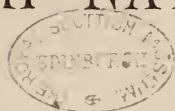


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SCOTTISH MUSEUM
1867

MARINE BIOLOGICAL LABORATORY
WOODS HOLE
LIBRARY
MASS.

Rush.

Slieve Donard.

Rockabill.

Knockbane.

Castle and
Plantation.

Lambay Head.

Loughshinny.



LAMBAY AND ITS SURROUNDINGS.

From a sketch by S. Rosamond Praeger.

The sketch is taken from the Cambrian promontory of Howth, looking northward. In the foreground is Howth harbour, half hidden by the trees of Howth demesne, and beyond it the Cambrian islet of Ireland's Eye. In the middle distance is the Ordovician volcanic island of Lambay, and opposite to it the mainland (Carboniferous limestone) at Rush and Loughshinny. Over the west end of Lambay lies the Devonian granite islet of Rockabill, with its lighthouse; while behind all rises the distant Tertiary granite ridge of the Mourne Mountains, 50 miles away, with Slieve Donard dominating the eastern end.

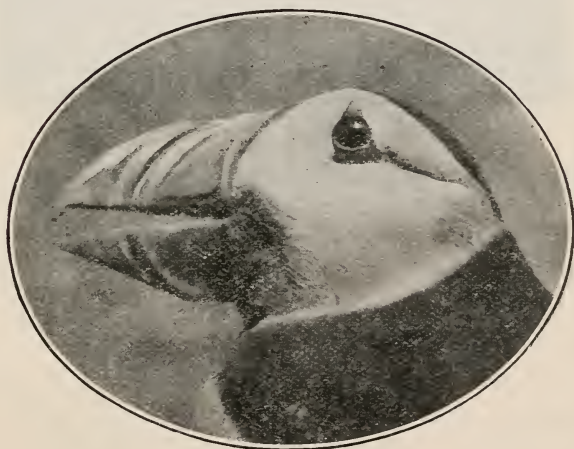
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CONTRIBUTIONS

TO THE

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Being the January and February numbers of the "Irish Naturalist"
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AT WORK.

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The Irish Naturalist.

VOLUME XVI.

CONTRIBUTIONS TO THE NATURAL HISTORY OF LAMBAY.

[Communicated to the Dublin Naturalists' Field Club, Feb. 12, 1907.]

PREFACE.

BY R. LLOYD PRAEGER.

SHORTLY after the present owner entered into possession of Lambay, I ventured to suggest to him that a systematic examination of the fauna and flora might lead to important scientific results, and moreover add to the interest which he already felt in the native inhabitants—animal and vegetable—of the island. Mr. Baring accepted the suggestion at once. Workers in the various branches of natural history were enlisted, and the survey was begun in June, 1905, when a week of cloudless weather favoured our first invasion. The party on this occasion consisted of H. J. Seymour (Geology), R. Patterson (Birds), Dr. Scharff (Land Mollusca, &c.), A. W. Stelfox (Land Mollusca), W. F. de V. Kane (Lepidoptera), J. N. Halbert (other Insecta), W. Rankin (Marine Crustacea), D. M'Ardle (Cryptogams), R. Ll. Praeger (Phanerogams), and G. E. Low (photography). Later in the same year various members of the party revisited Lambay and continued their work. At Easter, 1906, another joint visit was made, and the marine fauna and flora especially were collected, the party consisting of N. Colgan (Marine Mollusca), A. R. Nichols (Polyzoa, Echinodermata, &c.), H. J. Buchanan-Wollaston (Hydrozoa, &c.), A. L. Batters (Algæ), with J. de W. Hinch (Glacial Geology), N. H. Foster (Birds), R. Patterson, W. Rankin, and R. Ll. Praeger. In June of the same year a

third party visited the island, consisting of R. Welch (photography), R. Southern (Worms), Miss Knowles (Phanerogams), and also G. E. Low, J. N. Halbert, and R. Ll. Praeger, who continued work at their several groups. Before the year closed, Scharff, Halbert, M^cArdle, Seymour, Low, Hinch, and Praeger revisited the island to complete their observations, and in addition D. R. Pack-Beresford spent some days collecting Arachnida and Isopoda. On all the occasions mentioned the naturalists were the guests of Mr. and Mrs. Baring, for whose hospitality, helpfulness, and keen interest in their work, they find it very hard to express their deep obligation.

Most of the collectors have worked out their own material, but in a few instances assistance was called in, and thanks are due to several naturalists for the willing aid they rendered with regard to various groups, especially to Joseph Wright, F.G.S. (Foraminifera, recent and fossil), and to Robert Kirkpatrick (Sponges).

As regards the marine collections, no effort was made to explore the waters surrounding the island. A few scrapes of the dredge were indeed taken inshore on the west and north coasts, and the results included in the lists; but the limit which we appointed for our work was, with these exceptions, the limit which could be reached by shore-collecting.

The main object of our work on Lambay was simply the study of an island fauna and flora, and while as a contribution to that subject we hoped that our results might possess some general interest, we did not anticipate that the actual species inhabiting Lambay would furnish distributional records of more than purely local value. The results, however, in this direction prove that we were wrong. Five Lambay species (three worms, a mite, and a bristletail) are new to science; twelve other animals are additions to the Britannic fauna. The additions to the fauna and flora of Ireland recorded below total between 80 and 90 species, and while some of these additions result from the study of groups which have hitherto been almost unworked in this country (such as the Oligochæta and Oribatidæ), in many other cases additions are now made to groups of which the Irish list may be regarded as tolerably complete.





Lambay Head (right) and Tinian Hill (left), from near Heath Hill, looking N.E.

G. E. Low, Photo.

To face p. 3.

GEOLOGY.

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

THE island of Lambay lies in the Irish Sea off the coast of Co. Dublin, in N. lat. $53^{\circ} 29'$, W. long. $6^{\circ} 1'$. It is roundish in outline, well raised above sea-level, and has an area of 617 acres above high water mark. The channel which separated it from the mainland is $2\frac{1}{2}$ to $3\frac{1}{2}$ miles wide, and maintains a tolerably uniform depth of six to seven fathoms. At flow and ebb, a strong tide sets through this channel, the rise of tide being 13 feet at springs, 10 feet at neaps. Shoal water extends north and south of the west end of the island for several miles, tending to define the channel more strongly. Outside (east) of Lambay, the water deepens rapidly into the Irish Sea basin.

The climate of Lambay is thoroughly insular in character—cool in summer, warm in winter. Frost and snow are rare. During the year 1906 (a period of mild winters) frost was registered on 13 nights, the lowest temperature being 25° F. on December 28 and 29. On only one occasion (December 29) did the thermometer register below 32° F. at 10 a.m. The climate is also a dry one for Ireland, Lambay lying within the area of least rainfall in the country—a strip of the east coast, with a precipitation of under 30 inches.

Previous Literature.

The first detailed account of the geology of the island appeared in the year 1861, in the Geological Survey Memoir to accompany the one-inch sheets Nos. 102 and 112. The island was surveyed by the late G. V. Du Noyer⁽¹⁾, and the description written by him in conjunction with the late J. B. Jukes, F.R.S., the local director of the Irish Survey at that time. The occurrence of the well-known "Lambay porphyry," a rock similar to the "verde antique" of ancient writers, has been dealt with and described by Von Lasaulx⁽²⁾ in 1878, and subsequently by Teall⁽⁴⁾ and Harker⁽⁵⁾ in their works, published in 1888 and 1895 respectively. Professor Hull⁽²⁾ also described the Lambay porphyry, so far as the then immature condition of the science of petrography permitted,

and published some drawings of the porphyritic feldspars as they appeared in thin sections under the microscope. The most recent and most detailed account of the geology of the island was published in 1898 in the *Quarterly Journal* of the Geological Society of London, and sets out the results obtained by Messrs. Gardiner and Reynolds⁽⁸⁾ during a short holiday spent on the island in 1897. This last account, beyond bringing up to date certain details concerning the rocks (especially the igneous ones, which the authors were the first to study seriously), does not differ very materially from the work of Du Noyer. Both accounts have been drawn on when necessary in preparing the matter which now follows.

The writer, in the course of several visits to the island, has prepared a drift map of Lambay for the Geological Survey of Ireland (Plate 3), which is now published for the first time, by permission of the Director. In conjunction with it is a solid geology map embodying the results of previous workers, with a few minor alterations and additions which were necessary in view of further evidence obtained recently.

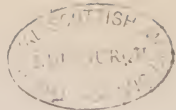
Geological History and Physical Geology.

Geologically speaking, Lambay is of considerable antiquity, consisting, as it does, of rocks referable to the older Palæozoic formations, and though rocks more recent than the Old Red Sandstone may once have buried the island beneath them, no traces of any formation belonging to the period of time intervening between the Devonian Period and the Glacial Epoch now remain.

It is, however, very probable that rocks of Carboniferous age once covered the area now occupied by the island, as they have covered the geologically contemporaneous rocks at Portrane, and their subsequent denudation has resulted in the isolation from the mainland of this portion of a once continuous mass of Silurian rocks. It is a matter for speculation as to whether any of the formations so well preserved for us under the plateau basalts of Co. Antrim were deposited over the Carboniferous limestone as far south as Dublin, though there is nothing inherently improbable in the idea. Should such have been the case, we may regard the present



GEOLOGICAL MAP OF LAMBAY, By H. J. Seymour.



contour and physiography of Lambay as of very great antiquity, possibly pre-Carboniferous or Devonian, and as having been protected throughout the subsequent æons under a mantle of strata, the comparatively recent denudation of which reveals once more the ancient contours pretty much in their original form. Seeing that the Carboniferous limestone has not yet been entirely denuded off the Silurians at Portrane, which belong to the same period as the Lambay rocks, it seems probable that the latter have only recently emerged from the covering of the former rocks. On the assumption that no Carboniferous rocks covered this portion of the Silurian inlier, Lambay must be regarded as but a remnant of a vastly greater mass, worn away by ages of denudation, and its physical features as being geologically recent.

The present physical features, in their broader aspect, are intimately connected with the general geological structure of the island. It is noticeable, for example, that practically all the rock crags face west or south-west. This is primarily due to the tilt of the strata, which dip generally, and at a fairly low angle, towards the east, and thus the edges of the beds appear in the scarps. This general dip can be well seen on approaching the island from the south, and also in the vicinity of Lambay Head, especially on its northern side. The minor features depend chiefly on local differences in the weather-resisting qualities of the various rocks, some of which disintegrate much more readily than others.

It is to this latter fact that we owe the presence of certain prominent scarps and rounded hillocks, such as Bell Rock, Flint Rock, and Raven's Rock, the two former being made up of the tough weather-resisting Lambay porphyry.

Roughly, some two-thirds of the island lies above the 150 ft. contour, the greatest height being reached at Knockbane (418 ft.). More than three-quarters of the entire shore line consists of steep cliffs varying from 50 up to 150 feet as at Saltpan Bay. The central back-bone of the island, forming the highest ground, runs in a sinuous line from Lambay Head to Raven's Rock, and is flanked on the north by the main depression of the island, ending at Freshwater Bay, and by a minor valley on the south running down to Seal Hole. Both valleys

have been slightly modified by glacial drift deposits and minor excavation along the courses of the streamlets which drain them. Drainage to the south has produced a fairly well marked trough in the Thorn Chase Valley on the south side of the island. Below the 150 ft. contour on the western third of Lambay, the ground flattens down more gently, forming a smooth saddle-shaped ridge north of the castle, and becoming nearly quite horizontal at the S.W. corner of the island.

With regard to this last-mentioned locality, a good deal of the ground below the 50 ft. contour presents some features recalling those of a raised beach. Its elevation is, however, somewhat greater than the modern or Post-glacial raised beach with its deposits of blown-sand, shingle, and shells. The relation of the two, however, is not dissimilar to that of the Pre-glacial and Post-glacial raised beaches of the south of Ireland, so graphically described by Messrs. Wright and Muff⁽⁹⁾, and seeing that these observers have detected traces of this formation as far north as Bray Head, it is here tentatively suggested, with a full appreciation of the slender evidence on which it rests, that at least a portion of the level platform north of Talbot's Bay, and now covered with Boulder-clay, may probably represent this Pre-glacial raised shore.

