidence produced by him (*supra*, p. 160). The number of young of the English Stoat has been at different times recorded as varying between two and thirteen per litter. The higher numbers are of course, exceptional, but the family of thirteen as well as others of eleven and ten were examined by perfectly trustworthy observers, and the thirteen young ones were all newly born and alive. But such efforts to perpetuate their race are insignificant besides a Scandinavian instance of sixteen known to Professor Collett.

Dr. Scharff's record is quite interesting, because very few records of the number of young per litter of the Irish Stoat are available.

G. E. H. Barrett-Hamilton.

Kilmanock, Co. Wexford

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Seal-cub from Mr. N. May, a Badger from Capt. Naper, two Fox-cubs from Mr. C. A. Clarke, four Sparrow-Hawks from Mr. M. Colgan, a Song-thrush from Mr. Flood, and a Pike from Dr. C. A. Ball. A pair of Black Spider Monkeys, an Opossum and a Kestrel have been acquired. The Spider Monkeys are highly interesting additions to the collection ; they have been placed in a large cage next the Gibbons, and it is very instructive to compare the method of climbing and jumping of the two types ; while the Spider Monkeys are provided with splendid prehensile tails, the tailless Gibbons are dependent on their long arms for the accomplishment of their wonderfully agile leaps. All visitors to the monkey-house will regret the loss of the friendly little Chimpanzee "Jane," who died unexpectedly in the last week of July. Eight young Rheas have been successfully hatched in the Gardens and are making good progress under the care of the father bird.

NOTES ON IRISH PLANTS.

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

In June this year I spent a few days in Clare, Galway, and Sligo, when I saw most of the following plants. One or two were found some years ago, but I have not previously recorded them, as they have only recently been identified. The delightful coast scenery of Co. Clare is a feature which no botanist should miss visiting. The plants which are new to *Irish Topographical Botany*, or believed to be additional, are marked with an asterisk. Those which are not native have † prefixed.

Ranunculus trichophyllus, Chaix.—Gort, 15.

R. heterophyllus, Weber.—Newtown, Gort, 15.

R. peltatus, Schrank.—Gort, 15.

Var. **truncatus** (Hiern).—Gort, 15.

Var. **penicillatus** (Dum.)—Gort, River Suck, Loughrea, 15.

R. Baudotii, Godr.—Lough Luirk, near Muckinish, 9.

***R. Steveni,** Andr.—Near Wicklow, 20; near Glasnevin, 21.

R. Auricomus, L.—Near the 'Punchbowl,' Gort, 15.

***Caltha radicans,** Forst.—Shore of Lough Derg near Rossmore, by the River Suck, Gort, Lough Rea, 15; Glencar, 28.

Aquilegia vulgaris, L.—Near Ardrahan, 15.

Papaver hybridum, L.—Near Roo. 15.

Radicula Nasturtium-aquaticum, B. and R., var. **microphylla,** Druce.—Near Ben Bulben, 28.

Barbarea arcuata, Reichb.—Near Gort, 15. The flowers are distinctly larger than those of *B. lyrata.*

†**B. verna,** Asch.—Murrough, *9; casual.

***Cardamine flexuosa,** With.—Ballyvaughan, 9.

†**Hesperis matronalis,** L.—Base of Ben Bulben, 28; near Clare-morris, *26. Well established.

Brassica alba, Boiss.—Ballyvaughan, 9.

Viola canina, L., and a form suggesting traces of *stagnina* parentage.—Margin of Lough Derg, 15.

V. canina × **stagnina.**—Unmistakably this hybrid, near Tirneevin, growing with both parents, *15. *V. stagnina* grew in the dampest part of the turlough, *V. canina* on the upper and drier ground; the hybrid was more frequent in the intermediate part.

V. Curtisii, Forst., var. **Mackaii,** Wats.—Murrough, 9; Wicklow sandhills, 20. Very luxuriant and beautiful in the latter situation.

Polygala serpyllacea, Weihe, var. **major,** Rouy and Fouc. (but not an extreme form).—Base of Ben Bulben, 28. A very beautiful plant. The small area where peat occurs, at the base of the mountain, was the locality. On the limestone cliffs of the mountain *P. vulgaris,* L., var. *grandiflora,* Bab., was in magnificent flower, and really appears to be a sub-species rather than variety. The var. *major* of *P. serpyllacea,* was associated with Montia, *Vaccinium Myrtillus,* &c.

Polygala vulgaris, L.—A pretty form, with small dark blue flowers, occurs by the railway at Ardrahan, 15

Silene Cucubalus, Wib., var. **hirsuta** (Gray).—Castle Taylor, 15.

Cerastium tetrandum, Curtis, *forma* **cæspitosa.**—A densely-tufted dwarf form occurred on walls in Galway town, 16. Very luxuriant at Murrough and Muckinish, 9; also on sandhills south of Wicklow, 20.

C. arvense, L., var. **Andrewsii,** Syme.—Slopes of Cappanawalla, 9; a stiff, glabrous plant.

Arenaria verna, L.—Local at Black Head and near Cregg, 9.

A. tenuifolia, L.—Railway near Castlegrove, 17; abundant near Ardrahan, 15; near Ballindine, *26. An alien species rapidly extending its area along the permanent way of the railway systems like *Linaria minor* and *Senecio squalidus* in England.

Sagina maritima, Don, var. **debilis** (Jord.)—Near Maghera, 20.

Montia fontana, L. (=*M. lamprosperma,* Cham.)—Rare near Rahelly House, 28.

Hypericum quadrangulum, L. (*H. dubium,* Leers).—Cahir valley, 9.

Rhamnus catharticus, L., var. **prostrata.**—Leaves small, four-fifths by three-fifths of an inch, plant small, 6-12 in., quite prostrate, growing on the limestone rocks between Gort and Tirneevin, 15. In the *Cyb. Hib.*, p. 79, a prostrate form of *R. Frangula* is said to grow outside Garryland Wood, near Gort, but I did not notice it.

Potentilla procumbens, Sibth.—Derrynane, 1; near Wicklow, 20.

P. fruticosa, L.—The Irish plant (*f. hibernica*) which grows in the turloughs near Ballyvaughan, has narrower leaf-divisions than the Teesdale plant.

Alchemilla vulgaris, L., var. **minor,** Huds. (*A. filicaulis,* Buser).—Ballyvaughan, 9.

Var. **glabra,** DC.—Ben Bulben, 28.

Var. **pratensis** (Schmidt).—Ballyvaughan, 9.

* **Agrimonia odorata,** Mill.—Near Ardrahan, 15.

Rosa spinosissima, L., *forma* **rosea.**—Petals often dark rose-coloured, near Ballyvaughan, 9; pale-pink on the Wicklow coast, 20.

Pyrus Aria, Ehrh.—By the railway (but not planted) between Athenry and Galway, 15.

Carum Carvi, L.—Alien by the river at Galway, 16.

Galium boreale, L.—Very small plants at Newtown, Garryland, 15.

Sherardia arvensis, L.—Unmistakably native at Black Head, 9.

†**Inula Helenium,** L.—Newtown, Galway, etc., 15.

†**Matricaria suaveolens,** Buch.—Lough Rea, 15; Ballandine, *26.

†**Petasites fragrans,** Presl.—Near Sligo, 28.

Cirsium arvense, Scop.—Ascends to 1,600 feet in Sligo.

Lapsana communis, L.—Very glandular at Muckinish, 9.

Crepis taraxacifolia, Thuill.—Abundant about Ballyvaughan, 9; near Newtown, 15.

C. virens, L., *var. **agrestis,** W. and K.—Ardrahan, 15.

C. biennis, L.—Ballyvaughan, 9.

Taraxacum lævigatum, DC., var. **erythrospermum** (Andr.)—Black Head, 9; Loughrea, 15; Wicklow, 20.

Tragopogon pratensis, L.—Ardrahan, 15.

Statice linearifolia, Lat.—Black Head, 9; Galway, 16; Sligo Bay 28; Wicklow, 20.

†**Symphytum peregrinum,** Ledeb.—Three miles from Sligo, towards Ben Bulben, alien, 28.

Cuscuta Epithymum, Murray.—Either this or *C. Trifolii* grows in a pasture about a mile south of Black Head, 9. It was not yet flowering when I saw it.

Veronica montana, L.—"Punchbowl" woods, Gort, 15.

Euphrasia Rostkoviana, Hayne.—Ballyvaughan, 9.

Mentha piperita, L.—Ballyvaughan, shown me by Mr. P. B. O'Kelly.

M. verticillata, Huds.—As a small, quite glabrous, non-odorous form at Garryland, 15.

***Lamium hybridum,** Vill.—Near Murrough, 9.

Ulmus stricta, Lindl.—Under this probably come the small-leaved strict-branched trees near Gort, 15.

U. campestris, L. (*U. montana,* Stokes).—Dalystown, 15.

†**Populus nigra,** L.—The true Italian species in the common Irish tree. I saw it in divisions 9, 15, 16, 17, 20, 21, 25, and near Tuam, 26.

*†**P. deltoidea,** Marsh (*P. monilifera,* Ait.)—Near Gort, 15.

Orchis mascula, L.—Often grows on very dry calcareous pastures in Clare and Galway. It varies much in colour and also in the cutting of the perianth lobes.

O. maculata, L., var. **O'Kellyi** (nov. var.)—This plant, which has been known to Mr. P. B. O'Kelly for many years, he pointed out to me in the immature condition. He has since sent me fresh specimens, which have confirmed my view as to its distinctness as a variety or sub-species of *O. maculata.* It is quite frequent over a large area of limestone country about Ballyvaughan, Co. Clare, and retains its character under cultivation in different soil. It may be diagnosed as follows:—

Plant 9–14 inches high. Root-tubers two, each deeply divided into two spreading recurved fleshy parts. Leaves long, keeled, very narrow, not acute, spotted, pale green. Flowers in a dense oblong-cylindric blunt (not tapering) spike. Bracts shorter than the flowers, and inconspicuous. Flowers pure white, smaller than in *maculata.* Three segments of the labellum narrow, oblong, sub-acute; the middle segment longer and as broad as the lateral. Flowering in July. From *O. maculata* it differs by its unspotted and narrower leaves and pure white flowers, which are also slightly firmer in texture; by its oblong-cylindric blunt spike, and by the shape of the flowers. From the variety *præcox* of *O. maculata* (*O. ericetorum,* Linton), it is still more removed by the above characters. Perhaps they are both soil varieties; one, with its narrower leaves and different-shaped spike, being limited to distinctly calcareous soils, with more complete drainage; the other, which flowers earlier, with its very broad labellum, in which the

middle division is smaller and shorter than the lateral, and with a peculiarly conical head, is the plant of peaty situations; whereas the type prefers the trough of valleys on clay soils, although able like other hydrophytes to flourish on the impervious beds of the chalk hills. Rarely in the new variety there is a dot or two of colour near the base of the labellum. From its being known so long to its finder, who has done so much to investigate the flora of his rich neighbourhood, and who had in fact called it *immaculata*, I have, with his permission, connected his name with this interesting plant.

Sparganium minimum, Fries.—Garryland, 15.

Potamogeton lanceolatus, Sm., var. **hibernicus,** Arth. Benn.—Cahir river, in its classic locality where Mr. P. B. O'Kelly pointed it out to me. In the very immature condition in which I saw it, it looked quite different from the Anglesey *lanceolatus*. Mr. O'Kelly has since sent me more matured plants, which I have sent to Mr. Hunnybun to sketch, and to Mr. Fryer to grow. I await the opinion of the latter botanist, who has made this genus his peculiar study, with considerable curiosity.

***P. angustifolius,** Presl. (*P. Zizii.*)—In the river near Newtown, 15.

Eleocharis acicularis, Br.—near Newtown, 15.

Scirpus pauciflorus, Lightf.—Near Feena, 9; near Ben Bulben, 28.

S. rufus, Schrad.—Near Seamount House, 28; with it, and sometimes on the same plant, the bracteate form (*bifolius*).

***Eriophorum paniculatum,** Druce. (*E. latifolium*, Hoppe).—In a calcareous marsh near Feena, 9.

Schœnus nigricans, L.—As a small slender form (6 inches high) with few-flowered spikes, near Newtown. 15.

Carex flava, L., var. **minor,** Towns. (*œdocarpa*, Anders).—Lough Derg, 15.

***C. Oederi,** Retz, var. **subglobosa** (Mielich).—By Lough Neagh, Co. Antrim. A new variety to the Britain Isles, named by Kükenthal.

C. panicea, L.—Very luxuriant by Lough Derg, 15.

C. Goodenowii, Gay, var. **recta,** Fleisch.—Lough Derg, 15; near Roo, 9; Glencar, 28.

Var. **chlorostachya** (Reichb.), Druce.—Gort, 15.

C. diandra, Schrank.—Near Drumcliff, 28.

C. disticha, Huds.—As a neat dark-plumed form at Roo, 15.

C. arenaria, Huds., var. **remota,** Marss.—Wicklow coast, 20.

Kœleria cristata, Pers.—In his recent monograph, Dr. Domin has shown that this plant, in the strict sense, does not occur in the British Isles; our commonest form is probably *K. gracilis*, Pers., but the common form is the one with more downy culm and florets, which Domin names **K. britannica*. This occurs in Ireland at *Ballyvaughan, 9; Ardrahan, 15; Glencar, Ben Bulben, 28.

***K. albescens,** DC., var. **glabra,** DC.—Derrynane, 1. New to Ireland I believe.

Poa pratensis, L., var. **subcærulea** (Sm.)—Murrough, Muckinish, 9.

P. trivialis, L., var. **glabra,** Doell.—Gort, 15.

Asplenium marinum, L.—Very luxuriant on the limestone pavement near Black Head, 9.

Equisetum palustre, L., var. **nudum,** Newm.—Abundant near Drumcliff, 28; on the sands near Rockfield, 20.

***E. variegatum,** Schleicher.—Glen Cahir, 9. With it was another plant which, with some other critical forms, shall be reported on later.

Chara aspera, Willd.—Lough Rea, 15.

C. contraria, Kuetz.—Lough Rea, Lough Derg, 15.

C. hispida, L.—Abundant near Lough Rea, 15.

Tolypella glomerata, Leonh.—Abundant in the river at Newtown.

High-street, Oxford.

ADDITIONAL RECORDS OF IRISH COLEOPTERA.

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

I find a number of species in my collection which I have neglected to record, and I propose now to remedy that defect. I am much indebted to Mr. F. Balfour Browne, F.Z.S., for kind help with some of the water-beetles; he went through all my specimens and succeeded in detecting several species which I had overlooked.

Haliplus flavicollis, Sturm.—Poyntzpass, in the canal and adjacent drains.

Hydroporus septentrionalis, Gyll.—Dean's River, Armagh.