The modifications in the land sculpture of the island produced by the passage of the ice sheet of the Glacial Period appear to have been slight, and confined almost entirely to the filling up and smoothing over of the hollows and irregularities in the rock floor produced by ages of atmospheric denudation.

The maximum effects were produced on the lower ground to the west of the island, where the drift occurs in some quantity, though the whole of Lambay was almost certainly over-ridden by the main ice-sheet at the period of maximum glaciation, as was also the adjoining higher ground which forms the peninsula of Howth; this is only inferred from the presence of large erratic blocks at high elevations, few other traces now remaining as confirmatory evidence. The geological history, then, of Lambay opens with the deposition of sands and clays in a gradually shallowing sea in Silurian times. Following the formation of a coralline limestone on these rocks came a period of volcanic activity, with

accompanying extrusion of lavas and ashes, and occasional intrusive masses of porphyry. On the new land surface, probably in inland lakes, deposits of Old Red sandstone and conglomerate were ultimately formed, the whole series undergoing a tilting and faulting later on, bringing them into their present relations to one another. In early Carboniferous times the land sank beneath the sea, and bed after bed of shales, limestones and grits was deposited on the older rocks, to be subsequently removed after ages of denudation, and the old land surface again appearing was moulded to its present form by the slow action of Nature's graving tools, and the smoothing action of an ice-sheet.

The Drift Deposits.

The superficial deposits occurring on Lambay are divisible into four groups, only two of which occupy any considerable area:—Boulder-clay, local drift, raised beach, and alluvium.

Boulder-clay.—This is the oldest form of drift on the island, and chiefly occupies the lower ground on the west side of the island, and also the chief valleys previously mentioned (p. 5). Small masses of the same deposit occur plastered against the steep cliff slopes on the east side of the island, these being generally covered with a sandy detritus, derived from the decay of the rocks in the vicinity. Towards the hill slopes the Boulder-clay becomes somewhat modified by the partial incorporation of local detritus, passing gradually into the latter material when close to the rock floor. Good sections of Boulder-clay are few and far between on the island, the best being exposed on top of the Old Red Sandstone at Broad Bay. This section is some six feet thick, and contains scratched pebbles of limestone, and others of sandstone, chert, flint, and andesites, with some odd shell fragments of *Tellina* (?) and *Astarte sulcata* (?). Smaller sections of typical tough limestone boulder-clay may be seen in the cliff face north of Seal Hole, and again to the south and east of Bell Rock. In general the boulder-clay areas are characterised by smooth and gently sloping grass-grown ground, rather sharply differentiated from the bracken and heather clad areas with, practically, no depth of soil.

As previously mentioned, Boulder-clay formerly occupied a much larger area than it appears to do now, this being indicated by the presence of glacial erratics of Old Red Sandstone at elevations well above the 250 ft. contour. The presence of a good deal of limestone in the drift is indicated also by the deposit of calcium carbonate formed on the shore at Freshwater Bay by the small streamlet draining the principal valley north of the central rock ridge of the island.

Local drift occurs in some of the minor hollows between rock slopes and in other places favourable for the accumulation of the detritus derived from the gradual decay of the local rocks. These areas are shown on the accompanying map the same colour as the boulder-clay deposits, but cross-hatched with broken lines running N.W. and S.E. Though an occasional round pebble may be found in this deposit, as a rule it consists exclusively of local material, the fragments being in an angular condition. The largest area of local detritus occurs to the S.W. of Trinity Well, and is composed of material washed down through the rock-gorge near this point, and deposited as a kind of delta at a lower level. A few rounded pebbles derived from the boulder-clay occur in this deposit, which mainly consists of andesitic debris. Besides the areas of local detritus shown on the map, a very thin skin of identical material occurs over much of the ground shown as bare rock; in a few places this is sufficiently thick to support a scanty herbage, but was considered too thin to be mapped with the local drift deposits, which are, relatively speaking, considerably thicker, and may be regarded as of economic value.

Raised beach.—Indicative of a comparatively recent upward movement of the land, is the raised beach deposit fringing in a narrow strip the western side of the island a little north and south of the harbour. At the latter place it attains its maximum development, and consists of the usual blown sand, beach shingle, and shells, and traces of midden deposits. Towards the south it merges gradually into a pebbly storm beach which generally shows a terraced cross section. Amongst interesting erratics found in this deposit are the Ailsa Craig granophyre, and a granite like that from the Mourne mountains, Co. Down. A fair number of flints also



R. Welch, Photo.
Kiln Point, looking N.E. to Lambay Head. Ordovician Limestones with colonies of *Kittiwakes*
and Shags in foreground.

occur, but the largest number of these were obtained by the writer many years ago from the material excavated by rabbits burrowing in some low mounds in the field east of Carnoon Bay, and recorded in the *Irish Naturalist* (¹). Most of the specimens were coarse rough chips, but several cores were found, also one chip showing secondary working.

Alluvium.—This deposit is of only very limited extent, being confined to a small area just above Seal Hole, and again in a hollow or two along the course of the streamlet flowing into Freshwater Bay. The material is a dark moory or peaty clay formed by the decay of vegetable matter mixed with a little clay in some hollows, kept continuously moist by drainage water from springs and the surrounding high ground.

Solid Geology.

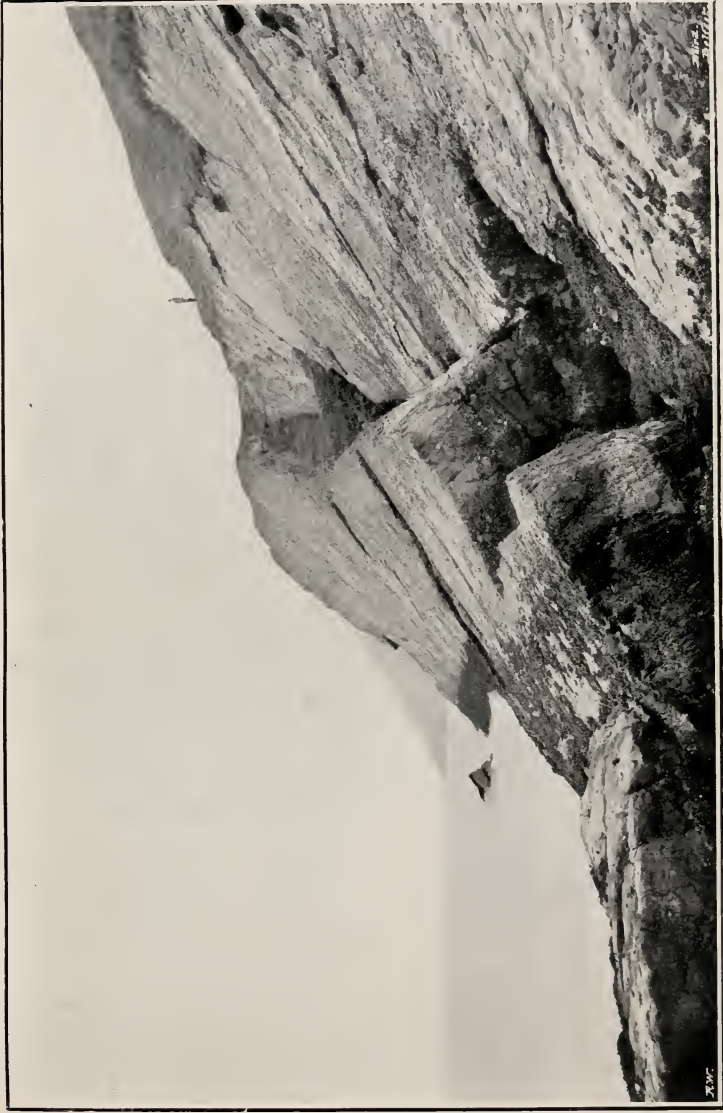
The various rocks which go to build up the island are divisible into two main groups—those of sedimentary origin and those formed by igneous activity. The former comprise shales and limestones of Silurian origin, also a peculiar limestone conglomerate between Kiln Point and Seal Hole. In addition, a small area on the south side of Broad Bay consists of coarse conglomerates and red shales referable to the Old Red Sandstone period. The igneous rocks, which make up by far the larger portion of the island, not less in fact than 19/20 of the whole, are andesitic in type. The rock most prominently developed is a fine non-porphyrific andesite, while andesitic ashes, porphyritic andesite, and an augite andesite occur in subordinate amount, and in small outcrops scattered over the island.

Silurian sedimentary rocks.—The main mass of shales occurs on the east side of the island, and forms the high ground between the summit of Heath Hill down to the shore line. These rocks are bounded by a fault on the north which may be observed in the cliff above Seal Hole. The rocks are olive-brown fissile shales much jointed, the joints being usually coated with a bronzy ferro-manganese deposit. Their relations with the limestone at Kiln Point (Plate 4) is not very clear, but the latter appears to be banked against them after the manner of a coral reef. This limestone shows signs of alteration by the andesite, the change being noticeable both in the hand specimen and under the microscope. The corals found

in this rock are chiefly species of Favosites, and also *Halysites catenularia*, the latter being very common in the corresponding limestone at Portrane. Covering the limestone at Kiln Point, and banked up against the cliff-face all the way round from here to Seal Hole, is a coarse conglomerate, consisting of large and small blocks of limestone, andesite, shale, &c. Many of the limestone blocks are very fossiliferous, and yielded to Messrs. Gardiner and Reynolds, Favosites, *Halysites catenularia*, *Heliolites megastoma*, and *Rafinesquina expansa*. The matrix of this rock is distinctly ashy, and the writer agrees with the above-mentioned authors that this conglomerate is not comparable with the crush-conglomerate of Portrane, but represents an ashy conglomerate of sedimentary origin.

Silurian shales of a brown colour occur at Saltpan Bay, and at the extreme east of the outcrop, on the top of the cliff, are much fractured, forming a land-slide. In the castle grounds the same rocks outcrop, also at Talbot's Bay, Carnoon Bay, and north of the Old Red Sandstone at Broad Bay. At Talbot's Bay the beds are very much contorted, and contain purplish bands, the rocks at Carnoon Bay resembling them, and both forming probably a slightly different horizon in the Silurians to that of the Saltpan Bay slates, though there is no evidence as to their relative horizons if they really are different. *Orthis biforata* has been obtained in some baked slates at Talbot's Bay, the later intrusion of the andesite having effected this change in the sediments here and at some other points on the island.

Some massive beds of Old Red Sandstone occur at Broad Bay, forming a striking feature at this point, as well illustrated in Plate 5. By some curious oversight no mention of this rock appears in the otherwise very detailed account of the sedimentary rocks of Lambay by Messrs. Gardiner and Reynolds. Three or four massive beds of coarse conglomerate passing into red shale locally, on which the remains of glacial striations are clearly visible, occur on the south side of the bay. The beds are steeply tilted, with a slight twist, so that the dip increases gradually from west to east. The total thickness of the beds is not above 50 feet, and it is noteworthy that they contain no pebbles of the local igneous rocks, though they are clearly later in date. The explanation may possibly be that they have been faulted down to their present position



Broad Bay, looking east. Massive beds of Old Red Sandstone in foreground.

R. Welch, Photo.

To face p. 10.

from their original level, which must have been out of reach of material derived from the local rocks. Of course an obvious explanation would be that the igneous rocks are later than the Old Red Sandstone in age and that the latter have been uptilted by the intrusion of the former. However the weight of evidence is undoubtedly in favour of the pre Old-Red-Sandstone age of the igneous rocks.

The Igneous Rocks and Ashes.—The greater portion of Lambay is made up of an andesitic rock possessing the usual characteristics of that type. Phenocrysts of plagioclase felspar are noticeable in thin sections, but are inconspicuous in the hand specimen. Usually the rock is altered somewhat in regard to many of its original constituents, and a good deal of secondary chlorite and calcite is developed, and also some epidote. The ferro-magnesian mineral is usually augite, which sometimes becomes dominant, and the rock then passes over into the augite-andesite group, the distribution of which rock on the island will be referred to later on. A rhombic pyroxene (hypersthene) is developed in the andesite next the limestone at Kiln Point. Though generally compact in type, examples of amygdaloidal andesite occur (N.E. of Bishop's Bay), and "xenolithic andesites" occur locally. These latter rocks are andesites containing more or less angular fragments, probably blown on to the surface of the lavas from a neighbouring volcanic vent, and gradually incorporated in the slowly moving Java flow.

An andesite, in which the dominating phenocrysts are augite crystals, occurs in several isolated localities on the island. A prominent outcrop is that on Lambay Head (Plate 2), where it forms the backbone of that portion of the island. Some of the augites are of considerable size, and are fairly fresh, though the feldspars are almost entirely altered to secondary products. Augite andesites also occur near Raven's Rock, Knockbane, and some 400 yards west of Flint Rock, and in a few minute outcrops elsewhere. In microscopic section this type of rock shows an altered ground-mass of felted felspar microlites (referable to andesine and labradorite), augite granules, and magnetite, with secondary hematite and chlorite as decomposition products. The phenocrysts are chiefly fairly fresh augites, showing characteristic cleavages and

occasional twinning, but a few apparently much altered felspars also are just noticeable.

The well-known Lambay porphyry, which is a porphyritic type of andesite, occurs in several usually rather restricted outcrops in various parts of the island. The outcrops are usually fairly conspicuous by reason of the relatively superior weathering qualities of this rock, which result in well-marked hillocks and rock scarps. When fresh, the ground-mass is of a dark green colour, in which the light-coloured felspar shows up prominently. On the hill-slope east of the castle, the ground-mass is purple in colour, owing to iron staining, and the rock is very much jointed. It is rather unfortunate that this makes the rock unsatisfactory for use as an ornamental stone, and only in one locality, just on the west of Sunk Island Bay (Plate 6), does it appear possible to procure specimens of this rock of a reasonable size and without flaws. The outcrops of this rock are indicated on the accompanying map by a special sign, as shown in the index.

It occurs chiefly as dykes or sills in the andesite, and probably as an extruded mass at Flint Rock and Pilot's Hill, where it appears to rest on a brecciated surface of an underlying andesite. Occasionally the porphyry is amygdaloidal, and sometimes also contains fragments of pre-existing andesites.

In section, the ground-mass of the rock is a much-altered granular crystalline aggregate of felspar and augite, with secondary minerals, amongst which epidote, iron ore, pyrites, sphene, and calcite are conspicuous. The porphyritic felspars which characterise the rock are fairly basic, and possess extinction angles which make them fall among the labradorite felspar group.

The remaining rocks are not very extensively developed, and belong to the fragmental series known as volcanic ashes. These consist of angular and sub-angular fragments of andesites, and occasionally shales, of all sizes, from about one foot to the finest dust. It is nearly impossible to decide in many cases whether the fine-grained matrix of these rocks is really of fragmental origin, or whether it represents an altered compact igneous rock. The microscope gives practically no information, and fails to distinguish between an altered



Sunk Island Bay, looking east. Cliffs and stacks of Andesite.

R. Welch, Photo.

To face p. 12.

xenolithic lava and an altered ash. The areas which appear to the writer to consist of volcanic ash are indicated by a special sign on the accompanying map, and include one or two areas apparently regarded by Messrs. Gardiner and Reynolds as consisting of xenolithic andesites.

Some small veins of red jasper occur in the rocks forming the high ground south by west of Harp Ear; similar veins are found also a few hundred yards south of Heath Hill. I have received from Mr. Baring a piece of red jasper which he obtained in the rocks at the foot of the cliff south of the Seal Hole. This material would therefore appear to be distributed over several parts of the island.

A statement appears in a foot-note to the Geological Survey Memoir to the effect that lumps of *hematite* were noticed on a small knoll 200 yards S. W. of Ravens Well, and further that "Professor Sullivan suspects that a copper lode may here be present," *i.e.*, at the mouth of Thorn Chase valley. No traces of the first named mineral were discovered, but minute crystals of iron pyrites were got in the rock at Scotch Point, and some of the green staining of the limestone at Kiln Point at its junction with the andesite may be due to the presence of copper pyrites.

REFERENCES IN TEXT.

- (1.) DU NOYER (G. V.): Explanations to accompany sheets 102 and 112 of the Maps of the Geological Survey of Ireland (1861), pp. 46-50.
- (2.) HULL (EDWARD): On the Microscopic Structure of the Lambay Porphyry. *Journ. Roy. Geol. Soc. Ireland* (1874) vol. xiv., p. 44.
- (3.) LASAULX (ARNOLD VON): *Tscherm. Min. u. Petrogr. Mitth.*, Bd. i, (1878), p. 419.
- (4.) TEALL (J. J. H.): *British Petrography* (1888), p. 248.
- (5.) COLE (G. A. J.): [Passing reference to Lambay]. *Irish Naturalist*, vol. i., p. 35 (1892).
- (6.) HARKER (ALFRED): *Petrology for Students* (1895), p. 106.
- (7.) SEYMOUR (H. J.): Excursion of Dublin Nat. Field Club to Lambay. *Irish Naturalist* (1896), vol. v., p. 186. [References to finds of flint cores and flakes].
- (8.) GARDINER (C. I.) and S. H. REYNOLDS: The Bala Beds and Associated Igneous Rocks of Lambay Island, Co, Dublin. *Q. J. Geol. Soc.* (1898), pp. 135-148.
- (9.) WRIGHT (W. B.) and H. B. MUFF: On a Pre-glacial Raised Beach on the south coast of Ireland. *Proc. Roy. Dub. Soc.*, vol. x. (n. s.), Part 2 (1904).

NOTES ON THE GLACIAL GEOLOGY.

BY J. DE W. HINCH.

THE Glacial deposits of Lambay are most irregularly distributed, the Boulder-clay often varying from over four feet to a few inches in depth within a distance of a hundred yards, an irregularity which, no doubt, results from the clay filling the hollows in the Pre-glacial land surface—a surface which is being steadily revealed by the cutting back of the north-western shore-line. It is only on this north-western slope that any continuous depth of Boulder-clay is to be found, the most satisfactory section being that produced by the land-slip on the face of the cliff over Saltpan Bay. Along this scarp, roughly the shore-line between Calico Hole and Broad Bay, occur a number of sections of Boulder-clay of the tough brown type so familiar on the lower slopes of the Dublin hills, and like that type crowded with travelled stones and shell fragments, and overlying smoothed rock-surfaces. Occasionally this brown type is replaced by a rather darker sort in which the pebbles appear to be mostly limestone. The following rocks collected in these north-western sections have been kindly identified by Professor G. A. J. Cole:—Very common—Carboniferous limestone. Common—Old Red sandstone, quartzite, chalk, flint, shale, Lambay porphyry, chert. Scarce—Ailsa Craig riebeckite-rock, hornblende granite strongly resembling Tyrone type, biotite gneiss, decomposed ferruginous micaceous rock (probably lamprophyre), fine-grained micaceous sandstone, compact igneous rock of felstone type.

The shell fragments though not rare are fragmentary, and in poor condition, so much so that at first it looked as if none were recognizable. Further search resulted in the following list:—

Mytilus, *sp.**Cardium edule*.*Cyprina islandica*.*Astarte compressa*.*A. sulcata*.*Tellina balthica*.*Littorina*, *sp.**Turritella terebra*.*Pleurotoma turricula*.*Balanus*, *sp.*

All these are found in the drift of the adjoining mainland.

From the northern line of sections the Boulder-clay extends across the lower western slopes of the island, and a section occurs in an old quarry near the castle. This section is over two feet in thickness, and, though it thins out rapidly, the Boulder-clay is exactly similar in character to the deposit on the northern shore, containing travelled stones and yielding three very small shell fragments.

On the southern shore the low coast-line and the intrusion of pasture have obscured the distribution, but while no shell fragments were found, travelled stones showed that the Boulder-clay was practically continuous from north to south.

The hilly district of the centre and east of the island yielded no satisfactory section of Boulder-clay, and while Mr. Praeger pointed out that the walls of some of the ruined cottages were formed of material which looked very like Boulder-clay, and contained shell fragments, this clay might have been brought up from the lower ground for the purpose. On the eastern cliffs occurs a rubbly deposit which in its original condition may have been Boulder-clay¹, but at present has been so cut up by the burrowing Puffins that it is impossible to come to any definite conclusion about it. Shell fragments much bleached may be obtained apparently *in situ*, but as these eastern cliffs are littered with the débris of bird food, the shell fragments cannot safely be used as an indication of drift. Small pebbles are also to be found, to which the same drawback applies. East of Gillap occurs a small patch of Boulder-clay pasted on the surface of the cliff, and containing fragments of flint and sandstone, and patches of a similar nature occur two or three times between Gillap and Saltpan Bay. I failed to discover glacial striæ in the higher portion of the island, and while it is very probable, especially when we remember the condition of the Isle of Man at this period, that the ice over-rode the whole island, the evidence also points to this period of smothering being, for the higher ground, of shorter duration² than for the lower western portion.

¹ It will be seen (p. 7) that Mr. H. J. Seymour considers this deposit to be local detritus, not derived from Boulder-clay.—EDS.

² Mr. Seymour informs us that he cannot agree with this opinion.—EDS.

A sample of Boulder-clay from the north-western section was submitted to Mr. Joseph Wright, F.G.S., who kindly examined it for Foraminifera, and reports as follows:—

FORAMINIFERA FROM BOULDER CLAY, LAMBAY.

Weight of clay, 28 oz., troy; after washing,—fine, 8·5 oz., coarse, 4·6 oz.; a few shell fragments. Foraminifera plentiful, small in size.

LIST OF SPECIES.

(c = common. f = frequent. r = rare. v = very. 1 = one.)

Miliolina seminulum (Linné), f.	Cristellaria crepidula (F. & M.), 1.
M. subrotunda (Montag.), r.	Uvigerina angulosa, Will., r.
Textularia conica, d'Orb., 1.	Globigerina bulloides, d'Orb., v.c.
T. globulosa, Ehr., r.	G. cretacea, d'Orb., v.r.
Virgulina schreibersiana, Cz., 1.	Orbulina universa, d'Orb., c.
Bulimina pupoides, d'Orb., 1.	Patellina corrugata, Will., 1.
B. marginata, d'Orb., 1.	Discorbina globularis (d'Orb), v.r.
B. fusiformis, Will., r.	D. nitida (Will.), v.r.
B. elegantissima, d'Orb., r.	D. obtusa (d'Orb.), f.
Bolivina punctata, d'Orb., r.	D. sp., 1.
B. dilatata, Rss., 1.	Pulvinulina karsteni (Rss.), r.
B. plicata, d'Orb., c.	P. nitidula, Chaster, 1.
Cassidulina crassa, d'Orb., v.c.	Rotalia beccarii (Linné), v.r.
Lagena lineata (Will.), v. r.	Nonionina depressula (W. & J.), v.c.
L. williamsoni (Alcock), f.	N. asterizans (F. & M.), f.
L. reticulata (Macgill.), 1.	N. turgida (Will.), 1.
L. marginata, W. & B.), r.	Polystomella arctica, P. & J., r.
L. lucida (Will.), r.	P. macella (F. & M.), 1.
L. orbignyana (Seg.), r.	P. striato-punctata (F. & M.), c.
L. fimbriata, Br., 1.	

FIG. 1.



Ornamented gold baud, of late Bronze Age, found on Lambay. Now in the R.I.A. collection.

HISTORICAL NOTES.

BY C. BARING.

To the foregoing description of Lambay it has been thought desirable to add a short account of the island in relation to its human inhabitants, since human occupation has naturally exercised a considerable influence on the flora and fauna. In order to avoid the introduction of matter that would be unsuited to these pages, the briefest summary that is consistent with clearness and truth is all that will be attempted. For an historical notice of the island, reference may be made to D'Alton's "History of the County Dublin," which has been used as the authority for many of the dates and statements that appear below.

That the island was colonised in Neolithic times would appear from the presence of flakes and cores of flint, which are mentioned above by Mr. Seymour and Mr. Hinch. The presence of man in the later Bronze Age is suggested by the finding on the island of a gold band, chastely ornamented (fig. 1, p. 16), which is referred to that period. The cairn which crowns Knockbane, too, is clearly artificial, and no doubt prehistoric, though no evidence is forthcoming as to its age.