H. umbrosus, Gyll.—Canal near Scarva, but in Co. Armagh.

H. vittula, Er.—Poyntzpass.

H. incognitus, Sharp.—Ardara, Co. Donegal.

H. celatus, Clark.—Poyntzpass. This species has been regarded as a synonym for *H. longulus*, Muls, but I am informed by Mr. E. A. Newbery that Seidlitz, in his work on the Dytiscidæ, separates *celatus* and *longulus* as follows:—

A. Elytra with diffuse punctuation, without pubescence, strongly shining, black; thorax more finely punctuated on middle of disc, l. 3—3.5 m.m. In the South of France and in Spain (Pyrenees, Pandellé). *longulus*, Muls.

A. A. Elytra densely punctured, finely pubescent, little shining; thorax scarcely more finely punctured on disc than margins, black; legs and antennæ pale red; sometimes the elytra are reddish; l. 3 m.m. In England and France. *celatus*, Clark.

In the last European catalogue (1906), *longulus* Rey. is given as a synonym of *celatus* Clark. It seems doubtful that *longulus* of Mulsant is a British insect. *Celatus* Clark, however, is, Mr. Newbery tells me, in his experience widely distributed in England and Wales

and Canon Fowler[1] gives several localities in Scotland. In Ireland it has been recorded from Downhill, Co. Londonderry, by the late Mr. Buckle[2] and from Kinsale, Co. Cork, by Mr. Balfour Browne.[3]

Agabus guttatus, Payk.—Clay Lake, Keady, Co. Armagh.

A. chalconotus, Panz.—Lough Shark, Co. Down.

Ilybius ater, De G.—Lough Shark, Co. Down.

Rhantus exoletus, Forst.—Lough Shark, Co. Down.

R. notatus, Berg.—Poyntzpass.

Philhydrus coarctatus, Gredl.—Lough Shark.

Laccobius minutus, L.—Lowry's Lough, Ardmore, Lough Neagh, Co. Armagh; Strandtown, Co. Down.

L. bipunctatus, F.—Strandtown, Kilkeel; the Strandtown specimens were taken by W. H. Patterson, M.R.I.S., who most kindly forwards me any beetles he meets with.

Hydræna Britteni, Joy.—Mullimore, Armagh; Mr. Balfour Browne detected two specimens of this beetle among my series of *H. riparia.* It was described by Dr. Joy[4] from specimens sent him by Mr. Britten from the North of England, and from Ballycastle, Co. Antrim, where it was taken by Mr. Tomlin.

Homalota pagana, Er.—Coolmore, Co. Donegal.

Stenus canaliculatus, Gyll.—Lough Shark, Co. Down.

Longitarsus atriceps, Kuts.—Poyntzpass.

L. suturalis, Marsh, Omeath.

[1] British Coleoptera, vol. i.

[2] *Irish Naturalist,* vol. ix., 1900.

[3] *Irish Naturalist.* vol. xvi., 1907,

[4] *Ent. Mo. Mag.*, xliii., 1907, p. 79.

Poyntzpass.

NEWS GLEANINGS.

Belfast Naturalists' Field Club.

We have received the "Annual Report and Proceedings" for 1908-9, which contain the usual abstracts of papers and reports of excursions. The volume points to an active year's work. A number of records of plants and animals will be found in its pages.

The British Association.

We hear that our valued contributor Prof. C. J. Patten has been acting as Secretary to the Anthropological Section at the Winnipeg meeting. A paper on the breeds of British and Irish cattle was read by Professor James Wilson, of the Royal College of Science, before the Agricultural sub-section.

A NEW THYMUS FOR IRELAND.

BY THE REV. E. F. LINTON, M.A.

On a fortunate day in 1885, the Rev. W. R. Linton and I drove from Portumna, gathering *Sisyrinchium angustifolium* Mill. at Woodford, and *Inula salicina* L. at Rossmore. At Rossmore I took a Thymus of large growth with the habit of what we called *T. Chamædrys* till lately, but with the creeping barren stems of *T. Serpyllum* L. This Thyme has lately been seen by Dr. Domin, and named by him *T. Löwyanus* Opiz (*T. collinum* MB.). This is an addition to the flora of the British Isles (see *Journ., Bot.*, 1908, p. 33).

Mr. E. G. Baker has kindly supplied me with the original description of *T. Lövyanus* (which Dr. Domin spells "Löwyanus") :—

Thymus Lövyanus Opiz (Naturalientausch IX., p. 105). Caule repente ramis adscendentibus pilis patentibus; foliis oblongo-ovatis petiolatis glabris basi ciliatis; floralibus sessilibus oblongis obtusis ramorum steriliorum obovatis longe petiolatis; floribus verticillato-capitatis pedunculis pilis brevissimis reflexis obtectis; calicibus pilis patentibus concoloribus; corollis calyce æqualibus; staminibus inclusis.

Opiz Anth. Herb., Nro. 23.

Pragæ, Lovy.

Intermedius inter *T. praecox* Opiz et *T. serpens* Opiz.

The verticillate inflorescence gives the plant a strong look of *T. ovatus* Miller, at first sight, the species which has been most often in this country mistaken for *T. Chamædrys* Fr.

For the complete distribution of *T. Lövyanus*, and a full account of the genus, we must await a further paper from Dr. Domin. He has given his name to specimens in my herbarium from Moravia, collected by Herr Ad. Schwöder and issued as *T. angustifolius* Pers. (part of the sheet being confirmed as rightly named); and he identifies *T. Lövyanus* with *T. collinus* MB., placed by Nyman as a variety under *T. montanus* W.K., a species of S.E. Europe occurring from Dalmatia and Hungary to S. Russia. The Irish station is thus far removed from published localities, the nearest being its original habitat at Prague.

Salisbury.

OBSERVATIONS ON THE WEIGHTS OF BIRDS' EGGS.

BY NEVIN H. FOSTER, M.B.O.U.

I have previously recorded in the pages of the *Irish Naturalist*[1] the measurements and weights of eggs of some 94 species of birds, and these notes are now supplemented by a few which I have been enabled to examine during the past two years. As on former occasions, except where otherwise stated, the eggs were fresh when weighed; but in two or three instances the measurements and weights are repeated, owing to previous clutches examined having undergone considerable incubation.

CHOUGH (*Pyrrhocorax graculus*).

Inch.		Inch.		Grains.	Inch.		Inch.		Grains.
1·55	×	1·07	=	237½	1·5	×	1·1	=	231½
1·55	×	1·08	=	237½	1·5	×	1·07	=	224
1·47	×	1·15	=	246					

RAVEN (*Corvus corax*).

Inch.		Inch.	Grains.
2·23	×	1·36	491½
2·08	×	1·42	503
2·	×	1·34	378

CARRION CROW (*Corvus corone*). Three-quarters hatched.

Inch.		Inch.		Grains.	
1·75	×	1·15		273	
1·75	×	1·16	=	290	An English-taken clutch.
1·76	×	1·15	=	276½	
1·76	×	1·16	=	Broken.	

HOODED CROW (*Corvus cornix*).

Inch.		Inch.		Grains.	Almost hatched.
1·86	×	1·2	=	298	
1·73	×	1·16	=	271½	

[1] vol. xi., pp. 237-245; vol. xii. pp. 295-297; vol. xvi., pp. 315-319.

SWIFT (*Cypselusa pus*).

	Inch.		Inch.	Grains.		Inch.		Inch.	Grains.
(*a*) Almost hatched.	1·07	×	·64	= 42	(*b*) Fresh.	1·15	×	·61	= 55
	1·05	×	·64	= 49½					
	1·	×	·65	= 41					

BARN-OWL (*Strix flammea*).

Inch.		Inch.	Grains.
1·64	×	1·26	= 348
1·62	×	1·26	= 353
1·57	×	1·24	= 301

In this clutch the first and second eggs were fresh, but the third was rotten.

LONG-EARED OWL (*Asio otus*).

Inch.		Inch.	Grains.
1·7	×	1·28	= 374
1·6	×	1·25	= 343½
1·58	×	1·25	= 342½

PEREGRINE FALCON (*Falco peregrinus*).

Inch.		Inch.	Grains.	Inch.		Inch.	Grains.
2·1	×	1·7	= 776½	2·	×	1·65	= 697
2·12	×	1·72	= 804	2·07	×	1·65	= 701

CORMORANT (*Phalacrocorax carbo*).

Inch.		Inch.	Grains.
2·72	×	1·65	= 978
2·7	×	1·65	= 963
2·56	×	1·65	= 906⅓

GANNET (*Sula bassana*).

	Inch.		Inch.	Grains.		Inch.		Inch.	Grains.
(*a*)	3·2	×	1·88	= 1,550	(*b*)	3·07	×	1·95	= 1,576

COMMON SCOTER (*Œdemia nigra*).

Inch.		Inch.	Grains.
2·53	×	1·75	= 1,066
2·58	×	1·77	= 1,123

COMMON SHELD-DUCK (*Tadorna cornuta*).

Inch.		Inch.		Grains.	Inch.		Inch.		Grains.
2·5	×	1·9	=	1,234½	2·55	×	1·87	=	1,220½
2·6	×	1·86	=	1,243	2·54	×	1·92	=	1,267
2·53	×	1·9	=	1,250	2·56	×	1·9	=	1,247
2·56	×	1·93	=	1,271½	2·5	×	1·9	=	1,218½
2·46	×	1·9	=	1,210	2·45	×	1·82	=	1,135
2·47	×	1·85	=	1,145	2·45	×	1·75	=	1,049

SHOVELER (*Spatula clypeata*).

Inch.		Inch.		Grains.	Inch.		Inch.		Grains.
2·23	×	1·57	=	752	2·17	×	1·57	=	769
2·28	×	1·63	=	847½	2·17	×	1·65	=	799
2·2	×	1·65	=	830	2·2	×	1·65	=	804
2·23	×	1·6	=	779	2·16	×	1·56	=	711
2·2	×	1·62	=	770	2·17	×	1·56	=	678

TEAL (*Nettion crecca*). Half hatched.

Inch.		Inch.		Grains.	Inch.		Inch.		Grains
2·03	×	1·38	=	475	1·82	×	1·4	=	443½
1·98	×	1·37	=	460	1·84	×	1·38	=	439½
1·87	×	1·42	=	474	1·85	×	1·37	=	409
1·84	×	1·42	=	451½					

RINGED PLOVER (*Ægialitis hiaticola*).

Inch.		Inch.		Grains.	Inch.		Inch.		Grains.
1·35	×	·98	=	160½	1·38	×	1·02	=	177
1·45	×	1·02	=	181½	1·42	×	1·	=	175

OYSTER-CATCHER (*Hæmatopus ostralegus*).

Inch.		Inch.		Grains.
2·17	×	1·56	=	701
2·25	×	1·55	=	703
2·23	×	1·53	=	687½

KITTIWAKE GULL (*Rissa tridactyla*).

Inch.		Inch.		Grains.
2·15	×	1·6	=	735½
2·05	×	1·53	=	649½
2·	×	1·55	=	668

RAZORBILL (*Alca torda*).

	Inch.		Inch.		Grains.		Inch.		Inch.		Grains.
(*a*)	3·05	×	1·85	=	1,361½	(*b*)	2·8	×	1·9	×	1,384

GUILLEMOT (*Uria troile*).

	Inch.		Inch.		Grains.		Inch.		Inch.		Grains.
(*a*)	3·4	×	2·02	=	1,727½	(*c*)	3·02	×	2·	=	1,506
(*b*)	3·38	×	1·97	=	1,711	(*d*)	3·	×	1·85	=	1,305

MANX SHEARWATER (*Puffinus anglorum*).

	Inch.		Inch.		Grains.		Inch.		Inch.		Grains.
(*a*)	2·3	×	1·55	=	762½	(*b*)	2·17	×	1·63	=	807½

Hillsborough, Co. Down.

REVIEWS.

AN ISLAND SURVEY.

A Guide to the Natural History of the Isle of Wight. Edited by FRANK MORLEY, F.L.S. London: Wesley and Son, 1909. Price 8*s.* 6*d.* net.

This bulky volume of five hundred and sixty pages consists, as its title page indicates, of a series of contributions by specialists relating to the various branches of natural history and kindred subjects. After the Introduction comes a very readable survey of the physiographical and geological features of the island, illustrated with several very clearly drawn sections. Then follows, less than two pages long, the shortest chapter in the book, on Earthquakes! We are informed that "at the present time the island itself does not produce earthquakes," but the presence of Professor Milne's observatory on the island probably supplies the justification for the chapter. Chapters on palæolithic implements and on meteorology are also found, and the remainder (seven-eighths of the whole book) consists of lists of species in the various groups of animals and plants known to occur in the Isle of Wight.

These lists vary in completeness, that of the flowering plants and ferns being, we are informed, practically complete, whereas others are as yet some distance from this ideal. The publication of these incomplete lists should serve as a stimulus to local workers in the various branches of natural history to extend and complete them. Accompanying the lists are brief notes on the localities and frequency of the species recorded, and the lists are usually preceded by paragraphs dealing with the characters of the groups and with the literature concerning them.

In some cases the classification adopted in the lists is very antique, in the case of the fungi, for instance, one finds *Aspergillus glaucus* and

Penicillium glaucum included under the Hyphomycetes, in spite of the fact that for a generation at least they have been known to be Ascomycetes. The book contains a number of excellent photographic illustrations, although we are doubtful of the value of photographs of mounted specimens in a book of local natural history.

The editor of the book, in his Introduction, anticipates the criticism that the lists will prove dry and uninteresting to those who have not studied natural history, but we agree with him in thinking that they will be very acceptable, nay, indispensable, to actual workers at the various groups in the locality, and the editor is to be congratulated on the successful completion of the arduous task he set himself. Nevertheless, we cannot help regretting that a chapter was not included dealing with the natural history of the island in a broad sense, showing how the various groups of organisms are correlated with one another and with the structural and climatic features of the island, and how the natural history of the island, as a whole, compares and contrasts with that of the adjoining mainland. We look, in vain, for any general account of the types of vegetation to be found on the island, and would suggest that as the local lists of species are now so nearly complete for the higher plants at least, the local botanists should turn from the floristic to the ecological standpoint in their study of distribution. A map of the island concludes the volume, but it is of no special natural history interest. How welcome would geological and vegetation maps of the island have been!

G. H. P.

MORE "NATURE STUDY."

The Young Naturalist: a Guide to British Animal Life. By W. Percival Westell, F.L.S., M.B.O.U. With eight coloured plates by C. F. Newall, and 240 photographic illustrations. Pp. 476 London: Methuen and Co. Price 6*s*.

The modern praiseworthy movement in favour of "Nature Study" has had, as one of its results, the production of an alarming number of popular books on zoology and botany—books, for the most part, with excellent photographic pictures and a striking want of originality in the letterpress. The present volume is a typical example of the group. In the Preface it is claimed that the volume "fills an important gap," because there has, hitherto, been no comprehensive guide to the whole British fauna in one volume. The comprehensiveness of this guide may be gathered from the fact that the various classes of worms are dismissed in four pages and the Protozoa in half a page. Birds and insects and other groups on which there are already plenty of popular books are treated at great length. In the chapters on Mammals and Reptiles there is hardly a hint of the interesting differences between the British and Irish faunas, but nearly a page is devoted to extracts from Mr. R. J. Ussher's paper in this Journal on the Birds of the Connaught lakes.

The coloured plates are mostly good, while the photographs are almost, without exception, of a high degree of excellence.

G. H. C.

OBITUARY.

THOMAS MELLARD READE, F.G.S.

The death of Thomas Mellard Reade removes one of the most eminent and active of English amateur geologists. Born in Liverpool in May, 1832, his work as a civil engineer introduced him to the study of geology, and from the year 1870, when he commenced writing, until his death, his interest in the subject never flagged, and to the literature of geology he contributed over 200 papers The greater number of these and his books on "The Origin of Mountain Ranges" and "The Evolution of Earth Structure" have little interest for students of Irish geology, save in a very general way. On the other hand, his papers on the Glacial deposits are of importance, as many of the problems on the east coast of Ireland are similar to those on the west coast of England, and in his visits to Ireland he never failed to apply the knowledge gained in Lancashire and North Wales. The most notable contributions to Irish geology was his work on the glacial deposits of Co. Dublin, in 1896. This, in the then transition state of glacial geology, was considerable. His Presidential address to the Liverpool Geological Society, 1896-7, on "The Present Aspects of Glacial Geology" (introducing many Irish instances), was also of great importance, and still remains the most closely-reasoned statement in support of the marine origin of the major portion of the Drift. During recent years he collaborated with Mr. Joseph Wright, F.G.S., of Belfast, in the microscopic examination of clays and sands from various parts of England and the Continent. The following is a list of such of his papers as deal with Irish geology.

J. DE W. HINCH.

On a Section of Boulder-Clay and Gravels near Ballygally Head [Co. Antrim] and an Inquiry as to the proper classification of the Irish Drift. *Quart. Journ. Geol. Soc.*, vol. xxxv., pp. 679-681.

Notes on the Scenery and Geology of Ireland (with illustrative sketches). *Proc. Liverpool Geol. Soc.*, vol. iv., pt. 1, pp. 64-89; 7 plates.

A Problem for Irish Geologists in Post-Glacial Geology. *Journal Roy. Geol. Soc. Ireland*, N. S., vol. v., pt. 3, pp. 173-176; *Sci. Proc. Roy. Dublin Society*, N. S., vol. ii., pt. iv., pp. 255-258, plate 19.

On the Relations of the Glacial Deposits of the Clyde and Forth to those of the North-West of England and the North of Ireland. *Transactions Geol. Soc. Glasgow*, vol. vi., pt. 2, pp. 264-276.

The High and Low-level shelly drifts around Dublin and Bray. *Irish Naturalist*, vol. iii., pp. 117-121, 150-153.

The Dublin and Wicklow Shelly-drift [with 4 plates of sections]. *Proceedings Liverpool Geol. Soc.*, 1893-94, pp. 183-206.

The Present Aspects of Glacial Geology [Presidential Address to the Liverpool Geological Society, 1896-7]. *Proceedings Liverpool Geol. Soc.*, 1896-97. *Geol. Mag.* Decade, iv., vol. iii., pp. 542-551.

NOTES.

BOTANY.

Sisyrinchium angustifolium in Donegal.

From Mr. A. R. Sanderson of Thornbury, Bradford, I have received two photographs of *Sisyrinchium angustifolium*, taken *in situ* near Killybegs, in S.W. Donegal. Regarding the finding of the plant Mr. Sanderson writes:—

"Two years ago a party of botanists, consisting of Mr. Cheetham, Mr. Bateson, and myself, while spending a holiday at Killybegs, Co. Donegal, found, amongst other things, *Sisyrinchium angustifolium*. Mr. Cheetham and myself again spent a week at Killybegs at the beginning of August last, and we saw *S. angustifolium* in a field at Port Roshin (near Killybegs), and in quantity in several meadows on the shores of Fintrough Bay."

This constitutes a very interesting extension of range for this rare plant and further strengthens its claim to be considered native. The plant is now known to occur in West Cork, Kerry, Clare, S E. Galway, Sligo, Fermanagh, and West Donegal.

R. Ll. Praeger.

Dublin.

Scrophularia umbrosa in Limerick.

The record of Isaac Carroll's Irish specimen in Herb. Mus. Brit., published by Pryor in this Journal for 1877 p. 238, seems to have been overlooked by the compilers of *Cybele Hibernica* and *Irish Topographical Botany*. The locality, which Pryor does not give, is "near Limerick, Aug., 1848"; this considerably extends its range, which is "confined, as at present known, to a few miles of the course of the Liffey" (Cyb. Hibern. 234).

James Britten.

British Museum.

The interesting record to which Mr. Britten draws attention forms part of one of a series of foot-notes appended to a paper by Mr R. A. Pryor, "On Bobart's green *Scrophularia*"— a non-Irish form of *S. nodosa* for which the writer proposed the varietal name *Bobartii*. The record reads "It is worth mentioning that there is an Irish specimen of *S. umbrosa*, labelled however *aquatica*, in the Irish herbarium of Mr. I. Carroll, now incorporated with the British Museum collection. The previous records appear to have been untrustworthy. Cf. Cyb. Hib., p. 209." Considering how ingeniously this record is tucked away, it is little wonder that Mr. Colgan, in publishing his discovery on the Liffey (*I. N.*, v., 182) overlooked it, and treated the plant as new to Ireland, and that subsequent writers followed suit. It remains for our southern botanists to refind the plant "near Limerick," and determine its range there. I may add that a few days ago I saw *S. umbrosa* in abundance at Killadoon near Celbridge, some miles higher up the Liffey than previously recorded; probably it occurs along the greater part of the lowland course of that river.

R. Lloyd Praeger.

Dublin.

ZOOLOGY.

The Use of Domed Nests.

Mr. Moffat, in his delightfully original article, has pointed out a use for domed nests that I have never seen suggested, namely, as safety-cradles for large broods. The struggles of a brood of Long-tailed Tits within the elastic walls of the nest, which yield like a bag, may be watched. The smallest species have large clutches, and these are laid either in holes or domed nests, or, in the case of the Goldcrest, in a specially constructed cradle, so well described by Mr. Moffat, which is of materials very similar to the nest of the Long-tailed Tit, and in which the young are embedded in a mass of little feathers.

This brings me to the subject of warmth, which all very small nestlings need so vitally in our climate. The members of the large broods help to keep each other warm, but that is not enough. They must either be ensconced in holes, or have covered nests, and on this use of the dome Mr. Moffat has not dwelt.

That the dome serves for concealment, I think there can be no doubt. White, or nearly white eggs, being conspicuous objects, are, with few exceptions, placed in covered nests, and, where these are not in holes, they must have domes. This is the case with all the species named by Mr. Moffat, except the Magpie, of which I have more to say, and these domed nests are self-concealing from the nature of their position and materials. Thus, a Chiff-chaff accumulates a mass of dead leaves and rubbish, that looks as if it had been lodged among the briars or shrubs accidentally; the Willow Wren's nest is so buried in ground-herbage as to be most difficult to detect; the Long-tailed Tit's nest is like a knot on the lichen-covered tree; while that of the Dipper is like a moss-covered stone, even when it is on an open rock, the buttress of a bridge, or the branch of a tree, it resembles a mossy tussock or a lodgment of rubbish. It is seldom accessible to the spray of a waterfall, though it is a protection against the draught of the river-course.

Nests of the House-Martin in sea-cliffs are, usually, much higher above the spray than where the open nests of Shags and Kittiwakes are sometimes built. The protective colouring of the former makes them difficult to distinguish against the rocky back-ground. Nests of this species are so stuck in the caves or under overhanging rocks, which serve as a roof, that there is seldom room for any dome, but no doubt they serve the purposes of domed nests, and the white eggs could not be better concealed.

It is otherwise with the Magpie, whose fortification of thorny twigs is, probably, for a defence against crows, which would be met at the entrance by the beak of the hatching Magpie. The conspicuous plumage may also need to be obscured from above, as Mr. Wallace has suggested, but the covering of twigs does not protect from cold nor exclude light. Magpies' eggs are coloured, and do not come under the category of those which need the shade of a dome or burrow. True, the Magpie's nest-covering may prevent "bubbling over" of her brood, which is, usually, larger than that of other Corvidæ.

I think the limit of five is exceeded by the smaller birds that build in trees and bushes more often than Mr. Moffat supposes, though, in the case of the Twite, which so commonly lays six, the nest is often on the ground, never far above it.

Mr. Moffat further has well pointed out that the large broods of ducks, game-birds, and rails, which usually breed on the ground, leave the nest as soon as they are hatched, so that safety cradles are not needed for them. In those exceptional cases where ducks and water-hens build in trees, the "bubbling over" takes place at once in a wholesale manner and the young fall to the ground or water like elastic balls and take no hurt.

R. J. USSHER.

Cappagh, Co. Waterford.

I read, with great pleasure, Mr. Moffat's paper on Domed Nests in the *Irish Naturalist* for August. As he points out, a survey of British Birds seems to indicate that one of the functions of a domed nest is that it enables the possessors to rear up a larger brood than they could otherwise do. It may interest your readers to know that those Indian species which construct covered-in nests do not lay an unusually large clutch of eggs, as the following table shows :—

	Usual No. of eggs in clutch.
Ploceinæ (Weaver Birds), ...	2
Viduinæ (Munias)	4-8
	6
Nectariniidæ (Sunbirds and Flower-peckers). .	2 (Sun-birds)
	3 (Flower-peckers)
Pittidæ (Pittas), ...	3-6
Eurylæmidæ (Broadbills), ...	5

In my opinion domed nests have not any particular significance, since it sometimes happens that the same species builds, apparently, indiscriminately, an open or a domed nest. Again, of the various species of a genus, some may build open nests, while others construct domed ones, and this may happen when the various species live in the same kind of country and have similar feeding habits, as in the case of the Indian Babblers.

DOUGLAS DEWAR.

Datchet.

Records of Irish Birds.

In *British Birds* for September, Mr. T. C. R. Jourdain records the occurrence of an Osprey on Lough Arrow on May 29. In the same number the Editors, summarizing recent records of Crossbills, mention one recorded in the *Field* of July 17 as seen at Coleraine.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two Jacobin Pigeons from Mr. W. Lane-Joynt, two pair of Grass Parrakeets from Miss T. T. Anderson, and Kestrels from Messrs. W. W. Despard and T. Mason ; a Herring Gull from Mr. F. Powell, a Grey-headed Love-bird from Miss Trumbull, a Mute Swan from Mrs. J. Redmond, three Yellow Wagtails from Mr. W. J. Williams, two Chestnut-eared Finches from Capt. Lepprup, a Long-eared Owl from Mr. J. E. Ellis, a Sparrow-hawk from Mr. M. Foster, two Rabbits from Mr. R. Falkiner, a Fox-cub from Mr. R. M'K. Boyd, a Macaque Monkey from Mr. D. R. O'Sullivan-Beare, a Mona Monkey and a Green Monkey from Mrs. Cummins.

A fine Hoolock Gibbon has been purchased and placed in the large cage with the other two Gibbons. The black coat of the new animal contrasts strikingly with the tawny hue of his companions.

More than half the new wing of the Carnivore House has been completed and, having been occupied by a large stock of Lions, Tigers, Leopards, and Jaguars, is now open to the public. The wire-fronts to the cages, replacing the old-fashioned heavy bars allow a splendid view of the great cats, and the house is beautifully light and airy. The second part of the wing is now being rapidly rebuilt and may be completed in the next few months.

BELFAST NATURALISTS' FIELD CLUB.

July 10–13.—Annual Long Excursion.—Thirty-six members and friends visited Bundoran and district. The party, which was conducted by Robert Patterson F.L.S., in the unavoidable absence of the President (N. H. Foster, M.B.O.U.), reached Bundoran about 2 p.m. on July 10, where lunch was waiting at the Club's headquarters, Hamilton's Hotel. After lunch the party proceeded by the east strand to Aughrus Head, stopping by the Rougie Rocks, where William Gray, M.R.I.A., gave an address on the geology of the coast, which here consists of rocks of Carboniferous age which are highly fossiliferous, corals and crinoids being very abundant. The walk was continued along the cliffs to the Fairy Bridges, and the Finner sand-dunes and Tullan strand were explored, a very finely worked flint arrowhead being found. At 6.30 the return journey was made to headquarters. On Sunday many went to various places of worship, while others were content to find their "sermons in stones," various small informal excursions being made to Lough Melvin and Glenade. On Monday morning, immediately after breakfast, the party mounted cars to drive to Mullaghmore. A stop was made at Bunduff Lake, where collections were made, and the promontory of Mullaghmore was then explored. After lunch the party scattered—

geologists, botanists, zoologists, and archæologists finding ample opportunities for work, and the afternoon passed all too quickly, Bundoran being reached in time for dinner at 7.30. After dinner a short business meeting was held—William Gray, M.R.I.A., in the chair. Resolutions of sympathy for recent bereavement were passed to the Club's President, N. H. Foster, M.B.O.U., and to Mrs. Thomas Anderson. On Tuesday morning the party drove to Ballyshannon, where the remains of the Abbey were visited, and the 2.40 train from Bundoran brought the members back to Belfast. During the whole excursion the weather was uninterruptedly fine, and a considerable amount of really excellent field work was done by various members. At this early stage it is not possible to give anything like a full list of the finds, but a complete account will be published in the Club's annual report. The rarest bird seen was the Tree Sparrow, between Bundoran and Ballyshannon, four feeding together. It is satisfactory to know that this species, first found breeding in co. Donegal in 1907, is still established there. The Grasshopper-warbler is a new record for county Sligo, while the Corn Bunting and Tufted Duck were apparently breeding in county Leitrim, though not hitherto known to do so. That local bird, the Siskin, was seen near Bunduff Lake, while Goldfinches were noted near the same place. A curious and striking feature was the complete absence of Missel Thrushes, Song Thrushes, and Larks, while the Blackbird was only seen at Glenade and Mullaghmore.