When we come to historical times we find Lambay identified by writers on church history with the *Rechra* or *Rechru* of early chronicles and the *Rechen* or *Rochen* of mediæval documents, names that still survive, it is thought, in Portrane, formerly *Port-Rechran*, the nearest point of the mainland to Lambay. This identification, hardly satisfying in the case of *Rechen*, is complicated in the case of *Rechra* by the fact that at least one other island, namely Rathlin, off the Antrim coast, is known to have borne that name; from which it seems to follow that what is recorded of *Rechra* cannot be referred with certainty either to Rathlin or to Lambay. Leaving on one side the interesting question thus raised, which concerns the philologist and the historian, we may apply ourselves to the consideration of Lambay under the name which it now bears. This name it is thought to have acquired about the tenth century from the Danes; but it is not impossible that there may have been an older name (perhaps discernible in the *Limnus* of Ptolemy and Pliny) on

to which was added a Scandinavian suffix. However this may be, it is as Lambay that the island at the end of the twelfth century became the property of the Archbishops of Dublin, in whose hands it was to remain for the next 350 years. Except for the authorization of the building of a chantry in 1337 and of a fortress in 1467, no knowledge of what happened on the island during that long period has come down to us. The chantry, if built, must have been since built over or otherwise suppressed; the fortress, which the Earl of Worcester was commissioned to build, may be the stone edifice now standing; but in neither case does the title to the island seem to have been disturbed, for it passed in 1551 (all except the hawks and falcons, which were specially exempt) from the See of Dublin to John Chaloner, an Englishman who held several official positions, and in particular that of Secretary of State in Ireland under Queen Elizabeth. Chaloner was interested in several Irish mines; on Lambay he worked four, and hoped from the copper and silver produced to enrich not only himself but the English Crown—an expectation that was not fulfilled. Of interest in his correspondence are the references to the Lambay marbles and to the falcons, bred on the Lambay cliffs, which in 1579 and 1580 he sent as a present to Sir F. Walsingham in London. In all likelihood the fortified enclosure which can still be traced in a field south of the castle, was made by Chaloner as a protection for the "colony" which there is reason to believe he introduced. Both before and after his time Lambay must have been, from a seafaring point of view, a well-known place; pirates and privateers were constantly using its convenient roadsteads, and from time to time it was the station or rendezvous of a fleet. The statement in D'Alton's history that there was at the end of the fifteenth century a dry passage between Lambay and Skerries, is based on a misunderstanding. There is no reason for believing in the recent existence of such a land connection. After Chaloner's death Lambay passed successively into the possession of the Ussher family (1610-1805), Sir William Wolseley (1805-1841), the family of Lord Talbot de Malahide (1841-1888), and Count James Considine (1888-1904). The introduction of deer dates from the last-named ownership. In Sir William Ussher's time (1610) there was a village near the castle, and the island is described as partly ploughed and partly pasture. About 1650



G. E. Low, Photo.

Lambay Castle, from the south-east.

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the population in recorded as nine Irish. In 1749 the buildings are enumerated as five castles and fifty cottages, and two-thirds of the area was grass land or tilled. In the first half of the nineteenth century the population was 100 to 120, and farming operations were carried on with success until the island was sold by Lord Talbot, about which time the old resident families seem to have died out or emigrated. The pier and coastguard station were built between 1822 and 1829; the chapel in 1833.

MAMMALS.

BY C. BARING.

THE list of Lambay mammals is not a long one. Including the two ungulates recently and purposely introduced (marked * below), it consists of the following nine species, representatives of five orders:—

WHISKERED BAT (*Vespertilio mystacinus*).

GREY SEAL (*Halichærus grypus*).

BROWN RAT (*Mus decumanus*).

LONG-TAILED FIELD MOUSE (*Mus sylvaticus*).

HOUSE MOUSE (*Mus musculus*).

RABBIT (*Lepus cuniculus*).

*FALLOW DEER (*Cervus dama*).

*MOUFFLON (*Ovis musimon*).

PORPOISE (*Phocæna communis*).

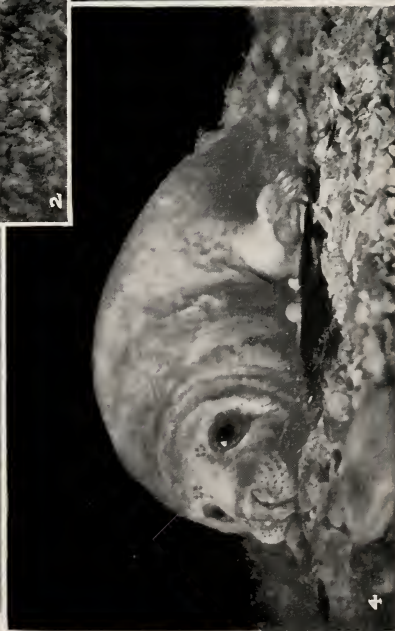
BATS.

BATS are not numerous. A few find breeding places round the castle. One caught in the autumn of 1905 was identified as the Whiskered Bat. Neither the Common nor the Long-eared Bat has been observed, nor have bats been noticed in the caves.

THE GREY SEAL.

LAMBAY has for long been known as a place of resort for seals; but the species, and the fact that it breeds on the island, do not appear to have been put on record. No doubt the deeply

notched coast-line, some part of which always affords shelter from wind and sea, and the caves, which in more than one place form lofty chambers, 150 feet in length, inaccessible from above, with pebbly floors that extend above high water, are considerations that recommend Lambay to these beautiful and interesting creatures. The species, as might be expected from the surroundings, is not the Common Seal (*Phoca vitulina*), but the Grey Seal (*Halichærus grypus*), the larger animal of the two, which is known to breed in small companies off the Shetlands, Hebrides, and southern and western coasts of Ireland, and which appears from time to time on different parts of the British and Irish shores. At any point off the Lambay coast it is a common sight to see two or three of these seals swimming in the water, but naturally they are oftenest seen near the caves, inside which the young for the first few months of their lives spend most of their time. Sometimes in bad weather a young one will be found left high up on the wrack-covered rocks, while the mother waits in the water within call (Plate 8, fig. 1-3). There are certain rocks to which the old seals resort regularly on a falling tide, and on which they lie, often making their presence known by the prolonged cries, like the howling of a wolf, with which they give vent to their feelings; at the same time they draw their toes up and spread the pink webs fan-wise. The tail, which in one individual (probably a female) was conspicuous, and about one-third of the length of the hind limbs, is also capable of active movement. A big old seal is a very heavy, powerful animal, fully seven feet long, as judged by the eye, bulky in proportion, and able to swim without embarrassment in the heavy swells which break violently against the rocky coast. When undisturbed, they play in the water, or lie stretched out on the rocks, now and then apparently stooping to drink; when their attention is attracted they do not swim away, but tread water, in which erect position the large inquiring eye, long muzzle, and thick folds of skin under the chin invest them with an air of calm and benignant solemnity, different from that which most wild animals exhibit in the presence of man. On the 25th of June, 1905, a boat containing some of the writers of the foregoing and succeeding pages was accompanied by a seal, which alternately dived and came up near the boat, from Sunk Island to the Burren Rocks, a distance of about a mile and a quarter.



Young Grey Seals.

1, 2, 3—Young Seal, 30 inches long, Oct., 1906.

4, 5—Young Seal, 42 inches long, Nov., 1906.

C. Baring, Photo.

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Ocular evidence of their breeding at Lambay was lacking until the 16th of October, 1906, when four young seals were found, three within a gravelly cave, and one on the rocks outside. All four were cream-coloured, the smallest about 2 feet 6 inches, the biggest about 3 feet 6 inches long. They allowed themselves (under protest) to be handled; one (the oldest) after some time slowly made his way from the cave to the sea, in which he was able to swim clumsily; the others were either unable or disinclined to leave the shore; the youngest, which may have been three or four weeks old, and could not climb over the rocks, cried lustily for his mother. During the three hours or more that were spent in examining these young seals and taking photographs (Plate 8, fig. 1, 2, 3) of the smallest—which in a better light might have been more successful—four old seals were constantly patrolling and keeping watch from the sea close by. This young seal, as will be clearly seen from the illustration, still wore its baby dress of long, thick hair, which falls off at the end of a few months, at the time when the young animals take to the water. A month later several single young seals still cream coloured but with faint spots on the back, were seen on another part of the coast. One of these (Plate 8, fig. 4, 5) after having been teased for some time for his photograph clambered over the rough rocks for fifty feet and swam into deep water. His mother was waiting for him, and their meeting was affecting to witness; after an interchange of caresses they started in procession for another bay, the mother steering her offspring by pushing him with her nose from behind. When quite young these seals are, as has been said, of a golden cream colour, which colour becomes less golden, and the coat less silky-looking, with faint mottlings, at the age of about two months. At about four months the young still give the impression of being roughly about half the size of old seals; the colour is distinctly differentiated into a light slate-grey above, and a light yellow below. At this age they can swim rapidly and well, and will not stay in the caves to be looked at. In the photograph of one taken on the 12th of November, 1906 (Plate 8, fig. 4, 5) there is to be seen above the eye a well-marked rosette formed by five black spots arranged in a ring, with hair issuing from each spot. This eyebrow-rosette, with its long hairs, and another black spot near the ear can be seen clearly on the heads of those old seals,

judged by their appearance and demeanour to be males, which otherwise, except for some dark, dorsal blotches on the posterior part of the body, are of an uniform dingy yellow colour. Seals, judged by their slighter build and more graceful movements to be females, are a good deal darker above than below. A third type (unless it is an accidental variation) seems to be represented by a full-grown seal, from its actions evidently mature and independent; dark slate-coloured above, including the head, on which no markings show; irregularly splashed and spotted with white below, the white predominating on the throat, sides of head, and chest and extending to the extremity of the fore limbs.

The foregoing abstract of locally made observations has been written without opportunity of consulting the published literature on the subject. It is possible that many of the facts are already and more completely known.

RATS AND MICE.

LAMBAY has not escaped visitation from the Brown Rat. That they are not very numerous nor apparently increasing may be due, Mr Patterson thinks, to the watchful and ever-hungry Herring Gulls—in whose pellets and on rock stacks he found many remains of young rats. On the other hand the many young gulls found dead and partly eaten point to retributive action on the part of the rats. A Long-Tailed Field Mouse (*vide* R. Patterson) was caught on the furthest point of Lambay Head, 3rd December, 1905. The House Mouse flourishes in the dwellings and out-houses.

RABBITS.

RABBITS abound on Lambay. When they were brought over is unknown; but they were being caught for sale in 1749, and have probably been so treated without much intermission since that date. Notwithstanding which, the absence of four-footed foes, a mild climate, plenty of food and good covert, have conspired to increase their numbers faster than the agriculturist would wish. Latterly an attempt has been made to keep them within reasonable limits. An idea of their numbers can be gained from the fact that between September, 1904, and the end of December, 1906, about 24,000 were killed. Black Rabbits are not rare,



Fallow Deer above the Seal Hole.

G. E. Loan, Photo.

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INTRODUCED SPECIES.

ONE Fallow buck and two does were introduced from Portrane by Count Considine about the year 1889. They also found a congenial home, for although the known deaths number between fifty and sixty, there is now on the island a herd of between seventy-five and one hundred head, which shows no symptoms of weakness or want of fertility. They grow remarkably thick coats in winter. It is noteworthy that a considerable proportion of the deer are black and without spots. According to eye-witnesses, the three originally introduced were all of the red, spotted variety. In the same category as the deer may be placed one male and one female Moufflon. These were placed on the island in 1906, and the surroundings seem to agree with them well.

CETACEA

PORPOISES have no special connection with Lambay, but are occasionally seen from the shore, and on that account have been included in the list.

BIRDS.

BY ROBERT PATTERSON, F.Z.S., M.R.I.A.

THE great attraction to the ornithologist undoubtedly lies in the sea-birds of the island.¹ Owing to the comparative absence of trees, the scarcity of hedges and marshes, and absence of running water, the land-birds, as a whole are poorly represented, if not in number of species, certainly in number of individuals. Leaving the Rooks, Starlings, and Jackdaws, which are numerous about the castle, out of the question, any one walking across the high centre of the island from the harbour to Lambay Head on a day in midsummer, would be able to make but a poor list of the number of land-birds seen, if Lapwing, Meadow Pipit, and Wheatear were eliminated. The common birds of the mainland, such as Song Thrush, Tits, Chiff-chaff, Sedge Warbler, Reed

¹ See HART (H. C.): *The Birds of Lambay Island, Co. Dublin. Zool.*, 1883, pp. 155-164, 225-226; and PALMER (J. E.): *Some of the Birds of Lambay Island, I.N.*, 1892, pp. 114-119.

Bunting, Wagtails, Yellow Bunting, Greenfinch, Magpie, Lark, &c., would either be absent altogether, or else only a pair or two would be seen. Again, the almost total absence of sandy bays and shingle deprives the Lambay list of all the small wading birds, which frequent such localities, the Ringed Plover only having been seen in winter occasionally, and a flock of Turnstones once, in December.

At the same time the position of the island, lying as it seems to do in the track of migrating small birds, brings a variety and charm of its own. For example, on April 14th, 1906, Nevin Foster and I noted *one* Willow Wren hopping silently among low gorse—the only one we saw that day. But on going out early the following morning we found innumerable Willow Wrens evidently just arrived; hundreds of them swarmed in the lane, in the plantation, in the garden, and along the old hedge that runs south from the garden wall; every sheltered, sunny corner was full of Willow Wrens, all quite silent and feeding eagerly and hungrily. By the afternoon of this day (15th) they had spread all over the island, as we found them near Lambay Head. The next day (16th) they had almost all gone on, and the few that were left were singing lustily, and had evidently satisfied their hunger. In October large irruptions of Blackbirds can be observed, while snow storms such as were experienced the last week of December, 1906, have the effect of sending large quantities of Starlings, Blackbirds, Rooks, Robins, Wrens, Larks, Thrushes, &c., and many Snipe, Teal, Lapwings, and Redwings over from the mainland to the milder climate of Lambay.

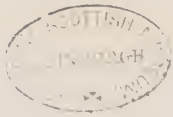
What the island may lack in the number of land-birds is amply compensated for by the quantity and variety of the sea-birds, which in summer crowd the ledges of the cliffs on all sides except the western. It is a wonderful experience to be rowed slowly round the island on a calm day in June, when one is almost deafened by the cries of the birds disturbed in their parental duties, and sea and sky are thick with white gulls, black cormorants, and black and white auks, flying hither and thither in seeming confusion and alarm. Or when walking along the cliffs in early summer one is surrounded by a halo of Herring Gulls, croaking and laughing overhead, while Puffins dart out of unnoticed burrows at one's feet, and clouds of silvery and dove-like Kittiwakes dash from little rocky creeks, repeating



Kittiwakes and nests.

G. E. Low, Photo.

To face p. 24.



their own name over and over again. All these birds get wonderfully tame and confiding on Lambay, because they are not shot at or unnecessarily disturbed, the object of the owner being to provide a sanctuary for his feathered guests. All day long the chorus of gulls never ceases, the soprano of the Kittiwakes blending with the baritone of the Herring Gulls and the bass of the Black-backs. And when night comes on the Shearwaters join in, their mysterious and unbird-like calls, heard all round one at once, rising and falling according to the distance of the unseen producers of the weird sounds, giving the impression that angry and vindictive spirits are about. The first night I spent on the island was made memorable by the hootings of numerous Shearwaters and the trilling of the Nightjars near Lambay Head—an unusual combination of little known and remarkable bird calls.

The curious pellets of indigestible portions of the Herring Gulls' food are found all over the island. They are composed of grain, fish-bones, rat-bones, rabbits' fur, mussels, and crab shells and claws. On the rocky islets round the coast bones of deer and of rabbits may be found, brought there by the gulls and picked clean. Thus on Carrickdorrish we found ribs and leg bones and caudal vertebræ of deer, and bones of rabbits and rats, while on Sunk Island, in addition to the foregoing, the wing of a Corncrake was found, and remains of numerous crabs and mussels.

The wealth of bird-life in summer is in marked contrast to the dearth in winter. Even by September the diminution is remarkable, and although many species may be seen in winter (on Christmas Day last Mr. Baring noted twenty-six species) the number of individuals is very small in comparison. But for five months of the year Lambay is an ornithological paradise for the study of sea-birds, which will undoubtedly increase under fostering care. As it is, there is a distinct increase in the numbers of Kittiwakes on the island.

The following list contains every species known to have frequented the island in the last century, and then follow some condensed notes on the more characteristic birds.

My thanks are due to Mr. Baring for sending me frequent bird notes, and for answering queries. Also to Nevin H. Foster, M.B.O.U., for much assistance on the island.

A LIST OF THE BIRDS OF LAMBAY UP TO THE END OF 1906:—

*—Breeding. H.—Formerly bred, but has ceased to do so.

?—Suspected to have bred, but actual proof wanting.

I.—Introduced in 1906.

*Mistle Thrush.	*Yellow Bunting.	I. Turtle-Dove.
*Song Thrush.	*Starling.	I. Red Grouse.
Redwing.	H. [Chough.]	I. Pheasant.
Fieldfare.	H. [Magpie.]	I. Partridge.
*Blackbird.	*Jackdaw.	I. Quail.
*Ring Ouzel.	H. [Raven.]	* Land-Rail.
*Wheatear	Carriion Crow.	? Water-Rail.
*Stonechat.	H. [Hooded Crow.]	Ringed Plover.
*Robin.	*Rook.	Golden Plover.
*Whitethroat.	*Skylark.	*Lapwing.
?Blackcap.	H. Swift.	Turnstone.
*Golden-crested Wren.	? Nightjar.	*Oyster-catcher.
*Willow Wren.	*Cuckoo.	Woodcock.
?Grasshopper Warbler.	Barn Owl.	?Common Snipe.
*Hedge Sparrow.	Long-eared Owl.	Jack Snipe.
*Wren.	Short-eared Owl.	Redshank.
*Pied Wagtail.	H. [Sea Eagle.]	Curlew.
Grey Wagtail.	Sparrow Hawk.	Common Tern.
*Meadow Pipit.	*Peregrine Falcon.	Arctic Tern.
*Rock Pipit.	?Merlin.	Black-headed Gull.
?Spotted Flycatcher.	*Kestrel.	H. Common Gull.
*Swallow.	*Cormorant.	*Herring-Gull.
*House Martin.	*Shag.	*Lesser Black-backed
*Greenfinch.	Gannet.	Gull.
Goldfinch.	Heron.	*Great Black-backed
*House Sparrow.	*Shield-Duck.	Gull.
Tree Sparrow.	*Mallard.	*Kittiwake Gull.
*Chaffinch.	Teal.	*Razorbill.
*Linnet.	Wigeon.	*Guillemot.
Lesser Redpoll.	Common Scoter.	*Black Guillemot.
Twite.	?Ring-Dove.	*Puffin.
Bullfinch.	?Rock-Dove.	*Manx Shearwater.
*Corn Bunting.		

NOTES ON THE RARER AND CHARACTERISTIC BIRDS.

Turdus torquatus (RING OUZEL).—I found a pair evidently breeding in the centre of the island in June, 1905.

Sylvia atricapilla (BLACKCAP).—Two pairs between the castle and Hill Cottage, 24th and 25th June, 1905. Heard by others also.

Passer montanus (TREE SPARROW).—One seen in winter (C. B.).

Pyrhula europæa (BULLFINCH).—One seen early in April, 1906.

[**Pyrrhocorax graculus** (CHOUGH).—“In the summer of 1852, when proceeding round the eastern extremity of Lambay, three birds of this species appeared on the wing, and in all probability had nests in the fissures of the rock.”—Watters, “Birds of Ireland.”]

Pica rustica (MAGPIE).—Nevin Foster and I found an old nest in a thorn, 4 feet from the ground, but the gamekeeper never saw a Magpie on the island

[**Corvus corax** (RAVEN).—“It nested on Lambay Island, Co. Dublin, until 1883.”—Ussher and Warren, “Birds of Ireland.”]

Corvus corone (CARRION CROW).—Reported by gamekeeper, who saw one.

[**Corvus cornix** (HOODED CROW).—“The breeding places of these birds frequenting Dublin Bay are at Bray Head, Howth, and Lambay, the nest being placed in clefts and fissures of the rock.”—Watters, “Birds of Ireland.”]

[**Hallæetus albicilla** (SEA EAGLE).—“Eyries were within the last century at Bray Head and Lambay.”—Watters, “Birds of Ireland.”]

Falco peregrinus (PEREGRINE FALCON).—Breeds regularly in one place. Neither old nor young have been noticed in the autumn. One old bird was seen at the breeding-place, 29th January, 1905. The pair were seen 12th March, 1906. Between 30th March and 12th April four eggs were laid, of which three were hatched 3rd-4th May. On 7th June the young birds had lost all down, and on 17th June were on the wing. The young birds were seen about the island for a month after that. Puffins seem to form their chief food.—(C. B.). I noticed that when disturbed the male flew about quite silently, but the female was crying continually.

Phalacrocorax carbo (CORMORANT).—In June, 1905, I found it fairly common, and breeding, but in April, 1906, there was a marked decrease in the numbers seen.

Phalacrocorax graculus (SHAG).—Much more numerous than the last, breeding in groups of four or five pairs. Many young were seen in June, 1905. The old birds stick to their nests in the most determined and amusing way, even when pelted with clods of earth and small pebbles. First egg seen 11th April, 1906.

Tadorna cornuta (SHELD-DUCK).—Two pairs, with young, seen in June, 1905. Another brood of nine or ten was seen on 4th July, 1905. They breed in rabbit holes a little north of the harbour. One was caught in a rabbit trap

Mareca penelope (WIGEON).—An occasional crippled or dead one has been picked up.

Edemla nigra (COMMON SCOTER).—Seen off the harbour. February, 1906.

Columba palumbus (RING-DOVE).—A pair was seen in a clump of Elder bushes in June, 1905. We found an old nest close beside the Magpie's nest mentioned before, and saw a bird on 17th April, 1906. “They are said to build among ivy on the cliffs” of Lambay—Ussher and Warren, “Birds of Ireland.”—Summer visitor.—(C. B.),

- Columba livia** (ROCK-DOVE).—One seen 24th June, 1905. One seen 14th April, 1906. Several seen 16th April, 1906. "We have only observed a few pairs breeding at Lambay."—Watters, "Birds of Ireland." I have little doubt that careful search will yet reveal nests.
- Rallus aquaticus** (WATER RAIL).—Seen both in summer and winter, and probably breeds.
- Vanellus vulgaris** (LAPWING).—Breeds abundantly in centre of island.
- Streptilas Interpres** (TURNSTONE).—A flock was observed on 31st December, 1905.
- Hœmatopus ostralegus** (OYSTER-CATCHER).—Several pairs breed on the rocks round the island. A nest I found was 8 inches in diameter, lined with small flat stones carried there for the purpose, the whole surrounded by growing Sea-pinks. It contained three eggs.
- Scolopax rusticula** (WOODCOCK).—Autumn and winter visitor, but one was seen in May, 1906. One was caught in a rabbit trap the 15th October, 1905.
- Sterna fluviatilis** (COMMON TERN) }
Sterna macrura (ARCTIC TERN) } Only very occasionally seen.
- Larus ridibundus** (BLACK-HEADED GULL).—Chiefly a winter visitor, but one or two have been seen in June, while young birds visited the small pond by the harbour in June, 1905, and July, 1906.
- Larus canus** (COMMON GULL).—We saw one on the 13th and 14th April, 1906, but, according to Watters, who makes frequent reference to the birds found on Lambay, it once bred there. He says, "Rare in its maritime breeding haunts, a few pairs only nidify at Lambay" (p. 260). And again at p. 267, he includes this species in a list of breeding birds of the island. There are certainly sloping and low cliffs on the S.W. side of the island resembling the ground where Mr. Campbell and I found Common Gulls breeding in Donegal in 1892.
- Larus argentatus** (HERRING GULL).—This is certainly the dominant bird of Lambay, as it is never absent. In winter (comparatively) few are to be seen, but by February 1st they are fairly numerous, and up to April the numbers are increased almost daily, until by the middle of that month immense colonies are breeding on the north, east, and south sides of the island, nests so close together that one has to pick one's steps, being found from a few feet above sea-level to right up among the heather. Disconnected masses of rock—such as Sunk Island—are also utilized. The nests vary greatly in size and make, from simple lumps of dry grass to large and perfectly shaped nests, composed of stalks of marine plants, dry sea-weed, bits of heather, and lined with dry grass, etc. Many are found on the paths through the heathery side of cliffs made by deer and sheep. I noticed that in May the eggs were fresher and clutches more incomplete the higher the elevation of the nest. Apparently the first comers had secured the rocky ledges near the sea and the



A Herring Gull colony, looking S.W. from near Kilm Point.