JULY 31.—A party of members and friends, numbering seventy-four, visited Inch Abbey and the valley of the Quoile, under the guidance of J. L. S. Jackson and W. A. Green. The party travelled by the 1.50 train to Downpatrick Station, where vehicles were waiting. Inch Abbey was reached about 3.30, and the party proceeded to explore the ruins, which stand on what was anciently Inis-Cumscraidh, or the Island of Cumscraidh, who was one of the sons of Conor Mac Nessa. Mr. Parkinson gave the members an interesting résumé of the history of the Abbey, after which the party scattered, studying the plant and animal life of the river and its banks. The Rev. Dr. Pooler placed two boats with boatmen at the disposal of the party, and many spent the afternoon on the waters of the Quoile. At five o'clock the party drove to Quoile Castle. Here much interest was displayed in the great square keep, with its vaulted lower chamber. The drive was then continued to Downpatrick, where the members and friends were entertained to tea by the Rev. Dr. and Mrs. Pooler. The usual business meeting was held before tea, the President of the Club, N. H. Foster, M.B.O.U., in the chair. One new member was elected, and a hearty vote of thanks was passed to Dr. and Mrs. Pooler for their hospitality. After tea most of the members visited the Cathedral, founded by St. Patrick in 440. The 7.15 train brought the members back to Belfast. The field work done was considerable, though full records have not yet been handed in. July is about the worst month in the year for the collection of mollusca. The water-lily leaves on the Quoile River, however, were found to be, as usual, the habitat of good species. *Ancylus lacustris*, the lake limpet, with

Valvata cristata, and *Physa fontinalis*, the fountain shell, were noted. These same water-lily leaves were covered on the under side with various species of small leeches and planarian worms, which were also in abundance under stones by the river side, with masses of fresh-water sponges, which seem very common at Inch Abbey shores. The muddy bottom yielded *Sphærium lacustre*, and a number of *Pisidia* not yet determined. *Helix hortensis* was found to be still fairly plentiful at its Downpatrick habitat. The most interesting ornithological feature proved to be the observation of a pair of Sandwich Terns, whose distinctive call-notes at once directed attention to them as they flew up the river at a short distanceoverhead. Five species of Woodlice were taken, the most interest ing being the Pill Woodlouse, *Armadillium vulgare*. This species is common in the South of Ireland, but remained unrecorded from Ulster until quite recently, when it was discovered at Portaferry and at Killough. It was very numerous under stones on the sloping ground between Inch Abbey and the Quoile.

JUNE 19.—GEOLOGICAL SECTION.—EXCURSION TO SCAWT HILL.—This volcanic neck, about six miles north of Larne, was visited to study the metamorphism of the adjacent chalk. A few years ago one of the members came unexpectedly on a basic dyke traversing the "neck" dolerite, and cutting across a narrow band of chalk; the latter near its junction with the dyke weathered so dark, that it was difficult to tell it from the dyke itself. Microscopic sections were prepared, and submitted to Professor Gough, who found the dyke to be a granitoid holocrystalline rock, which may be classed as a diabase without olivine, and the adjacent rock proved to be the chalk completely altered into a calc-silicate hornstone (*Geol. Mag.*, April, 1907). The members of the Geological Section, on the 19th ult., observed the chalk in contact with the "neck" dolerite, even at a distance from the dyke, to be similarly altered. No other case, we believe, has been recorded of the conversion of ordinary white chalk, by contact with an igneous magma, into a calc-silicate hornstone.

AUGUST 21.—GEOLOGICAL SECTION.—EXCURSION TO BALLYMENA.—At Drumfane, two miles N.E. of Ballymena, fine sections of sands and gravels of the esker type, exposed in Mr. Clyde's sand pits were first examined; the drive was then continued to Cloughwater, where a protrusion of beautifully banded and fluidal rhyolite occurs. It appears as a white boss in the midst of a bog. From Cloughwater a return was made to Broughshane, where a magnificent section of the esker deposits on the north side of the Ballygarvey road was visited. The stratification of the material, with excellent examples of current-bedding was very clearly defined. From an examination of 100 boulders taken at random both here and at Drumfane, it was evident that the deposits were mainly derived from rocks in the district. At Broughshane rhyolite seemed to be absent, whereas at the Drumfane pits it was common. Many beautiful hand specimens were collected by the geologists at Cloughwater, and at all the places visited a large number of geological photographic records were made.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 15.—EXCURSION TO DELGANY NURSERIES.—The members travelled by the 10.15 train to Greystones, driving thence to Delgany, where, under the guidance of I. Pennick Jones and D. Houston, they studied the interesting exotics and weeds of cultivation in the extensive nurseries. Tea was taken in Delgany, and the members returning on foot to Greystones, travelled by the 6.5 train to Dublin.

JUNE 12.—EXCURSION TO BRITTAS BAY.—Twenty members took part in this excursion. The majority travelled by the 10.15 train to Wicklow, driving thence to Brittas Bay, while a few cycled the whole distance from town. The party subsequently divided into two sections. One under H. Gore Cuthbert studied the zoology of the district. The most interesting lepidopteron noticed was *Colias edusa*, also the larvae, in some numbers, of *Smerinthus ocellatus*. Beetles were very abundant, and included *Otiorrhynchus atroapterus*, *O. ovatus*, *Philopedon geminatus*, *Alophus iii-guttatus*, *Opatrum sabulosum*, *Heliopathes gibbus*, *Aegialia arenaria*, *Melolontha vulgaris*.

A second party, under W. B. Bruce, investigated the interesting botany of the sand-hills. The plants collected included *Saxifraga granulata*, *Festuca uniglumis*, *Trifolium glomeratum*, *Echium vulgare*. The party drove back to Wicklow in time for the 8.58 train.

JUNE 26—EXCURSION TO FASSAROE.—A party of nearly fifty travelled by the 12.45 train to Bray, where they were met by their conductor and host, R. M. Barrington, F.L.S. Brakes and cars conveyed the party to Fassaroe, whence they walked to Ballyman Glen and across the fields, returning to Fassaroe at 4 o'clock, where tea was provided. The principal plants of interest were the rare *Eriophorum latifolium*, *Carex muricata*, *Senecio saracenicus*, and *Mimulus luteus*. The party visited Mr. Barrington's interesting museum of Irish birds, containing several unique specimens. A cordial vote of thanks having been passed to Mr. and Mrs. Barrington for their hospitality, the party drove back to Bray in time for the 6 p.m. train to town.

JULY 3.—EXCURSION TO MALAHIDE.—Owing to unfavourable weather only ten members joined this excursion. Travelling by the 1.40 train they crossed by boat to the "Island" (really a peninsula), where, under W. B. Bruce, one section studied the sea coast plants. A second section under R. Southern, B.Sc., dredged in the Sound, bringing the catch on shore, where a demonstration was given. Heavy rain put a stop to further collecting, and after tea in Malahide the members returned to town. This excursion took the place of the proposed long excursion to Omagh, which the committee had decided to abandon.

To face page 229.]

DANIEL JOHN CUNNINGHAM.

Irish naturalists, no less than those of Great Britain, mourn the death of Prof. D. J. Cunningham, F.R.S., who passed to his rest, after much suffering, at Edinburgh on June 23rd of this year. For although a Scotsman—he was born at Crieff, Perthshire, a "son of the manse," on April 15th, 1850—and at the time of his death occupant of the Chair of Anatomy in his own University of Edinburgh, Cunningham's greatest years were passed in Ireland; to Ireland he devoted his best energies and talents, and he leaves an indelible mark on the scientific life of Dublin.

After school days at Crieff and a short business experience in Glasgow, Cunningham entered the medical school of Edinburgh University in 1870. He had a highly distinguished career as a student, and after his graduation he became demonstrator in anatomy under Prof. (now Sir William) Turner. In 1876 he was appointed senior demonstrator, an office which he held through six busy years during which he devoted himself to teaching, and found time to carry on much anatomical research.

It was in 1882 that Cunningham left Edinburgh for Dublin, accepting the Chair of Anatomy in the Royal College of Surgeons. But he only held that post for a year, being appointed in 1883 to succeed Prof. Alexander Macalister (who had been transferred to Cambridge) as professor of anatomy in Dublin University. For twenty strenuous years he laboured at the teaching and organising work of the Trinity medical school. In the earlier part of this period, building and equipment occupied much of his attention, and the present and future efficiency of the anatomical department owes and will owe much to his genius and foresight. In this work he was associated with the late Rev. Dr. S. Haughton, his close friend, whose energetic advocacy had convinced the governing body of the College of the needs of the medical school, and who found in Cunningham an enthusiastic colleague and helper.

As a teacher, Cunningham was conspicuously successful and inspiring, drawing out to the full the enthusiasm and devotion of his students, who look back to his lectures and social intercourse with feelings of deep admiration. During his tenure of the Chair of Anatomy, Trinity College was made famous by the publication of a number of masterly memoirs from his pen, in which facts of human anatomy, new and old, became luminous in the play of his scientific genius and literary style. The human body was to him that of "the paragon of animals," and in elucidating its structure he used the comparative method cautiously and yet fearlessly. In his classical paper on the Lumbar Curve in Man and the Apes,[1] he dwells on the essential similarity between the form of the backbone in Man and the Chimpanzee, while he shows that at no stage in the development of the human foetus does the vertebral column resemble that of any adult ape. His equally important paper on the Surface Anatomy of the Cerebral Hemispheres[2] contains a thorough description of the highest centre of the human brain at all stages of development and a most instructive comparison of its convolutions and fissures with those of the Apes. In the great paper written by Cunningham in collaboration with Dr. Telford-Smith, on the Cranium and Brain of the Microcephalic Idiot[3] he argues strongly that this cerebral condition must be regarded as an example of reversion and not merely of arrested development, though when he started on the investigation he inclined towards the latter view. Thus he appreciated to the full the zoological bearings of human anatomical study. Many Irish naturalists recall his discussion of the Pithecanthropus remains when Dubois exhibited them before the Royal Dublin Society in 1894; his reasoned opinion that they indeed represented a new type of Anthropoid nearer to the Hominidae than any existing genus was a strong reinforcement to their discoverer's advocacy of their importance.

Cunningham's interest in zoology was shown also by his services to the Royal Zoological Society, of which he was for many years secretary (succeeding the late Dr. V. Ball in 1895) and subsequently President. He loved the gardens and the

[1] *Cunningham Memoirs, R.I.A.*, ii., 1886.
[2] *Ib.* vii., 1892.
[3] *Trans. R. Dubl. Soc.* (2) v., 1895.

animals, and many of the improvements of recent years in Phœnix Park were due to his initiative and zeal. Naturally he took an especial interest in the Anthropoids, and many who read these lines will recall a popular lecture in which—taking as his text Sindbad, the orang-utan which had lived for six years in the "Zoo"—he expounded some of the far-reaching conclusions to which his own researches had so signally contributed. All the scientific life of Dublin benefited by his services. He was a Vice-President of the Royal Irish Academy, and for several years an Honorary Secretary of the Royal Dublin Society. The foundation of the Anthropometrical Laboratory in Trinity College was pre-eminently due to him.

No surprise was felt when, on the appointment of Sir William Turner to the Principalship of Edinburgh University in 1903, Cunningham was recalled to the Scottish capital to occupy the vacant chair. None of his friends imagined that his tenure of that great office would last but for a few years, and that, at the early age of fifty-nine, in the height of his powers, he would be called away. The writer of this notice had the sad privilege of hearing the news of his death from the lips of his former teacher, Sir William Turner, during the Darwin centenary celebrations at Cambridge. There was fitness in the coincidence, for few naturalists have contributed more lasting work than Cunningham towards the study of human relationships, which Darwin initiated. A great anatomist, a great naturalist, a most capable man of business, and a Christian gentleman, Cunningham leaves to the men who strive to carry on those varied activities to which he devoted himself while in Dublin a manifold inspiration.

In compiling this notice acknowledgment is due to the biography of Cunningham contributed to the *Dublin Journal of Medical Science* by his pupil and successor, Prof. A. F. Dixon, who has most kindly lent the block for the accompanying excellent photograph.

G. H. C.

A LATE GLACIAL CLAY AT TEMPLEOGUE, CO. DUBLIN.

BY PROF. GRENVILLE A. J. COLE, M.R.I.A., F.G.S.,
Director of the Geological Survey of Ireland.

During the work of the Geological Survey near Belfast several deposits of stratified drift were observed, principally on the lower ground, and these are described in the Memoir[1] on that district, issued in 1904. The fine laminated clays of the Lagan valley are dealt with by Mr. G. W. Lamplugh under the name of "warp" clays, a term borrowed from the English fenlands; and on p. 63 of the Memoir he shows how they accumulated in a lake during the gradual retreat of the inland ice, and while the Scottish ice still occupied the basin of the sea. Prof. James Geikie[2] describes fluviatile clays as overlying the typical estuarine deposits of the Scottish carses, and remarks that "the fine tenacious brick-clays, and even the less cohesive silty or loamy clays, cannot be likened to the dark sludge and mud which now gathers in our estuaries. They in some measure resemble the laminated clays of the 100-ft. terrace. The rivers that flowed into our estuaries whilst the Carse-deposits were being accumulated must have been abundantly charged with the 'flour of rocks' and finely levigated material." Prof. Geikie uses the character of these later Carse-clays as an argument in favour of a fresh extension of glacial action. It is clear that the glacial sands and gravels, particularly those grouped together to form eskers, result from the washing of material that might otherwise have been dumped down upon the land as boulder-clay. It is clear also that the fine sand and clay thus removed from round the stones must have been carried away to some other area. Now and then these materials are found in estuaries, deposited at some distance from the melting ice, as in the Scottish carses; and now and then they are laid down quietly in glacial lakes, as in the Lagan valley near Belfast.

Laminated glacial clays do not seem to have been widely observed during the work of the Geological Survey in the

[1] p. 50, &c., and Plate v.

[2] "Great Ice Age," 3rd ed., 1894, p. 311.

Dublin district. The torrents descending from the mountains during the melting of the ice were usually strong enough to carry even pebbles beyond the present coast-line.[1] The contorted clay exposed by the flood of 1905 on the north bank of the Cookstown River between Enniskerry and Fassaroe[2] was distinctly stratified, and may point to a more considerable deposit than has been yet revealed. In this case the stratified clay is overlain by the great mass of ordinary boulder-clay that forms the Fassaroe plateau. The occurrence now to be described is very limited, but seems of sufficient interest to be recorded.

In August, 1909, the construction of a drain for new labourers' cottages led to the cutting of a deep trench through and along the main road in the village of Templeogue. The ground underlying the road-metal had probably not been exposed for some centuries, though old cross-drains may be seen in it here and there. North-west of the road, boulder-clay has been observed, and the fine sections cut by the Dodder in this material lie close against it on the south-east. On the course of the road, however, the recent excavations showed that boulder-clay extended from the north-east only as far up the village as the north end of the tramway station—a point where there is a gap in the houses on the north-west side. A stiff blue-black clay was then met with, overlying the boulder-clay, with occasional interstratified seams of a more sandy nature. The section revealed it in places to a depth of five feet below the ancient road-metal. About two hundred yards farther up the village the deposit becomes much more sandy, with gravelly layers overlying it. The sandy beds contain small lumps of clay, doubtless washed from the underlying material, and these have become coated with the yellow sand. Stratification is apparent in the sands, and layers of clay are occasionally intercalated. In the almost pure clay of the north-eastern and lower part of the section, very delicate lamination occurs, indicative of times when the gentle flow of water brought down alternately fine clay and clay mingled with a little sand.

[1] Lamplugh, "Memoir on the Country around Dublin," 1903, p. 51; on stratified clay, see p. 39.

[2] British Association Handbook to Dublin District, 1908, p. 37.

The deposit seems distinctly connected with the esker-stage of glacial melting, and no doubt represents the track of a side flow, here locally dammed up and checked, which descended from the slope on which the well-known esker of Balrothery stands. We have here preserved for us, laid down in some chance and probably narrow backwater, a part of the material washed out from the boulder-clay during a late glacial stage, while the esker and the local flood-gravels represent the coarser residue.

Seeing how readily the limestone blocks in the upper layers of exposed boulder-clays yield up their calcium carbonate and leave only clayey residues, it is somewhat surprising to find that the very fine clay of Templeogue is still highly calcareous. The whole material is of course much finer than the two-millimetre grade which is selected as the upward limit of the "fine earth" of ordinary soils. Mr. W. D. Haigh, A.R.C.Sc.I., has kindly determined the calcium carbonate present, in the laboratory of the Geological Survey, and finds it as high as 24·3 per cent. When sifted through the finest practicable wire sieve, with meshes ·02 mm. in diameter, a very few grains of quartz sand remain upon the sieve. I have found no foraminifera or other organisms. The great mass of the material washes through, and this, when examined microscopically, appears to consist of very fine mud and sand. When treated with hydrochloric acid, considerably more than 25 per cent. of this fine matter is at once dissolved with effervescence, showing that the mud consists largely of comminuted limestone. Sulphuretted hydrogen is evolved, doubtless from iron pyrites. The undissolved residue seems equally fine, with the exception of a few coarser sand-grains, which now assume prominence, and one or two minute prisms of zircon. From this we may suspect that, when our boulder-clays near Dublin are examined from a chemical point of view, a large part of their "mud" may prove to consist of undestroyed detrital limestone. Mr. Kilroe informs me that such clays effervesce freely when placed in acid.

Geological Survey Office, Dublin.

OBITUARY.

JOHN HENRY DAVIES.

John Henry Davies, of Lenaderg House, Co. Down, whose death took place suddenly at Belfast on the 20th August, was the son of Peter Davies, of Penketh, near Warrington, where he was born in 1838, and educated at a private school in Penketh, conducted by members of the Society of Friends. In early life, while his father resided at Ballitore, Co. Kildare, Davies developed a taste for botany, and gained a good knowledge of the plants included in the Irish flora, making from the first a speciality of mosses, and corresponding amongst others with Professor W. H. Harvey, of Trinity College, Dublin, and William Wilson of Warrington; specimens of mosses collected by him in Wicklow and Kildare in 1857, appear in the Herbarium of Trinity College.

In business he was engaged for nearly forty years in the Messrs. Richardson's, Glenmore Bleach-works, near Lisburn, where he was in the position of manager up to eight years ago. For the last seven years he was managing director of another linen bleach-green at Lenaderg, near Banbridge. Owing to his long association with this branch of the linen manufacture, he was well known throughout Ulster, and recognized as an authority upon all matters connected with it.

In 1856, during a short visit to the Isle of Man, Davies compiled a list of all the mosses that he could find on the island, which was subsequently published in the *Phytologist* for 1857, and was his first published contribution to science. He joined the Belfast Naturalists' Field Club in 1871, and took an active part in the work of the Society. He was also a member of the Belfast Natural History and Philosophical Society.

During his residence of half a century at Glenmore in Antrim, and Lenaderg in Down, Davies's botanical work was confined almost exclusively to mosses, of which he was successful in discovering one species new to the British Islands, and several new to Ireland. His enthusiasm in moss-hunting for a day or an afternoon was as keen to the last as it had been in his boyhood, and he was always provided with a small pocket vasculum in which to place plants that he might unexpectedly meet with. He had a keen eye, and in his rambles in localities close to both his places of residence he often picked up rarities which had escaped the notice of other investigators. Those who knew him best will not easily forget his tall and stately person, his handsome and kindly features, his genial manners, and aptitude and readiness in imparting information on botanical subjects, and his always having in his pockets specimens of some unusual form of some moss or other—what muscologists term "puzzles"—which he invariably produced and made the subject of conversation.

His botanical work is described at length in the papers which from time to time he contributed to the pages of the *Phytologist* and *Irish Naturalist*, of which a list of the more important is given below.

List of Papers.

Mosses of the Isle of Man. *Phyt.*, 1857.
Muscologia Hibernica. *Phyt.*, 1857.
Muscology of Colin Glen. *Phyt.*, 1861.
Mosses from North East of Ireland. *I. Nat.*, 1900.
A new British Moss, *Ditrichum vaginans*, in Ireland. *I. Nat.*, 1901.
Some Mosses in Northern Ireland. *I. Nat.*, 1902.
Weissia rostellata in Ireland. *I. Nat.*, 1902.
Moss Notes from North of Ireland. *I. Nat.*, 1904.
Mosses from Co. Down. *I. Nat.*, 1905.
Bryological Notes from Co. Down. *I. Nat.*, 1907.

H. W. L.

REVIEWS.

A ZOOLOGICAL PICTURE BOOK.

The Animals and their Story. By W. Percival Westell, F.L.S., M.B.O.U. With 100 photographs and 8 coloured plates, by W. S. Berridge, F.Z.S. Pp. 322. London: Robert Cully. Price 5*s.* net.

There seems no end to the making of "popular" books on natural history, and the volume before us is a fair example of its class. The photographs, taken in the London "Zoo," are in most cases excellent, in many instances beautiful, while the plates are admirable examples of the three-colour process. The letterpress is divided into four chapters, entitled respectively "Denizens of the Forest and Jungle," "Denizens of the Plains and Deserts," "Denizens of the Hills and Mountains," and "Prowlers of the Night." This arrangement does not conduce to systematic study of the Mammalia—to which class the book is confined—but it affords the author an opportunity of telling pleasantly many stories of wild and captive beasts, and culling accounts of their habits from the writings of Lydekker, Hudson, Selous, and others.

When Mr. Westell discusses questions of classification and distribution, he frequently writes so as to mislead the ignorant reader seriously. The statement on p. 123 implies that Bovidæ are absent from Southern Europe and Asia, and on the next page we are told that animals of this family were "introduced into the great African Continent in comparatively recent times." It is to be presumed that "comparatively recent" is used in a geological sense, but, then, how are we to understand the statement (p. 62), that the Puma "is an ancient animal, as fossil remains have been discovered which, it is stated, probably belong to the Pleistocene period"? And the meaning of the following passage—descriptive of the jungle-haunting Carnivora—is too deep for our zoological philosophy: "creatures who are famous for their hunting powers, creatures who possessing sharp teeth and sharp claws (known as the law of correlation, and for information upon which we are very largely indebted to the French naturalist Cuvier), live by means of stalking and tearing to pieces their prey."

G. H. C.

THE EVOLUTION PROBLEM.

The Making of Species. By DOUGLAS DEWAR, B.A. (Cantab.), I.C.S., F.Z.S., and FRANK FINN, B.A. (Oxon.), F.Z.S., M.B.O.U. With fifteen illustrations. Pp. 400. London: John Lane. Price 7*s.* 6*d.* net.

The authors of this book are strong champions of "discontinuous variation," and remorseless enemies to all exaggerated belief in the potency of Natural Selection. They pin their faith on the origin of species through sudden jumps or "mutations," and much interesting matter is adduced by them in support of their application to the animal world of a modified form of the theory put forward by De Vries with special relation to plants. The extensive and critical knowledge which both authors possess of the natural history of India enables them to supplement largely from their own store of observations the mass of more generally known facts having a bearing on the question. In its main lines the argument is well calculated to impress. Indeed, the case for a very large play of discontinuous variation in evolution has rarely, if ever, been better put in a book adapted for general reading.

In presenting the negative side of their case the authors adopt a rather more warlike tone than the contents of the book justify. They do not make it quite clear what part they would themselves allow Natural Selection to play. We are told that she has a "casting vote" on the question whether a new mutation is to survive or perish; but the extent of any further concession to Darwinism ("Neo-" or otherwise) is left obscure. Roughly speaking, the line seems to be taken that no special contrivance in nature can be accounted for by the favour shown to its incipient stages. Positive utility, in many of its more marked phases, is acknowledged as a fact, but held to be accidental. The authors specially attack the doctrines of protective or obliterative colour, of warning colour, of mimicry, and of the adaptation of flowers to secure cross-fertilisation. Here, we think, they weaken and harm their case. The view which the reader is asked to take is one that violates his sense of proportion.

In disputing, for instance, the view that the colours of flowers have any special relation to the object of attracting insects to secure cross-fertilisation, Messrs. Dewar and Finn challenge what they call the assumption that cross-fertilisation is advantageous to plants, and bring forward some arguments tending to show that self-fertilisation is really the more serviceable process. On this view the workings of Nature must have been veritably paradoxical. Self-fertilisation was undoubtedly the primitive process throughout the floral world. The great advantages that it does secure are obvious, so much so that it would have seemed inconceivable in a world where no other method was followed that plants could even depart from it. Yet we see throughout the phanerogamic world, and especially among the more highly developed orders of plants, the most varied and elaborate contrivances to prevent it, and to secure cross-fertilisation in its stead. Is it credible that all these complex and ingenious devices, serving in so many ways the same end, have

been not merely useless and purposeless but harmful? They have, no doubt, turned out harmfully in certain cases. Over-adapted plants, like human beings that "put all their eggs in one basket," have sometimes incurred the failure which they courted by speculating too fiercely. Others, more fortunate, may have saved themselves in the nick of time, by reverting, as the Bee Orchis seems to have done, to self-fertilisation when its insect friends, for some reason or other, failed it. But such cases would be poor evidence to adduce as proof that the plant-world as a whole made a huge mistake when it set out on the road to cross-fertilisation.

Messrs. Dewar and Finn rely on what may be a parallel to the case of the Bee Orchis—that of the genus Viola—as evidence that the abandonment of cross-fertilisation should be regarded as a progressive, not retrogressive development. For this "advanced genus" has taken to self-fertilisation through its cleistogamous flowers, which never open, and so cannot be visited by insects, while, "according to Bentham, the Pansy (*Viola tricolor*) is the only British species of Viola in which the showy flowers produce seeds." Attentive readers of this journal will take the statement just quoted as to the British members of the genus *Viola* with some reserve; for Mr. G. C. Druce has in a recent number[1] brought forward additional evidence to that already existing[2] for the well-attested fact that *Viola stagnina* in different parts of its West of Ireland range hybridises pretty freely with its ally *V. canina*. The production of hybrids manifestly implies cross-fertilisation and insect-agency in the case of both the parent species. But even if the facts were more in accordance with the authors' argument, the argument itself would be a self-destructive one. The fact of one "advanced genus" having fallen back on self-fertilisation would clearly be a much less powerful argument for the superior usefulness of that process than the similar argument furnished to the contrary by the many hundreds of advanced genera in which the once general rule of self-fertilisation has been discarded.

We cannot at all agree with our authors that "a weighty objection to the theory that the colours of flowers have been developed because they attract insects has been urged by Mr. E. Kay Robinson, namely, that among wild flowers the most highly coloured are the least attractive to insects." It is true enough that insects go in swarms to many inconspicuous flowers like those of the ivy, spurge-laurel, and bramble, while the showy poppies, irises, and dog-roses attract much smaller numbers. But surely this, instead of a "weighty objection," is precisely what might be expected. The plants that are attractive to only a few insects are just those that should need a conspicuous standard to be seen from afar, while to those that are eagerly sought by myriads flaming advertisements are unnecessary.

The attack on warning colours is, we think, vitiated by oversights similar to that implied in the passage last criticised. Our authors suggest, for example, that warning colour is not likely to be needed by

[1] *Irish Naturalist*, October, 1909, p. 209.

[2] Praeger, "Tourist's Flora of the West of Ireland," p. 123.

the wasp when its cousin the hive-bee gets on perfectly well without it.

This may be taken as almost an extreme example of the readiness of the authors to overlook important distinctions in the economy of the animals they compare. It is easy to show that the wasp is in far greater need than the bee of some such defence against casual enemies as a warning livery is supposed to afford. The casual enemy, it must be remembered, is not a wholesale destroyer, but one that snaps up an individual now and then, through carelessness or mistake. Now no harm can possibly come to the bee-community through an enemy of this kind. An odd "worker," incapable of producing progeny, is all that would be lost, and the community, if a healthy one, would not miss it. The queen and the young perfect females, immured at home, are free from all risk of being thus snapped up. It is, as everyone knows, far otherwise with the queen-wasp, who flies about freely all through the spring, when any injury to her would entail premature but certain extinction on the community she is about to found. And the difference does not end here. The wasp-colony, even when the workers appear, begins as a small beginning. On the work of the few workers first hatched the lives of the residue yet depend, and the casual enemy, if not warned off by the bright yellow livery of the insects, might still "nip the swarm in the bud." There is no stage analogous to this in the life of the bee-community, which founds itself by migration with its queen in a swarm already strong. Bearing these distinctions in mind, one can hardly reject as a far-fetched supposition the contention that a warning colour may be important to the wasp but cannot be needed by the bee.

There may, of course, be something in the general objection to warning colour as a product of the selective process, that in its early stages it would be harmful. Still, if we suppose that in the initial stage the animal destined to a warning coloration was merely distasteful or otherwise formidable, and that it had no brilliant tints, there appears to be every ground for inferring that intelligent predaceous creatures would learn to avoid it, as they now do the bee, and we can hardly avoid supposing that in doing so they discriminate it, by such markings as it possessed, from other creatures more or less allied to it but not formidable or distasteful. An advantage would almost certainly accrue, in such cases, to those individuals in which the markings in question were exceptionally vivid—provided that they did not go at a bound beyond all recognition, in which case difficulties might, no doubt, arise. On what the authors call the Wallaceian view, it would seem that the more distinct such markings became the better they would serve this use, so that in course of time they might, without ever having been harmful, develop into conspicuous and even gaudy patterns. This is not intended as a denial of the possible origin of many of these conspicuous colours through mutation. But we suggest that it is to cases of origin through mutation that the objection urged by the authors would most strongly apply. The animal would then have suddenly assumed all the disadvantages of increased conspicuousness, without the compensating

value of any previously impressed lessons to possible foes as to what its bright colours signified. "*Festina lente*" is a maxim not to be too roughly ruled out of court, even in the winning of the device "*Nemo me impune lacessit.*"

We must add that we are fully at one with the authors in urging the need for experimental study and for a steady refusal to take hypotheses, however plausible, as proved facts or "all-sufficient" explanations. In many parts of the book before us Messrs. Dewar and Finn not only argue acutely and convincingly on behalf of some of their contentions, but add very materially to the sum of what the average student of evolutionary problems can be supposed to have grasped in his effort to obtain a survey of the existing data. For instance, the account given (pp. 179–80) of some of Mr. Finn's experiments with mimetically coloured Indian butterflies provides us with some of the most interesting evidences we possess of the effectiveness of protective mimicry, showing, as they do, not merely that such mimicry serves its purpose, but that it does so with greater or less degrees of certainty in proportion as the mimetic resemblance is more or less exact. It is because we think that in the destructive part of their case they have taken an unwarrantably confident tone and belittled extravagantly the probable influence of Natural Selection that we have been at some pains to assail a few of their arguments. Their book deserves not merely to be read, but to have its contents carefully digested.