R. Welch, Photo.

To face p. 28.



R. Welch, Photo.
Young Herring Gull, choked by attempting to swallow
the tail of a Thorn-back Ray.

To face p. 29.

islands as the best places, and late couples had to content themselves higher up the slopes, finally invading the heather. A completed nest, apparently ready for eggs, was found on 14th April, and several nests contained eggs by 28th April. Many eggs taken on 19th May were very much incubated, and in early June the downy young are in all stages of independence. The colour of their down so well matches the grey lichen-covered rocks (as can be well seen by R. Welch's photographs (Plates 14, 15), and they sit so still that they are difficult to find, and they are adepts at hiding. By the end of June the young, now grown big and looking ridiculous in the remnants of their baby-clothes (Plate 15, fig. 3), may be seen on rocks a few yards out in the sea, looking rather unhappy in that situation, while the mothers croak encouragement 30 or 40 yards away. The mortality among the young must be very high, rats probably exacting a heavy toll. Of special interest as the cause of death in a young gull is the tail of a Thornback Ray, which had choked the specimen photographed in Plate 12. This young bird, apparently about eight days old, was found dead in its nest with the ray's tail, which measured six inches in length, stuck in its throat. There can hardly be a doubt that the young bird owed its death to some perverted instinct of its mother who had tried to feed her offspring with such strangely unsuitable provender.

Larus fuscus (LESSER BLACK-BACKED GULL).—A few pairs breed high up in the heather in company with the last species, and two pairs near Lambay Head. Single birds are often seen during the winter. Young were hatched out on 22nd May, 1906.

Larus marinus (GREAT BLACK-BACKED GULL).—Two pairs bred in 1905 and 1906, near Lambay Head. They are very shy and difficult to approach. One was observed on Christmas Day, 1906.

Rissa tridactyla (KITTIWAKE GULL).—The colonies of this bird are another marked feature of Lambay. On the 13th April, 1906, there was not one to be seen or heard, but by the following day (14th) they were very numerous, having come in during the night. We counted at least seven distinct colonies, which were increased on the 15th, and by the 16th the numbers were marvellous. They were very unsettled, dashing to and from the narrow ledges of rock for no apparent reason, all the time uttering their well-known cry. They take a long time to make their nests, and are not breeding till end of May or June, when they are easily approached; and can be studied at close quarters (Plate 10). They breed on the N. and E. sides of the island in dense colonies, and have not been observed in winter. Undoubtedly the most interesting and beautiful sea-bird of the island.

Alca torda (RAZORBILL).—Breeds in some numbers on the same ledges as the Guillemots, but it is not so numerous. They begin to come in to the island by the middle of April, and are common by June, small flocks being met with when sailing to or from Lambay. Not seen in winter.

Urula troile (GUILLEMOT).—The same remarks apply to this species generally, but it is much more numerous, and is occasionally seen in winter.

Uria grylle (BLACK GUILLEMOT).—A few pairs breed. On 16th April, 1906, we saw a flock of about ten coming in to the island, and in June several were seen. In Watters' time he estimated that from 100 to 150 of these birds bred annually on Lambay.

Fratercula arctica (PUFFIN).—This bird forms another of the sights of Lambay, as immense numbers breed in rabbit holes on the north and east sides. On sailing round the island on 25th June, 1905, immediately after rounding Scotch Point, we came into numerous flocks on the water, estimated total between 300 and 400. From this on to Lambay Head large bodies of these birds were seen at intervals, but the greatest sight of all was from Tayleur Bay to the post. Here there were at least 1,000 Puffins *in the sea alone*, while almost as many were sitting beside their burrows on the steep sides of the earthen tops of the cliffs, or skimming with fast-beating wings to and from the water. We wondered where such an immense multitude could obtain food sufficient for themselves and their young. On Lambay they are known to vary their fish diet by an occasional young rabbit. Some of the nests are on high ground, among heather and bracken. In April, 1906, we noticed large numbers coming in to the island.

Puffinus anglorum (MANX SHEARWATER).—Locally well-known by the name of "Mackerel Cock," this bird is more often heard than seen. We heard their weird crowing all round the island on the night of the 13th April, while one was caught in a rabbit trap on the 22nd March. It is impossible to state how many breed in burrows on the east side now; but in 1840, according to Watters about 50 bred there. Its nocturnal habits make observations difficult, but on June 27, 1905, R. Ll. Praeger met with a flock of about 40 on the water five miles south of Lambay at 10 p.m.

[Mr. Baring contributes the following particulars of birds introduced on Lambay.

Anas boscas (MALLARD).—Twenty-nine eggs hatched in May, 1906.

Lagopus scoticus (RED GROUSE).—Four cocks and five hens, October, 1906.

Phasianus colchicus (PHEASANT).—Thirteen eggs hatched, May, 1906; nine hens and two cocks turned out, October, 1906.

Perdix cinerea (PARTRIDGE).—Twenty-eight eggs were hatched in May, 1906, but nearly all the young are known to have been killed by hawks. Five pairs of adults were turned out in December, 1906.

Coturnix communis (QUAIL).—Fifteen adults were turned out in August, 1906.

Turtur communis (TURTLE-DOVE).—A pair of adults turned out, October, 1906.]

REPTILIA AND AMPHIBIA.

OUR only Irish reptile—the Viviparous Lizard, *Zootoca vivipara*—does not occur on Lambay, but Mr. Baring introduced, in August, 1906, several European species, including twelve Land Tortoises (*Testudo iberica*), two Water Tortoises (*Emys*, sp.) from Italy, and one Slow-worm (*Anguis fragilis*). The almost complete want of suitable localities accounts for the absence of the Common Frog and Newt.

FISHES

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

THE fishes which no doubt abound in the sea surrounding Lambay, have not as yet been systematically collected and recorded. Nor has it, I think, been determined by the owner of the island, what area of the sea would naturally fall within his domain. Almost all the species mentioned in the British Association "Guide to the County of Dublin" (1878), as occurring in Dublin Bay are probably found in the neighbourhood of Lambay too. But it never was Mr. Praeger's intention, in conducting this survey, to produce long lists of species which probably occur on Lambay or its shores. His conception, which he carried out with his usual forethought and perseverance, was to publish a full account of the living organisms as actually seen by the naturalists who associated themselves with him in this most praiseworthy object.

Personally I was unfortunately not able to take an active share in the collecting of specimens; almost all the fishes I refer to in the adjoined list were casually taken either by Mr. Buchanan-Wollaston, who sent me a list of his captures, or by Mr. Nichols when gathering other marine objects.

As there is no river, or even brook to speak of, on Lambay, freshwater fishes, with the exception of the Common Eel, are absent.

Lampris luna (OPAH or KING-FISH), almost insisted on being recorded in this list of fishes. According to the account furnished by Mr. Baring of its capture last June, it seemed to struggle violently in shallow water, apparently determined to reach dry land. About 2 p.m. on the 25th June, 1906, one of Mr Baring's men working in the lower garden called out that he saw something strange on the strand south of the harbour. There was bright sunshine at the time and the red colour gave the impression, to those who were running to the spot, of some creature covered with blood. It turned out to be a great red fish of strange shape, stranded by the outgoing tide among the rocks and sand, and lying there gasping and glittering in the sun. Realising that it must be something out of the common and that the fish was already too far gone to be restored to the sea, it was brought carefully ashore in a barrow, and sent to Dublin in a boat which, as it happened, was about to sail for Howth. The specimen is now preserved in the Dublin Museum. It measures 3 feet 7 inches in length and 2 feet in height. The gorgeous colours which characterise this large pelagic fish were still plainly visible when it reached me. It is one of the most beautiful species of the Atlantic Ocean, and it is said to be excellent eating. If reports can be trusted the anterior half tastes like beef and the other half like salmon. A vivid reddish violet tint is the prevailing colour, but it gradually merges into a silvery hue below, while specks of silver appear on its body like bright six-penny pieces. The fins are brilliantly scarlet. With us this fish is exceedingly rare. There have only been seven previous records, three of which were from the north. Once before, namely in 1851, was an Opah taken on the Dublin shore, but since that time, for 55 years, no specimen seems to have visited our coast. An illustration of the Lambay specimen is given in this report (Plate 13).

Gobius minutus (FRECKLED GOBY), was taken in Talbot's Bay (A. R. N.).

Blennius pholis (SHANNY), common in rock-pools (B.-W.).

Centronotus gunnellus (BUTTERFISH), common in rock-pools (B.-W.).

Cottus bubalis (FATHER LASHER), was taken in bay on south-west of Lambay and at Carrickdorrish.

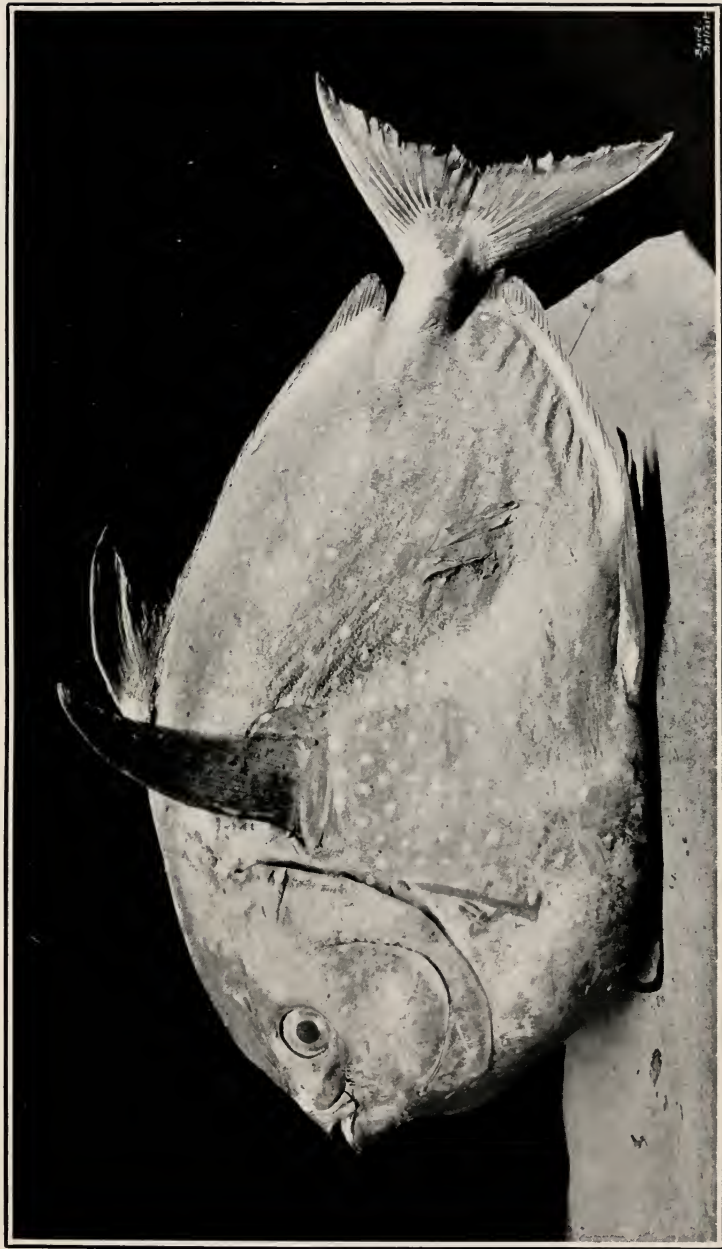
Gasterosteus spinachia (SEA STICKLEBACK), was caught in a hand net in the harbour by W. Rankin (R. L. P.).

Onos mustela (FIVE-BEARDED ROCKLING), was observed in rock-pools near Carrickdorrish (B.-W.) and in Talbot's Bay (A. R. N.).

Pleuronectes limanda (COMMON DAB), a young specimen dredged up in 5 fathoms on gravelly bottom off north shore (B.-W.).