C. B. M.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Rabbit from Mr. H. E. Jolly, Hedgehogs from Mr. W. E. Peebles and Mr. J. Carnell, an Otter cub from Mr. F. Fitzmaurice, a Grey Wagtail, a Yellow Wagtail, and four Pied Wagtails from Mr. W. J. Williams, four Japanese Pullets from Colonel J. G. Adamson, ten Wild Ducks from Mr. J. Tones, two young Barn Owls from Mr. M. Colgan, a pair of Long-tailed Weaver birds from Mr. T. Bennett, a young Gannet from Mr. M. M'Keown, a Jay and a Starling from Mr. W. W. Despard, four Domino Finches from Miss Cree, two Kestrels from Mr. G. J. Hemmingway, a Budgerigar from Mrs. Cullinan, and seventeen young Toads from Mr. E. Pelly. There have also been received in exchange from Sydney, a valuable collection of Australian marsupials, comprising four Brush-tailed Kangaroos, a pair of Black-tailed Wallabies, a pair of Wombats and three Vulpine Phalangers. These interesting beasts have been placed in the enclosures of the Haughton House.

A very serious loss has been sustained by the death early in October of the splendid female Giraffe which has lived in the Gardens for several years. The animal succumbed to a sudden and unexpected attack of illness despite the unwearied efforts of the Superintendent and staff of keepers and the skill of Professor Mettam.

NOTES.

BOTANY.

Hygrophorus intermedius in Ireland.

In June, 1908, I gathered on the south shore of the most eastern of the Rough Islands, Lower Lough Erne, a fungus which was identified at Kew as *Hygrophorus intermedius*, Pass., with the remark added, "this is the first record for Ireland." This year, at the latter end of July, I found three plants of the same fungus on Rossharbour Island, distant about two miles from Rough Island—these also were identified at Kew.

HERBERT TREVELYAN.

Army and Navy Club, London.

Trifolium glomeratum at Brittas Bay, Co. Wicklow.

The finding of this rare clover by the Dublin Field Club party who visited Brittas Bay on June 12, is worthy of a more conspicuous notice than that accorded to it, in the report of the Excursion on p. 228. For long, the sandy shore near Wicklow was the only known Irish station of this little Trefoil; in 1897, Rev. E. S. Marshall discovered it at Rosslare in Wexford. A third station is now added, lying between these two. The plant was found growing in chinks of a low wall near Brittas Bridge, but probably its head-quarters are on some part of the adjoining sandy ground. Mr. W. F. Gunn has kindly sent me specimens.

R. LLOYD PRAEGER.

Dublin.

Spiranthes Romanzoffiana not in Devonshire.

In "The Country-side" for August 22, 1908, the following appeared among the "Nature Records":—

"SPIRANTHES GEMMIPARA, found in plenty in a locality (name suppressed) in East Devon.—(M. PAGE). [This plant has been properly identified. It has been supposed to occur only in Ireland.—Ed.]."

Other references to this important find, due in part to my enquiries, appeared in the same Journal for September 12, p. 201, and December 5, p. 36. In response to further enquiries, Mrs. Page has been so kind as to send me fresh specimens which she states are the same as those collected last year. They belong to *Epipactis palustris*.

R. LLOYD PRAEGER.

Dublin.

Irish Thymes.

In a note on Thymes in the *Journal of Botany* for October, Mr. G. C. Druce records *T. glaber* Mill. (*T. Chamædrys* Fr.) from Brandon, Kerry S.; *T. ovatus* Mill. (*T. Chamædrys* auct.) from Derrynane, Kerry S.; and *T. præcox*, Opiz, from Cave Hill, Co. Antrim.

Cichorium Intybus and Mimulus guttatus in Co. Armagh.

In July last, I noticed some plants growing in hay fields which were strange to me. Presently the hay was cut and the plants flowered and were available for examination. They proved to be *Cichorium Intybus* L. I observed it in several places near Poyntzpass and it seemed to me to be introduced with grass seed.

Along the canal bank between Poyntzpass and Goraghwood I have observed quantities of a Mimulus which I presume is *Mimulus guttatus*, DC. It is growing very freely and seems quite established though I did not observe it till lately, and as I have been along that part of the canal many times it could hardly have escaped me.

W. F. Johnson.

Poyntzpass.

ZOOLOGY.

Hymenoptera in Ulster and Connaught.

My captures of aculeates this year adds no species new to the Irish List. The following are, I believe, all new county records. I am indebted to Mr. Edward Saunders, F.R.S., for their identification :—

Crabro dimidiatus, Glenade, Leitrim; *C. cephalotes*, Bloomfield, Down; *Vespa vulgaris*, Asseroe Abbey, Donegal; *V. austriaca*, Cave Hill, Antrim; *Odynerus pariatum*, Cave Hill, Antrim; *Sphecodes affinis*, Strandtown, Down; *Halictus cylindricus*, Strandtown, Down; *H. leucopus*, Strandtown, Down; *Andrena clarkella*, Shaw's Bridge, Antrim; Belmont, Down: *Psithyrus rupestris*, Mullaghmore, Sligo; *P. vestalis*, Donaghadee, Down; *P. campestris*, Belmont, Down; *Bombus smithianus*, Donaghadee, Down; *B. agrorum*, Glenade, Leitrim; Richhill, Armagh; *B. hortensis*, Glenade, Leitrim; *B. derhamellus*, Mullaghmore, Sligo; Richhill, Armagh; Rostrevor, Down; Cave Hill, Antrim; *B. jonellus*, Cave Hill, Antrim; Knock, Down; Mullaghmore, Sligo; Glenade, Leitrim; *B. terrestris*, Mullaghmore, Sligo; Glenade, Leitrim; Asseroe Abbey, Donegal; Richhill, Armagh.

Hugh L. Orr.

Belfast.

Paludestrina confusa in Kilkenny and Clare.

During the past month (June) I have seen this species in abundance below Rosbercon, on the Kilkenny side of the Barrow, and on the Clare side of the Shannon below Limerick.

Cork.

R. A. Phillips.

Helix nemoralis in North-West Donegal.

Mr. Edward Collier contributes to the July number of the *Journal of Conchology* a paper on this subject, dealing with the forms of the species found on an excursion with G. W. Chaster, C. E. Wright, and A. W. Stelfox last September.

Mayo Bird Notes.

To the *Zoologist* for February, 1909, Robert Warren records from Ballina the passage of fourteen snow-geese in December, 1906, and of four in December, 1908, while in the same magazine for June, he contributes some miscellaneous notes dealing with birds observed near Ballina during the spring.

Ruff at Inch, Co. Donegal.

On 23rd September, Mr. Ashmead Bond shot a Ruff (*Machetes pugnax*) at Inch, Co. Donegal. It was an adult female in good plumage. This is the third record from Inch.

D. C. Campbell.

Londonderry.

Food of Birds.

Ivy Berries (see *I.N.*, September, p. 207) are occasionally eaten by Mistle-Thrushes, and no doubt others ; but I have long been accustomed to look upon them as in a peculiar sense the property of the Blackbird, and have sometimes even been tempted to go so far as to speculate on a possibly more than accidental correlation in colour between the bird and the berries. The injury to Primrose blossoms (p. 203) is most probably the work of Greenfinches.

W. E. Hart.

Kilderry, Londonderry.

Primrose Blossoms eaten by Sparrows.

In the September number of the *Irish Naturalist* (p. 203, *supra*), Mr. W. P. Westell asks for information with regard to primrose blossoms nipped off in pieces in the spring. I have several times seen the common House Sparrow (*Passer domesticus*) busily engaged in this work and have known a row of plants to be deflowered by them.

F. C. R. Jourdain.

Clifton, Ashburne, Derbyshire.

Supposed Poisoning by "Cuckoo-spittle."

Has any one noticed or heard that young birds, such as chickens, ducklings, or pheasants are poisoned by eating the insect commonly known as cuckoo-spittle? There seemed to be a great deal of it last spring, and it has been announced that in a certain midland district in Ireland young pheasants, fowls, and ducks were poisoned, and "frothed at the mouth" from picking cuckoo-spittle off the grasses and weeds. As in the case referred to 15 per cent. of these young pheasants and a number of young wild-ducks and common fowl died, it is believed, from this cause, it would be of importance to poultry-farmers and game-rearers to investigate the matter.

E. Shaw.

Bushy Park, Terenure.

Former occurrence of the Goshawk in Ireland.

The position of this bird in ancient Ireland, as recorded in books of falconry (see Ussher, "List of Irish Birds," page 28), is very vague and uncertain. It may be, therefore, well to have recorded in the pages of the *Irish Naturalist* the mention of an eyrie said to exist, in 1583, in Glenmurlane, Cleanglas, County Limerick, as recorded in the Survey of the Confiscated Estate of Gerald, Earl of Desmond, and preserved in the Public Record Office, Dublin. This is alluded to by Westropp in his recent paper on the Forests of the Lower Shannon Valley, *Proceedings Royal Irish Academy*, page 293, April, 1909. I give the record for what it is worth, without expressing opinion as to the identity of the bird.

G. E. H. Barrett-Hamilton.

Kilmanock, County Wexford.

Occurrence of the Osprey in Sligo.

About mid-day on Saturday, May 29, 1909, while fishing on Lough Arrow, I saw a fine adult Osprey circling slowly over the lough within gunshot. I called Mr. H. B. Greenfield's attention to it, and we both had a good view of it before it sailed away towards the north. The occurrence so late in the spring seems remarkable in view of the fact that there is no record of the breeding of this species in Ireland.

J. Henderson.

Clifton House, Ashbourne, Derbyshire.

Records of Hawks.

A female Honey Buzzard in adult plumage was trapped on Lord Ashtown's property at Glenahiery, Co. Tipperary, on the 12th June. A Montague's Harrier, male, in adult plumage, was shot near Rathdrum, Co. Wicklow, on August 27th; his stomach was empty, but grouse feathers were adhering to his talons.

W. J. Williams.

Rathgar, Dublin.

Birds of Skerries, Co. Dublin.

In Prof. Patten's notes on Skerries (p. 185 *supra*), I was rather surprised to see he has evidently overlooked the Tree Sparrow, or failed to identify it. It breeds in places along the shore between Skerries and Balbriggan, and I have met it in small parties in the corn-fields bordering the Balbriggan road. I should hardly think the Wood-pigeon would feed on the undigested droppings of the Herring Gull, when the stubbles were full of grain. I have seen Wood-pigeons leave corn-fields to fly to the beach to get salt, which all pigeons like, and I have often flushed them from rock-pools close to the road.

W. J. Williams.

Rathgar, Dublin.

Crossbills near Dublin.

A flock of twenty Crossbills were observed by me in Palmerston Park on the 16th July.

W. J. Williams.

Rathgar, Dublin.

THE SURVEY OF CLARE ISLAND.

REPORT OF PROGRESS DURING 1909.

BY R. LLOYD PRAEGER.

(A report laid before the Royal Irish Academy, 8th November, and before the Dublin Naturalists' Field Club, 23rd November, 1909.)

The *Irish Naturalist* for June, 1908, contains a report of a meeting held in the National Museum on April 23 preceding, at which it was decided to organize a natural history survey of Clare Island, lying off the coast of County Mayo. On account of the work consequent upon the visit to Dublin of the British Association in September, 1908, operations were not commenced till the present year; during the season now closed, work has gone on vigorously. The number of persons who have visited the island or neighbouring district in connection with the survey during the year has been over 60, of whom, however, about 10 must be reckoned as non-combatants, being friends or relations who accompanied the workers, and themselves often rendered excellent service. While the majority paid only one visit to the district during the season, several of our workers went down twice, and the majority of this year's visitors will take the field again next year, as well as a large body of additional recruits.

The season's work opened at Easter, when a party of seven, namely Major Barrett-Hamilton (Mammals), J. Bayley Butler (Protozoa), A. D. Cotton (Marine Algae), Arthur Skinner (Photography, &c.), A. W. Stelfox (Mollusca), Isaac Swain (Geology), and R. Ll. Praeger (Phanerogams), spent five to eight days upon the island. In the groups of Seaweeds and Terrestial Mollusks especially good progress was made, not only on the island, but subsequently on the mainland adjoining. H. Bassett and W. L. Hicks, both of Liverpool University, members of a cave-exploring party who had been working at Cong, joined the party before the week was out, and reinforced the photographic detachment.

Our May party was small, consisting of Nevin H. Foster (Birds), Rev. Canon Lett (Mosses and Liverworts), R. Southern (Worms), and the writer. In all the groups mentioned, good

lists and collections were made on the island, and subsequently in the surrounding district, where Canon Lett worked Achill and Curraun, and Mr. Foster the Louisburgh area; while the welcome arrival of the Fisheries steamer "Helga" gave Mr. Southern an opportunity of dredging in the local waters in company with G. P. Farran, S. W. Kemp, and W. M. Tattersall, who were on board; the result being considerable collections of marine animals. Great progress was made during May with the Mosses and Liverworts, as Canon Lett was reinforced by W. H. Pearson from Manchester and the Rev. C. H. Waddell from County Down, and among them much exploration was carried out.

Early in June a party of ten went to the island, including J. N. Halbert (Insects, &c.), W. F. de V. Kane (Lepidoptera, &c.), C. F. Rousselet (Rotifera), D. J. Scourfield (Entomostraca), R. F. Scharff (Mollusca, Woodlice, &c.), and R. Ll. Praeger. The co-operation of two such authorities in their respective groups as Messrs. Rousselet and Scourfield was especially welcome, and their contribution to the final report will be of much value. As regards insects, the prevalence of cloud and wind during the visit caused very little to be on the wing, Lepidoptera being especially few; but good collections of beetles, &c., were made. On leaving the island after a five-days sojourn, the majority of the party worked the Achill Sound district.

On June 19 Miss Knowles went west to collect Lichens and Flowering Plants, and spent a fortnight in the Louisburgh and Westport districts, and on the island.

Two parties were organized in July. The first one, crossing on July 8, included D. R. Pack-Beresford, who worked the spiders, first of the island and subsequently of the Mallarany neighbourhood; Prof. J. Wilson, who studied the agricultural conditions of the island, past and present; and the writer, who pushed on with a vegetation map. The second party, crossing on July 16, included F. Balfour-Browne (Water-beetles), A. D. Cotton (Seaweeds), N. Colgan (Marine Mollusca), J. de W. Hinch (Glacial Geology), A. W. Hill (Botany), W. F. de V. Kane (Lepidoptera), A. R. Nichols (Polyzoa, &c.), and Miss J. Stephens (Sponges, &c.).

The marine fauna and flora received much attention during this trip; considerable collections were made, and some inshore dredging was carried out by N. Colgan and R. Ll. Praeger. Messrs. Balfour-Browne, Kane, Cotton and Colgan subsequently carried out further work around Louisburgh and Westport; and Miss Stephens, revisiting the district almost immediately, explored the shores of Achill, Belclare, and Louisburgh.

At the end of July we were most fortunate in securing the assistance of Dr. Eugene Penard, of Geneva, the well-known authority on the Rhizopoda. He spent a week in the district, collecting on the island, and in the Louisburgh and Achill neighbourhoods.

On August 20 a strong party went to the island for a week's work, chiefly at the flora. It included H. C. Hawley (Fungi), J. Adams (Marine Algae), Rev. Canon Lett (Mosses and Hepatics); also Dr. Otto Stapf of Kew and Miss Saunders of Newnham College: Dr. G. Fogerty and T. J. Westropp (Archæology), W. Rankin (Crustacea) and the writer. The "Helga" came in on August 23, with G. P. Farran and S. W. Kemp on board, and joined by Messrs. Rankin, Adams, and Praeger three days were devoted to dredging. Messrs. Westropp and Fogerty were very successful in their antiquarian work, and their results will form an interesting chapter of the report. An excellent preliminary survey of the fungus flora was made, and dredging added some important species to the fine list of Algae already made by A. D. Cotton. Mr. Hawley subsequently worked the Westport district for Fungi.

Early in September the last expedition of the year was sent down. G. W. Chaster, Edward Collier, A. W. Stelfox, R. Welch, and J. N. Milne worked Achill Sound, the island (especially), Louisburgh, Westport, and thence to Castlebar. Land and fresh-water Mollusca particularly engaged their attention, but many insects, &c., were also collected, and Mr. Welch secured a very fine series of photographs on the island. D. M'Ardle, who went down with them, spent ten days working the Mosses and Hepatics of the island and of the Louisburgh district.

During the season the geology of the island has engaged the attention of the staff of the Geological Survey. J. R.

Kilroe, R. Clark, and T. Hallissy have all been at work, and the revision of the "solid" map, as well as new drift and soil maps, are well forward.

On the whole, substantial progress has been made during the year with the working out of the fauna and flora. Among the animal groups, the lists of Mollusca, both land and marine, are well advanced; the same may be said, among the Arthropods, for the beetles, spiders, woodlice, and decapods; also some of the groups of worms. On the other hand, owing to one chance or another, some large groups have hardly been touched yet. The birds and fishes need further attention; Lepidoptera hang back, owing to the unsuitable weather; Diptera and other orders of insects have as yet hardly been touched; and the vast marine fauna has been only very partially examined, though here and there good lists have been compiled.

The flora has on the whole advanced more than the fauna. The mosses and liverworts stand out pre-eminently, having had the service of four skilled workers, and an aggregate period of about seven weeks of work. The Phanerogams are up to date, the marine Algae far advanced, the Fungi well begun. The Lichens alone hang back, but extensive collections of them have been made.

As regards new or rare species, there are indications that the report will be not devoid of interest. Several of the species collected appear to be new to science, and already a number are reported which have not previously been recorded from Ireland, and others from the British Islands.

In conclusion, it may be stated that in a number of groups the Committee will be glad of further assistance. The district over which their operations extend is a large one, and time is short. The secretary (the writer of the present report) will be pleased to receive communications from any fresh volunteers, and to give information as to the conditions under which the survey is being carried out.

National Library of Ireland, Dublin.

NOTES ON THE IRISH FALSE-SCORPIONS IN THE NATIONAL MUSEUM OF IRELAND.

BY H. WALLIS KEW.

IN connection with a "Synopsis of the False-Scorpions of Britain and Ireland" now nearly completed, I recently examined the animals of this order belonging to the National Museum; and at the suggestion of Dr. Scharff, to whom I am indebted for permission to make the examination, the present note is submitted to the *Irish Naturalist*. I wish to thank Dr. Scharff, and also Mr. J. N. Halbert, who helped me in various ways. Many of the specimens were collected on trips organised by the Fauna and Flora Committee of the Royal Irish Academy. Most of the specimens are in spirit, and most of them had been named some years ago by Professor G. H. Carpenter. With the exception of a few from extra-Britannic localities (not critically examined by me), the collection consists of seven species as follows :—

Chelifer cancroides, Linn.—Limerick; 1894 (F. Neale).

Chelifer (Chernes) dubius, Cambr. (?).—Ovoca, Co. Wicklow; 1895 (J. N. Halbert). Reported in *Irish Naturalist*, V. (1896), p. 215, as *Chernes phaleratus* Simon, by which is intended, no doubt, the animal so named by Mr. Cambridge (= *C. scorpioides*, Herm.). I believe, however, that this identification is erroneous, and that the animal is *C. dubius*, Cambr.; but I cannot refer it to that species with certainty because one should examine the galea in lateral view, the ventral as well as the dorsal surface of the body, and note the presence or absence of certain tactile-hairs, and this cannot be done in the case of the present carded, somewhat damaged specimen.

Cheiridium museorum, Leach.—Dundrum, Co. Dublin; 1903 (R. F. Scharff).

Obisium muscorum, Leach.—Lucan, Co. Dublin; 1892 (R. F. Scharff). Lough Gilly, Co. Armagh; 1893 (W. F. Johnson). Killarney, Co. Kerry; 1893. Ovoca, Co. Wicklow; 1894. Bray, Co. Wicklow; 1895. (R. F. Scharff). Glandore, Co. Cork; 1896 (J. N. Halbert). Poyntzpass, Co. Armagh; 1896 and 1897 (W. F. Johnson). Leenane, Co. Galway; 1897 (J. N. Halbert). Delphi, Co. Mayo; 1897 (J. N. Halbert). Kinbane, Co. Antrim; 1897 (R. Welch). Kenmare, Co. Kerry; 1899 (J. N. Halbert). Ballycastle, Co. Antrim; 1900 (R. Welch). [Edinburgh; 1892 (W. Evans).]

Obisium maritimum, Leach.—Kenmare Bay, Co. Kerry; 1909 (H. W. Kew). The Museum also possesses examples of this species from Jersey, which it was of interest to compare with those from Kenmare

Bay; they were labelled *O. littorale*, Moniez: a name already placed as a synonym under *O. maritimum*, Leach.

Chthonius Rayi, L. Koch.—Lucan, Co. Dublin; 1892 (R. F. Scharff). Ovoca, Co. Wicklow; 1894 (R. F. Scharff). North Bull, Co. Dublin: 1894 and 1898 (J. N. Halbert). Bray Head, Co. Wicklow; 1895 (G. H. Carpenter). Tallaght, Co. Dublin; 1895 (J. N. Halbert). Londonderry; 1895 (J. N. Milne). Borris, Co. Carlow; 1895 (J. N. Halbert). Glandore, Co. Cork; 1898 (J. N. Halbert). Howth, Co. Dublin; 1909 (J. N. Halbert).

Chthonius tetrachelatus, Preys.—Dublin; 1894 (J. N. Halbert). Belfast; 1896 (A. G. Wilson). [Edinburgh; no date (W. Evans)]. These specimens had been referred erroneously to *Chthonius orthodactylus*, Leach; and those from Belfast and Edinburgh have been recorded under that name. (*Guide to Belfast, etc. British Association*, 1902, p. 220; and *Proc. Royal Physical Society, Edinburgh*, xiv., (1900), p. 180.)

12 Herndon Road, Wandsworth, London S.W.

SOME ADDITIONS TO MY PAPER ON THE IRISH FLORA.

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

Euphrasia brevipila, B. & G.—Blackhead, Co. Clare.

Taraxacum obliquum, Dahlst.—Near Loughrea, Co. Galway.

T. udum, Jord.—Ben Bulben, Sligo.

T. erythrospermum, Andrz.—Wicklow.

T. paludosum, Schlecht.—Gort, Co Galway.

Hieracium cymbifolium, Purchas.—Ballyvaughan, Co. Clare, and Glencar, Sligo. (Ref. No. 4205.) Apparently new to Ireland.

Hieracium britannicum, F. J. Hanb.—Ballyvaughan, Co. Clare; Ben Bulben rare.

H. Somerfeltii, Lindeb. var.—A form, as Mr. Ley says, with much more glandular heads, occurred in some quantity near the canal, Glasnevin, Co. Dublin.

Lapsana communis L., var. **pubescens,** Reichb.—This appears to be the Muckinish plant alluded to in my last paper. Not given in our British Floras.

Bromus hordeaceus L., var. **microstachys** (Duval-Jouve).—Sown grass fields, Burren, Co. Clare, and Roo, Co. Galway.

B. hordeaceus L., var. **leiostachys.**—Wicklow.

Festuca rubra L., var. **commutata,** Gaud. (*F. fallax* Thuill.)—Ben Bulben, Sligo.

Nitella opaca, Ag.—This is the plant I wrongly recorded as *T. glomerata* from near Gort, Galway, in the *Irish Naturalist* for October.

High Street, Oxford.

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[1] See *Irish Nat.*, October, 1909.

IRISH SOCIETIES.

BELFAST NATURALISTS' FIELD CLUB.

GEOLOGICAL SECTION.—SEPTEMBER 11.—EXCURSION TO ISLANDMAGEE.—The rocks investigated belong to the Cretaceous series, and comprise Glauconitic Sands, Yellow Sandstones, Chloritic Sands, and Chalk.

The mineral beekite was found on a *Pecten quinquecostatus*, and the minerals levyne, gmelinite, and analcime in the basaltic rocks at Blackhead.

GEOLOGICAL SECTION.—SEPTEMBER 25.—EXCURSION TO WOODBURN GLEN.—A fine section of Cretaceous rocks at the Woodburn river was examined. The Glauconitic Sands were well exposed in the west bank of the river, but the water was so deep they were inaccessible to most of the party. These beds had a special interest for the members of the Geological Section, as it is to the late Professor Ralph Tate, the distinguished founder of the Belfast Naturalists' Field Club, that we owe their earliest comprehensive exposition. A little higher up, on the west side of the river, a basalt dyke was noted, traversing the Chalk, which in its vicinity was converted into marble, some specimens showing a beautifully banded structure.

GEOLOGICAL SECTION.—OCTOBER 9.—EXCURSION TO MOIRA.—The fine chalk quarries at Maghaberry, about three miles N.E. of Moira, were visited. The first quarry showed about fifty feet of Chalk, capped, by about thirty feet of rudely columnar basalt, surmounted by from eight to twelve feet of Boulder clay. In the second quarry, two to twenty feet of Boulder clay was found, capping the Chalk directly. Many very fine paramoudras were noted in this quarry, one in situ, measured fifty inches by eighteen ; and others forming a vertical series in the Chalk cliff appeared to be as large, but were inaccessible.

In the last quarry visited at least fifty feet of Chalk was visible, surmounted by about twenty-five feet of rudely columnar basalt, capped by Boulder clay averaging twenty feet in depth. The erratics from the Boulder clays included granite, gabbro, quartzite, mica schist, and Ailsa Craig riebeckite-eurite; a specimen, the last found in the first quarry, measured twelve inches by seven inches, the largest specimen yet found in our Boulder clays.

DUBLIN MICROSCOPICAL CLUB.

MAY 12.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President) exhibited the fungus *Melanospora leucotricha*, Corda, which is new to the British Islands. It was found growing on decaying Cherry-laurel leaves from the neighbourhood of Monaghan.

October 13.—The Club met at Leinster House. Dr. G. H. Pethybridge (President) exhibited the fungus *Verticilium alboatrum*, Reinke et Berthold, which he had obtained by culture from potato plants growing near Dublin attacked with one of the forms of "leaf-curl" or "roll." The fungus is of very considerable economic importance, and this is the first time it has been recorded for the British Islands. The wood vessels of every part of the attacked plants, leaves, stems, roots and rhizomes, were permeated by the mycelium of this fungus, and it also enters the tubers, having been traced in one instance to a distance of two and a half inches from the heel end. Owing to the choking of the vascular system of the plant it wilts and dies, and the fungus then spreads into other tissues than the wood and destroys them. The mycelium then becomes black and passes into a hibernating condition and is capable of renewing its growth again in the following season under suitable conditions. Healthy potato plants can be artificially inoculated with the fungus through wounds. In one such case the mycelium travelled up the stalk in the wood vessels to a distance of about eight inches in the course of a few weeks. How infection occurs under natural conditions in the field is not known with certainty, but planting affected "seed" would seem to be one means of propagating the disease. Further experiments with this fungus are in progress.

J. N. Halbert showed the larval and adult forms of the hemipteron *Nabis lativentris*, found commonly under clumps of Matricaria, &c., on the south shore of Howth. The larva of this species is highly chitinised and well pigmented with dark colour, and in general structure bears a superficial resemblance to the common black ant *Formica fusca*, which abounds in the same locality. The resemblance between the two insects was especially striking when they were seen running about in company. The hemipteron is apparently common in England, but in this country it is rather local, occurring chiefly in maritime localities.

R. Southern exhibited a living specimen, with tube, of *Lanice conchilega* (Gall.) The tubes of this polychaete, with their opercular flaps fringed with long filaments, are amongst the commonest sights of the littoral region. The tubes penetrate into the sand for a considerable distance, and hence the worms are seldom seen. The specimen exhibited was obtained from a rock-pool at Howth, Co. Dublin.

F. W. Moore exhibited the fructifying stage of *Stemonitis ferruginea*, one of the Myxomycetes. It was found growing on a damp shaded bank in the Botanic Gardens. The plasmodium stage covered a large space, adhering to leaves of grass, Campanala, and dead Holly leaves, soft yellowish irregular plastic masses. The sporangia were dark brown on short stalks.

NOTES.

BOTANY.

Cluster-Cups on Barberry.

On the 3rd of August last I noticed a specimen of the Common Barberry (*Berberis vulgaris*, Linn.) growing on a hedge near Skerry, co. Antrim. The leaves were covered with the cluster-cup stage of the fungus *Puccinia graminis*, Pers. In connection with the relation between this stage of the fungus and wheat rusts, its occurrence seems worth recording.

J. Adams.

Royal College of Science, Dublin.

Fusicladium dendriticum on Wild Crab.

On the 21st of July, near the Hill of Tara, in Co. Meath, I observed a number of fruits of the Wild Crab, covered with Apple Scab (*Fusicladium dendriticum*, Fuckel). This disease is rather common in orchards on the cultivated Apple, but I have seen no previous record of its occurrence on the Wild Crab. It is supposed to have been introduced with Apple trees, but its occurrence on Crab makes it possible that it is a native species of fungus.