Nerophis lumbriciformis (WORM PIPE-FISH), a small specimen in a rock-pool on south-west shore (B.-W.).

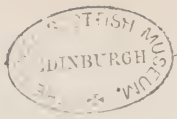
Anguilla anguilla (COMMON EEL), inhabits the small pond above the lower garden at the castle. A specimen has attained the length of 13 inches.



T. Mason, Photo.

Opah, captured on Lambay, June, 1906.

To face p. 32.



TUNICATA.

BY H. J. BUCHANAN-WOLLASTON.

ASCIDIÆ COMPOSITÆ.

Botryllus Schlosseri (Pallas) Sav.—Under tones between tide-marks. Generally distributed.

B. violaceus (H. M.-Edw.)—Under stones between tide-marks. Generally distributed.

Botrylloides rubrum (H. M.-Edw.)—Under stones between tide-marks. Generally distributed.

B. Leachii (Sav.)—In small masses under stones, at low water mark, S.W. shore.

Polyclinum aurantium (M.-Edw.)—Very common near Carrickdorrish, under large overhanging rocks between tide-marks.

What appears to be a sandy variety of this species was taken under a stone on the S.W. shore, associated with *Botryllus*. It is a small flattened lobular mass, with a thin coating of fine sand covering the surface.

Parascidla Flemingi (Ald.)—Under stones between tide-marks near Carrickdorrish.

Leptoclinum gelatinosum (M.-Edw.)—Two or three colonies of what I take to be this species were found under stones between tide-marks on S.W. shore. There were *no spicules in the test*. The common cloacal cavities were crowded in two of the colonies with loose eggs and spermatozoa, in globular masses. A thin skin seemed to be present over the common orifices, preventing extrusion.

MARINE MOLLUSCA.

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

THE character of the coast line of Lambay is not such as to raise any strong hopes of its yielding a rich molluscan fauna. For the greater part of its circumference the island is girt with cliffs rising abruptly from water of considerable depth, so that no large area of rock is laid bare at low water. The tidal rocks accessible to the shore collector are almost altogether confined to the west and south-west, where some fairly good ground occurs to the northward of the harbour and in Carnoon Bay and Talbot's Bay. A much smaller area of rock, a few square yards only, emerges at Carrickdorrish on

the northern side. The extent of sandy beach is quite insignificant. A strip of some 450 yards in length exposed at low water in and southward of the harbour is the only sand accessible in the whole island.

The list which follows is almost entirely the result of four days' shore collecting in Easter of the year 1906, the writer having received valuable assistance in this branch of the work from Messrs. R. L. Praeger, A. R. Nichols, and H. S. B. Wollaston, while a few records were contributed by Mr. J. de W. Hinch. A little dredging was done close inshore in two places, off Salt-pan Bay in about four fathoms from the dandy lugger "Shamrock," and a couple of hundred yards outside the harbour mouth in about two fathoms from the lugger's dingy. These dredgings were purely subsidiary to the work of shore collecting, and as they added but four species of mollusca to these gathered between tide-marks, *Ceratisolen legumen*, *Aporrhais pes-pelecani*, *Tellina donacina*, and *T. squalida*, it is of little importance whether they be regarded as lying within or without the Lambay territory.

The immediate result of our four days' field work, if that term may be applied to floundering amongst rock-pools and seaweeds, was the discovery of 58 conspicuous species. This total, which seemed fully correspondent to the unpromising nature of the shores, was raised to no less than 109 by careful examination of material of various kinds carried away from the island—seaweed siftings from Carrickdorrish and Talbot's Bay, gravelly sand from rock-pockets both at Talbot's Bay and Carnoon Bay, and shell-sand taken from the harbour, a little below high-water mark. A further increment of six species was contributed by Mr. Wollaston as the fruit of his examination of the Nudibranchs collected by him.

The harbour shell-sand proved exceptionally productive. I have examined many scores of samples of shell-sand gathered at various points along the Dublin coast, but none of them approached in richness this material from Lambay harbour. It yielded me 77 species of marine mollusca, of which 23 were nowhere else observed in Lambay. As the final result of our four successive days' collecting and of a second gathering of harbour sand made by me in July last (which yielded two additional species), the marine molluscan fauna of Lambay

was brought up to a total of 117 species. This happens to be precisely equal to the total yielded me by a close examination on many days and at all seasons of the year of the famous Portmarnock strand, the classic ground *par excellence* of Co. Dublin conchology; it is no less than 23 species in excess of the number I have hitherto succeeded in finding on the Rush or mainland shore directly opposite to Lambay. So far, then, from being poor, the marine molluscan fauna of the island deserves to rank as exceptionally rich, judged by the Co. Dublin standard.

The most interesting item in the list which follows is undoubtedly *Runcina Hancocki*, discovered by Mr. Wollaston among seaweeds on the S.W. shore. This is an addition to the marine mollusca of East Ireland, the only other Irish record extant being one for Valentia Harbour, where the species was found by Mr. F. W. Gamble in 1895 (*Proc. R. I. Acad.*, (3), vol. v., 1900). Two others of the Lambay species here listed, *Odostomia turrita* and *Rissoa calathus*, the latter regarded by some authorities as a variety of *R. reticulata*, are new to Co. Dublin, and three others, *Cerithiopsis tubercularis*, *Odostomia rissoides*, and *Mytilus phaseolinus*, were first recorded for the county in the issue of this Journal for July, 1906. In addition to these, several species, rare for Co. Dublin, are here first put on record for Lambay—*i.e.*, *Tectura testudinalis*, *Trochus millegranus*, *Rissoa punctura*, *R. inconspicua*, *R. soluta*, *R. semistriata*, *Jeffreysia diaphana*, *Odostomia pallida*, *O. insculpta*, *Philine punctata*, *P. catena*, *Pecten tigrinus*, and *Tellina donacina*.

No previous attempt appears to have been made to catalogue the Lambay marine mollusca, and the published references to this section of the island fauna are very few. William Thompson, the accomplished author of the "Natural History of Ireland," paid at least one visit to Lambay (in June, 1838), and collected there one Chiton, *C. ruber*, entered in his MS., and three Nudibranchs, *Æolis papillosa*, *Doris bilamellata*, and *Goniodoris nodosa*, which are duly recorded in vol. iv. of his History. Of these four species only one, *Æ. papillosa*, was observed by us in Easter last, so that Thompson's records (here entered in square brackets) raise the total of known Lambay mollusca from 117 to 120.

In the following list the nomenclature adopted is that of Jeffreys' "British Conchology"; the general sequence and the names of the classes and orders are taken from Cook's "Mollusca," vol. iii. of the Cambridge Natural History; the initials, "H. J. B.-W.," denote species collected and determined by Mr. Wollaston, and "G. W. C." those verified by Dr. G. W. Chaster.

GASTEROPODA.

AMPHINEURA.

Chiton marginatus, Pennant.—Frequent at Talbot's Bay and N. of harbour.

[**C. ruber**, Lowe.—Lambay Island: *Thompson MS.*]

PROSOBRANCHIATA.

Tectura testudinalis, (Müller).—One living at Talbot's Bay and another at Carrickdorrish; one dead in harbour.

T. virginea (Müller).—Talbot's Bay; harbour; Carrickdorrish; not infrequent.

Patella vulgata, Linné.—Common all round the coast.

Helcion pellucidum (Linné). } Both frequent, living at Talbot's Bay,
var. **lævis**, Pennant. } &c., and dead in harbour shell-sand.

Fissurella græca (Linné).—Two broken specimens, Talbot's Bay, and a third in harbour.

Emarginula fissura (Linné).—One living at Carrickdorrish; fragments at Talbot's Bay and in harbour sand.

Cyclostrema serpuloides (Montagu).—Six specimens in harbour sand, July, 1906.

Trochus cinerarius, Linné. }
T. umbilicatus, Montagu. } Common all round the coast.

Trochus helicinus, Fabricius.—Frequent, living in Talbot's Bay and at Carrickdorrish, and dead in harbour sand.

T. millegranus, Philippi.—One specimen, immature, in harbour.

T. zizyphnus, Linné.—Frequent, living, Talbot's Bay and Carrickdorrish.

Phasianella pullus (Linné).—Occasional, living, Talbot's Bay and Carrickdorrish; frequent, dead, in harbour.

Velutina lævigata (Pennant).—Not infrequent in harbour sand.

Littorina obtusata (Linné). }
L. rudis (Maton). } Common everywhere, both living and
L. littorea (Linné). } dead.

Lacuna divaricata (Fabricius).—Frequent in harbour sand; one living at Carrickdorrish.



R. Welch, Photo.

Very Young Herring Gull, in hiding attitude beside nest.

To face p. 37.

- L. pallidula** (Da Costa).—Living at Talbot's Bay; frequent in harbour and in dredgings from outside it.
- Rissoa reticulata**, var. **calathus**, F. & H.—One fresh specimen in shell-sand, Talbot's Bay, and another in harbour.
- R. punctura** (Montagu).—Occasional in shell-sand, Talbot's Bay, and harbour.
- R. parva** (Da Costa). } Both frequent, living, at Talbot's Bay
var. **Interrupta**, Adams. } and dead in harbour sand.
- R. inconspicua**, Alder.—Rare; two specimens in Talbot's Bay, and one in harbour.
- R. striata** (Adams).—Common, living and dead, Talbot's Bay, harbour, &c.
- R. soluta**, Phillipi.—One specimen $\frac{3}{16}$ -in., from seaweed siftings, Talbot's Bay, *vide* G.W.C.
- R. semistriata** (Montagu).—One specimen in harbour sand, July, 1906.
- R. cingillus** (Montagu).—Frequent, living, in Talbot's Bay and Carrickdorrish, and, dead, in harbour sand.
- Hydrobia ulvæ**, Pennant.—Talbot's Bay and harbour, rare.
- Skenea planorbis** (Fabricius).—Common, living, at Carrickdorrish and Talbot's Bay, and, dead, in harbour.
- Jeffreysia diaphana** (Alder).—One specimen in harbour sand, *vide* G.W.C.
- Cerithium reticulatum** (Da Costa). } Both in harbour shell-
Cerithiopsis tubercularis (Montagu). } sand; rare.
- Turritella terebra** (Linné).—Talbot's Bay and harbour, sparingly.
- Aporrhais pes-pelecani** (Linné).—Several live specimens dredged within 5-fathom line off Saltpan Bay.
- Cypræa europæa**, Montagu.—Talbot's Bay and N. of harbour, occasionally.
- Odostomia unidentata** (Montagu).—One specimen in harbour.
- O. turrita**, Hanley.—Three specimens in harbour, *vide* G.W.C. New to Co. Dublin.
- O. pallida** (Montagu).—On seaweeds, Talbot's Bay, 30 living specimens, and one at Carrickdorrish; three dead in harbour sand, *vide* G.W.C. The living specimens were all of a clear amber colour.
- O. rissoides**, Hanley.—Two specimens in Talbot's Bay and one in the harbour. One of the Talbot's Bay specimens detected by Mr. Nichols was quite fresh, with the epidermis and operculum intact, so that the animal must have been living where the material was gathered.
- O. insculpta** (Montagu).—Three specimens in harbour, *vide* G.W.C.
- O. spiralis** (Montagu).—Talbot's Bay and harbour, not infrequent.
- O. lactea** (Linné).—With the preceding species, but rare.
- Murex erinaceus**, Linné.—Occasionally north of harbour and in Talbot's Bay.
- Purpura lapillus** (Linné).—Common everywhere, living and dead.
- Nassa reticulata** (Linné).—Occasional in harbour and in dredgings outside it.

- Nassa Incrassata** (Ström.).—Frequent, living, in Carnoon Bay and Talbot's Bay.
- Fusus antiquus** (Linné).—Two on shore near harbour.
- Buccinum undatum**, Linné.—Frequent, living, north of harbour.
- Defrancia linearis** (Montagu).—Talbot's Bay and harbour, rare.
- Pleurotoma nebula** (Montagu). } One specimen of each species in
P. rufa (Montagu). } harbour shell-sand.
- P. costata** (Donovan).—One specimen in Talbot's Bay.

OPISTHOBRANCHIATA.