J. Adams.

Royal College of Science, Dublin.

Bartsia viscosa in Connemara.

Mr. A. R. Sanderson, whose discovery of *Sisyrinchium angustifolium* in Donegal is referred to in a recent number (p. 222), writes me that when camping with a party of English botanists at Dog's Bay, in August, about a dozen plants of *Bartsia viscosa* were noticed in a potato field, a quarter of a mile east of Dog's Bay. The find is very interesting. The plant is admittedly native in the South of Ireland (Kerry to Waterford). Its only other Irish stations are two, situated on Lough Swilly, W. Donegal; and while its wide western range in Great Britain (Sussex and Cornwall to Argyll) offers no obstacle to its being native in Donegal (as held by H. C. Hart), the Editors of *Cybele Hibernica* inclined to the view that it may have been introduced from S. Scotland, the evidence quoted in favour of that view being the wide gap between its Donegal and southern stations. While the Connemara station is in itself unsatisfactory, by reason of its being on cultivated land, and of the small quantity of the plant observed, it nevertheless bridges the gap and strengthens the case for *Bartsia viscosa* being native throughout its Irish range. And if the plant has only now been detected in the comparatively well-known Roundstone district, it seems possible that the future will reveal other stations in unexplored portions of Galway or of Mayo.

R. Lloyd Praeger.

Dublin.

Scrophularia vernalis in Ireland.

Mr. R. M. Barrington sends us an old letter, containing an unpublished locality for this plant, which appears to be unrecorded for Ireland even as a casual. It is from Prof. W. H. Harvey to Mr. Thomas Noble Cole, of Ballitore, co. Kildare, is dated 26th May, 1858, and runs as follows :—

"The plant from the "Ruins of Ballitore" is the *Scrophularia vernalis*—rather a suspicious habitat for a rare British plant—not hitherto found in Ireland. But in England it only grows on rubbish. I have no objection to your drying me a good specimen, or bringing one with you for me to dry when you come."

Asparagus officinalis in Co. Londonderry.

Mr. D. C. Campbell has sent me a specimen of Asparagus collected last August by his brother, Rev. W. N. Campbell, on the sands at the mouth of the Bann. This being just the kind of place in which the plant is found as an indigenous species, I have made inquiries, which show that the Asparagus cannot on the strength of this discovery be added to the northern flora. The specimen submitted belongs to the large cultivated form, not to the smaller procumbent native type. One specimen alone was found, and this was only a few feet above high water mark, suggesting casual importation by the river, aided by a high tide and perhaps by a gale. The spot where the plant was found was on the northern bank of the river, three quarters of a mile from its mouth, and one-third of a mile from the nearest point of the open sea.

R. Lloyd Praeger.

National Library of Ireland.

ZOOLOGY.

Fossil Foraminifera.

The Report and Proceedings of the Belfast Natural History and Philosophical Society for 1907-8, recently issued, contains a paper by Mr. Joseph Wright, F.G.S., on Foraminifera obtained in sands and clays from several localities near Belfast.

Water Beetles at Armagh.

In the April number of the *Entomologist's Monthly Magazine*, the Rev. W. F. Johnson notes the capture of the local Water-beetle *Hydroporus dorsalis*, F., in the Armagh district, and gives reasons for believing that the species has become common there since the year 1895.

Micropeplus cœlatus in Ireland.

In a combined note (*Entomologists' Monthly Magazine*, July, 1909), Messrs. N. H. Joy and J. R. C. B. Tomlin record the occurrence of *Micropeplus cœlatus*, Erichson, in Ireland. It was taken sparingly at the end of April in marshy ground near Cloghane, in the County Kerry. The species had not been previously noticed in the Britannic area.

Beetles in Birds' Nests.

In a paper entitled "A New Method of Collecting Coleoptera" (*Entomologists' Monthly Magazine,* January, 1909), Mr. Norman H. Joy, M.R.C.S., F.E.S., records the results of a careful examination of the debris of various sea-birds' nests, chiefly with a view of ascertaining their beetle inhabitants. The following notes refer to Irish localities:—

Bull Rock, S. W. Ireland, August 7th, 1906. Gannets's nests, consisting of rotting seaweed:—*Philonthus cephalotes* Grav.; *Gnathoncus rotundatus*, Kugel. Three puffins' nests, *Choleva Watsoni* Spence.

Valencia Island, S.W. Ireland; Puffins' nests:—*Bradycellus verbasci*, Duft; *Pterostichus niger*, Schall., fragments; *Amara triviales; Homalota circelloris*, Grav: *Atomaria atricapilla*, Stephs. In tufts of grass from the same locality were found several *Otiorrhynchus blandus*, Gyll.

Irish Hymenoptera.

In the *Entomologists' Monthly Magazine* for December, 1908, Mr. Claude Morley records various Hymenoptera collected by Mr. H.W. Andrews in the counties of Cork, Kerry, and Waterford during the seasons of 1907 and 1908. Fourteen species of Ichneumonidæ, twelve of the Aculeata, and six Terthredinidæ are recorded. Amongst the Aculeates we notice the capture of the local wasp *Vespa austriaca* at Kenmare in August, 1907.

Sirex gigas in Co. Carlow.

A party camping out near here were surprised one morning in August to find their bell tent invaded by numbers of *Sirex gigas*, which were found to proceed from an old larch log which was perforated in scores of places, and used to prop up one of the beds; some of the larvæ were secured. Perhaps some of your readers may report if they have met with a colony of this fly in Ireland. Though individuals are captured occasionally, they are generally supposed to be rare, and to effect no material damage on our trees, but it should seem, from the evidence here given, that they are far more numerous than usually suspected, and must be prevalent in the locality from which this larch log was obtained.

T. Hartley.

Borris.

[For many years past *Sirex gigas* has not been scarce in Ireland.—Eds.]

Irish Fossil Molluscs.

Mr. Longstaff contributes a paper to the *Quarterly Journal of the Geological Society* (vol. lxv.), May, 1909, on the Palæozoic marine gastropod Loxonema. Several new English species are described and figured. Among the Loxonemas in the Museum of Practical Geology in London, Mr. Longstaff found two specimens which had been named *L. striatissimum* by Mr. Cowper Reed. Both of these came from the Silurian (Upper Bala) of the Chair of Kildare, and were found to be new species. Mr. Longstaff now redescribes them under the names of *Loxonema Reedi* and *Stylonema* (?) *hibernicum*.

The Warty Newt presumably introduced into Dublin.

In digging a drain at the back of the new Royal College of Science in Dublin the workpeople noticed a creature walking about which inspired them with wonder. After having induced it to creep into a bottle, they brought it to the Museum, where it was identified by Mr. Halbert and myself as a female specimen of the Warty Newt (*Molge cristata*). As this species is not known as a native of the Irish fauna, I sent it to Mr. Boulanger, of the British Museum, who kindly confirmed our identification. He remarked, at the same time, that he had no doubt of its having been introduced. This supposition seems to be strengthened by the fact that at the end of the new drain alluded to, the workmen discovered an ancient well. The newt had possibly lived in it, and may perhaps have been deposited there by one of the former tenants of the houses now occupied as offices by the Department of Agriculture and Technical Instruction. In any case, it is important to place the occurrence on record.

R. F. Scharff.

National Museum, Dublin.

Marked Birds.

For some time past I have taken a great interest in the ringing of birds so as to obtain information in regard to their migration and general movements. During the present year a number of readers of *Country Life* have marked birds, and we are now desirous of establishing a correspondence in all parts of the world with all who would let us know should they come across the birds we have marked and identify our rings. The rings we have used are engraved *Country Life* and a number; and I would be very grateful if those who are interested in birds will, as far as possible, help us to trace the birds. It is only by co-operation, not only with people in England, but in foreign countries, that we can hope to obtain results.

P. Anderson Graham.

20 Tavistock-street, London, W.C.

Glossy Ibis in Cos. Donegal and Derry.

Evidently a flock of Glossy Ibis (*Plegadis falcinellus*, Linnæus) has visited our north coast. About October 12 one was shot at Malin Head, Co. Donegal, and one at Straidarran, Co. Derry, about thirteen miles inland from Derry City, by Mr. Samuel H. M'Candless. Both specimens seemed to be immature; the back, wings, and tail were beautifully glossed with greenish purple; the under parts were brownish black; the head and neck streaked with greyish white, and the legs and feet light grey. One of the specimens is now in our city Museum. These are the first records I have for this north-west district

D. C. Campbell.

Londonderry.

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No. 1. The Warble Fly.
„ 2. *Out of Print.*
„ 3. *Out of Print.*
„ 4. Workmen's Compensation Act.
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„ 16. Sheep Scab.
„ 17. The Use and Purchase of Manures.
„ 18. Swine Fever.
„ 19. Early Potato Growing.
„ 20. Calf Rearing.
„ 21. Diseases of Poultry :—Gapes.
„ 22. Basic Slag.
„ 23. Dishorning Calves.
„ 24. Care and Treatment of Premium Bulls.
„ 25. Fowl Cholera.
„ 26. Winter Fattening of Cattle.
„ 27. Breeding and Feeding of Pigs.
„ 28. Blackleg, Black Quarter, or Blue Quarter.
„ 29. Flax Seed.
„ 30. Poultry Parasites—Fleas, Mites, and Lice.
„ 31. Winter Egg Production.
„ 32. Rearing and Fattening of Turkeys.
, 33. Profitable Breeds of Poultry.
„ 34. The Revival of Tillage.
„ 35. The Liming of Land.
„ 36. Field Experiments—Barley.
„ 37. „ „ Meadow Hay.
„ 38. „ „ Potatoes.
„ 39. „ „ Mangolds.
„ 40. „ „ Oats.
„ 41. „ „ Turnips.
„ 42. Permanent Pasture Grasses.
„ 43. The Rearing and Management of Chickens.
„ 44. "Husk" or "Hoose" in Calves.
„ 45. Ringworm on Cattle.
„ 46. Haymaking.
„ 47. The Black Currant Mite.
„ 48. Foul Brood or Bee Pest.
„ 49. Poultry Fattening.
No. 50. Portable Poultry Houses.
„ 51. The Leather-Jacket Grub.
„ 52. Flax Experiments.
„ 53. The Construction of a Cowhouse.
„ 54. Calf Meal.
„ 55. The Apple.
„ 56. Cultivation of the Root Crop.
„ 57. Fruit Packing.
„ 58. Sprouting Seed Potatoes.
„ 59. Seed Testing Station for Ireland.
„ 60. The Packing of Butter.
„ 61 The Care of Milk for Creameries.
„ 62. Plans for Creamery Buildings.
„ 63. "Redwater" or "Blood-Murrain" in Cattle.
„ 64. Varieties of Fruit suitable for cultivation in Ireland.
„ 65. Forestry : The Planting of Waste Lands.
„ 66. Forestry : The Proper Method of Planting Forest Trees.
„ 67. Forestry : Trees for Poles and Timber.
„ 68. Forestry : Trees for Shelter and Ornament.
„ 69. The Prevention of Tuberculosis in Cattle.
„ 70. Forestry : Planting, Management, and Preservation of Shelter-Belt and Hedgerow Timber.
„ 71. Forestry : The Management of Plantations.
„ 72. Forestry : Felling and Selling Timber.
„ 73. The Planting and Management of Hedges.
„ 74. Some Common Parasites of the Sheep.
„ 75. Barley Sowing.
„ 76. American Gooseberry Mildew.
„ 77. Scour and Wasting in Young Cattle.
„ 78. Home Buttermaking.
„ 79. The Cultivation of Small Fruits.
„ 80. Catch Crops.
„ 81. Potato Culture on Small Farms.
„ 82. Cultivation of Main Crop Potatoes.
„ 83. Cultivation of Osiers.
„ 84. Ensilage.
„ 85. Some Injurious Orchard Insects.
„ 86. Dirty Milk.
„ 87. Barley Threshing.
„ 88. The Home Bottling of Fruit.
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NOTICE.

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

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Royal College of Science, Dublin.

R. LLOYD PRAEGER,
National Library, Dublin.

ROBERT PATTERSON,
Glenbank, Holywood, Co. Down.

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CONTENTS.

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„ 35. The Liming of Land.
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„ 37. „ „ Meadow Hay.
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„ 39. „ „ Mangolds.
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CONTENTS.

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MARCH, 1909.

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CONTENTS

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„ 36. Field Experiments—Barley.
„ 37. „ „ Meadow Hay.
„ 38. „ „ Potatoes.
„ 39. „ „ Mangolds.
„ 40. „ „ Oats.
„ 41. „ „ Turnips.
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„ 43. The Rearing and Management of Chickens.
„ 44. "Husk" or "Hoose" in Calves.
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„ 53. The Construction of a Cowhouse.
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CONTENTS.

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,, 35. The Liming of Land.
,, 36. Field Experiments—Barley.
,, 37. ,, ,, Meadow Hay.
,, 38. ,, ,, Potatoes.
,, 39. ,, ,, Mangolds.
,, 40. ,, ,, Oats.
,, 41. ,, ,, Turnips.
,, 42. Permanent Pasture Grasses.
,, 43. The Rearing and Management of Chickens.
,, 44. "Husk" or "Hoose" in Calves.
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,, 86. Dirty Milk.
,, 87. Barley Threshing.
,, 88. The Home Bottling of Fruit.
,, 89. The Construction of Piggeries.
,, 90. The Advantages of Early Ploughing.
,, 91. Black Scab in Potatoes.
,, 92. Home Preservation of Eggs.
,, 93. Marketing Wild Fruits.

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CONTENTS.

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CONTENTS.

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CONTENTS.

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CONTENTS.

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OCTOBER, 1909.

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CONTENTS.

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NOVEMBER, 1909.

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,, 36. Field Experiments—Barley.
,, 37. ,, ,, Meadow Hay.
,, 38. ,, ,, Potatoes.
,, 39. ,, ,, Mangolds.
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,, 43. The Rearing and Management of Chickens.
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,, 53. The Construction of a Cowhouse.
,, 54. Calf Meal.
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,, 65. Forestry: The Planting of Waste Lands.
,, 66. Forestry: The Proper Method of Planting Forest Trees.
,, 67. Forestry: Trees for Poles and Timber
,, 68. Forestry: Trees for Shelter and Ornament.
,, 69. The Prevention of Tuberculosis in Cattle.
,, 70. Forestry: Planting, Management, and Preservation of Shelter-Belt and Hedgerow Timber.
,, 71. Forestry: The Management of Plantations.
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,, 73. The Planting and Management of Hedges.
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,, 80. Catch Crops.
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,, 84. Ensilage.
,, 85. Some Injurious Orchard Insects.
,, 86. Dirty Milk.
,, 87. Barley Threshing.
,, 88. The Home Bottling of Fruit.
,, 89. The Construction of Piggeries.
,, 90. The Advantages of Early Ploughing.
,, 91. Black Scab in Potatoes.
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CONTENTS

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