- Utriculustruncatulus** (Bruguère).—Five specimens in harbour sand.
- U. hyalinus** (Turton).—Two specimens with the preceding species
- Philine punctata** (Clark).—Three specimens in harbour.
- P. catena** (Montagu).—With the preceding, one specimen.
- Runcina Hancocki**, Forbes.—Several specimens among seaweeds in a pool on S.W. shore near high tide mark.—H.J.B.-W. A most interesting addition to the molluscan fauna of East Ireland. Its rarity as an Irish species was quite unsuspected by Mr. Wollaston, who has gathered it by hundreds on the Devonshire coast.
- Æolis papillosa** (Linné).—Several specimens were taken, some breeding, both on the S.W. shore and near Carrickdorrish.—H.J.B.-W. [Lambay Island—Thompson, *Nat. Hist.*].
- Æ. coronata**, Forbes.—One specimen taken among rocks on S.W. shore.—H.J.B.-W.
- Æ. lineata**, Lovén.—One specimen which may be this species was taken in a rock-pool on S.W. shore. The body was distinctly lined with white, but the animal was unfortunately lost before it could be certainly identified.—H.J.B.-W.
- Doris tuberculata**, Cuvier.—Several specimens were taken between tide-marks both on the S.W. shore and near Carrickdorrish.—H.J.B.-W. Two specimens to the N. of the harbour, N.C.
- D. aspera**, Alder and Hancock.—Two specimens taken among weed in a rock pool on S.W. shore.—H.J.B.-W.
- [**D. bilamellata**, Linné. } Lambay Island, between tide-
Goniodoris nodosa (Montagu) } marks.—Thompson, *Nat. Hist.*]

PULMONATA.

- Melampus bidentatus** (Montagu).—Five specimens in harbour sand.

PELECYPODA.

PROTOBRANCHIATA.

- Nucula nitida**, G. B. Sowerby.—Living specimens dredged off harbour mouth and Saltpan Bay; frequent, dead, in harbour sand.
- N. nucleus** (Linné).—Sparsely in Talbot's Bay.

FILIBRANCHIATA.

- Anomla ehipplum**, Linné.—Common, both living and dead, in Talbot's Bay, at Carrickdorrish, &c.
- A. patelliformis**, Linné.—Frequent in harbour and in Talbot's Bay.
- Mytilus edulis**, Linné.—Abundant on rocks at Carrickdorrish, the Seal Hole, &c. A common constituent of the sea-gull pellets all over the breeding grounds towards Lambay Head.
- M. modiolus**, Linné.—Three living in Talbot's Bay; occasional dead near the harbour.
- M. phaseolinus**, Philippi.—One specimen in Talbot's Bay and two others in harbour, all immature.
- Modiolaria discors** (Linné).—Common, living, in Talbot's Bay and Carrickdorrish, also, dead, in harbour sand.

PSEUDOLAMELLIBRANCHIATA.

- Ostræa edulis**, Linné.—Single valves occasionally on W. and S.W. shore.
- Pecten pusio** (Linné). } Single valves occasionally in harbour and
P. varius (Linné). } Talbot's Bay, also in dredgings from
 } harbour mouth.
- P. opercularis** (Linné). } Single valves occasionally near harbour.
P. maximus (Linné). }
- P. tigrinus**, Müller.—A fragment in Talbot's Bay; one perfect valve in harbour sand and a fragment from dredgings outside.

EULAMELLIBRANCHIATA.

- Cyprina islandica** (Linné).—Fragments found in Carnoon Bay and in dredgings from the harbour mouth.
- Lucina borealis** (Linné).—Single valves frequent in harbour and in dredgings from outside it.
- Axinus flexuosus** (Montagu).—One valve and two fragments in harbour sand.
- Montacuta ferruginosa** (Montagu).—Single valves frequent in harbour sand
- M. bidentata** (Montagu).—Single and double valves rather common in harbour and in Talbot's Bay.
- Cyamium minutum** (Fab.) } Both rather common, living in
Lasæa rubra (Montagu). } Talbot's Bay, and dead in harbour sand.
- Kella suborbicularis** (Montagu).—One mature valve in harbour.
- Tellina balthica**, Linné.—One specimen in harbour.
- T. squalida**, Pulteney.—One broken valve dredged off harbour.
- T. tenuis**, Da Costa. } Both frequent in harbour.
T. fabula, Gronovius. }
- T. donacina**, Linné.—One pair of valves, united and quite fresh, dredged off harbour mouth.

- Scrobicularia alba** (Wood).—Single valves frequent in harbour and in dredgings outside.
- Donax vittatus** (Da Costa).—Broken valves occasional in the harbour. The broken shells of this species are a very common ingredient in the sea-gull pellets all over the breeding grounds of Lambay, yet the species seems to be quite rare in the island, the shells being probably carried over from the feeding grounds on the opposite mainland coast at Rush.
- Mactra solida**, Linné. }
M. subtruncata (Da Costa). } Immature valves occasional in harbour.
- M. stultorum**, Linné.—One valve in harbour.
- Venus exoleta**, Linné. }
V. lineta, Pulteney. } Single valves frequent in the harbour and
V. gallina, Linné. } in dredgings from outside it.
- V. fasciata** (Da Costa).—Three living specimens in Talbot's Bay; single valves frequent in the harbour.
- V. ovata**, Pennant.—Two single valves in harbour, and two in dredgings from outside.
- Tapes pullastra** (Montagu).—Living at Carrickdorrish; single and double valves frequent in and near the harbour.
- Cardium echinatum**, Linné.—Single valves occasionally in Talbot's Bay and harbour; two living, immature, dredged off Saltpan Bay.
- C. exiguum**, Gmelin.—Several broken valves in harbour.
- C. nodosum**, Turton.—Two single valves Talbot's Bay, and in harbour.
- C. edule**, Linné.—A few single valves in Talbot's Bay and one double north of harbour.
- C. norvegicum**, Spengler. }
Psammobia ferroensis (Chemnitz.) } Single valves occasionally in
 harbour.
- Mya arenaria**, Linné.—One valve in harbour.
- M. truncata**, Linné.—One valve in dredgings off harbour mouth.
- Corbula gibba** (Olivi).—Single valves frequent in harbour and in Talbot's Bay. Double valves occasionally in harbour.
- Lutraria elliptica**, Lamarck.—Broken valves frequent in harbour.
- Ceratisolen legumen**, Linné.—Dredged off Saltpan Bay.
- Solen ensis**, Linné. }
S. siliqua, Linné. } Fresh valves occasional in harbour.
- Saxicava rugosa** (Linné). }
 var. **arctica**, Linné. } Frequent, living, at Talbot's Bay and
 Carrickdorrish, and dead in harbour.

In concluding this first essay at a list of the marine mollusca of Lambay, I wish to acknowledge my indebtedness to Mr. A. R. Nichols and to Dr. G. W. Chaster for assistance kindly given me in the naming of some critical species.

LAND AND FRESH-WATER MOLLUSCA.

BY A. W. STELFOX AND R. WELCH, M.R.I.A.

AS FAR as land and freshwater molluscs are concerned, Lambay must be considered a poor field for research. The western shores and low ground from Saltpan Bay, on the north, to Carnoon Bay, on the south shore, are the habitats of the great majority of the species found on the island. The rest of Lambay, except for the margins of the few small streams, is totally devoid of habitats suitable for most species of mollusca. The best of the small streams is that running into Freshwater Bay and the outlets of Raven's and Trinity Wells, all of which are surrounded by marshy areas. The sandy bluffs north of the harbour are the home of several xerophiles, while the woods surrounding the castle and the garden are the principal stronghold of the slugs. The almost total absence of freshwater species in the following list will be at once observed; this is accounted for by the lack of anything in the form of a lake or even a pond. The following species, although not found by us on the island, might be expected to occur:—*Hyalinia cellaria*, *Agriolimax lævis*, *Helix pulchella*, *Vertigo antivertigo*, and *V. substriata*.

LIST OF SPECIES.

- Vitrina pellucida**, Müll.—Dead shells only, near the castle, Scotch Point, and Heath Hill.
- Hyalinia allaria**, Miller.—Rare, near the castle and at Scotch Point.
- H. pura**, Alder.—A few in the marsh surrounding Raven's Well
- H. radiatula**, Alder.—Several dead shells in the rejectamenta of Raven's Well.
- H. nitidula**, Drap.—Collected by Dr. R. F. Scharff during several visits to Lambay
- H. crystallina**, Müll.—Common in marsh at Raven's Well and at Scotch Point.
- H. fulva**, Müll.—One dead shell at Raven's Well.
- Arlon ater**, L.—The jet black form was noticed in swarms towards dusk in the central moorland parts of the island. The brown forms were in predominance near the coast.
- A. subfuscus**, Drap.—Rare at Raven's Rock, and also in the plantation round the castle.
- A. hortensis**, Fér.—Found in abundance on the rocky talus at Calico Hole and in the plantation, all very dark in colour.
- A. circumscriptus**, Johnst.—Common in the castle garden and plantation.

- A. intermedius**, Normand.—In the plantation only and very rare.
- Limax maximus**, L.—Common on Knockbane, about the castle, Scotch Point, and Raven's Rock.
- L. flavus**, L.—Two large specimens in the castle plantation.
- L. marginatus**, Müll.—Trinity Well and the castle plantation, very rare. R. Ll. Praeger obtained the var. *rupicola*, Less. and Poll. near the castle.
- Agriollimax agrestis**, L.—Common throughout the island.
- Helix rotundata**, Müll.—One of the commonest species on the island.
- H. hispidula**, L.—Rare in the castle plantation, but common at Scotch Point and Calico Hole.
- H. rufescens**, Penn.—In the castle garden only. Common.
- H. virgata**, Da Costa.—Very common on the sandy bluff north of the harbour.
- H. intersecta**, Poir.—Common close to the Old Red Sandstone cliffs at Broad Bay, and almost at high tide mark.
- H. acuta**, Müll.—Common near the harbour with *H. virgata*. One specimen taken alive in the marsh at Raven's Well. A few near sea-level at Freshwater Bay—(R. Ll. P.).
- H. nemoralis**, Müll.—Common on most parts of the island, even to be found on the dry stony ground above Sunk Island cliffs. Some very pretty colour forms were taken near the harbour, having a distinct white line below the third band.
- H. aspersa**, L.—Common on several walls round the castle.
- Cochlicopa lubrica**, Müll.—Rare in the plantation. A few dead in the marsh at Raven's Well.
- Pupa cylindracea**, Da Costa.—Rare, a few at Trinity Well and Scotch Point.
- Vertigo pygmaea**, Drap.—One dead shell in the marsh at Raven's Well.
- Clausilia bidentata**, Ström.—Common at Calico Hole among rocky debris, and at the roots of Sea Campion. Also at Carnoon Bay.
- Succinea elegans**, Risso.—Common in the marsh at Raven's Well. All were the *S. Pfeifferi* of continental authors.
- Carychium minimum**, Müll.—Common in all moist places.
- Limnæa peregra**, Müll.—A small form common in all streams.
- L. truncatula**, Müll.—Common, with *L. peregra*.
- Pisidium pusillum**, Gmelin.—Common.
- P. fontinale**, C. Pfr.—In stream running into Carnoon and Freshwater Bays.
- P. millum**, Held.—Common in streams running into Freshwater Bay.

Mr. Charles Oldham kindly indentified the *Pisidia*, and we have to thank Dr. Scharff for a list of the shells found by him, and also Mrs. Praeger and Miss Knowles for species that they met with when botanizing.

DIPTERA.

BY PERCY H. GRIMSHAW, F.E.S.

[The following short list of two-winged flies is the result of very casual collecting while working other groups of insects. A few of the species are uncommon, and are possibly here recorded from Ireland for the first time. It may be of interest to record the occurrence of the gnat *Culex pipiens*, L., in abundance in the cave at Sunk Island.—J. N. H.]

Scatopse notata, L.	Morellia hortorum, Flin.
Bibio lacteipennis, Ztt.	Calliphora erythrocephala, Mg.
B. lapidus, Lw.	Euphoria cornicina, F.
Diamesa obscurimanus, Mg.	Lucilia cæsar, L.
Culex pipiens, L.	Polietes lardaria, F.
Ptychoptera lacustris, Mg.	Spilogaster duplicata, Mg.
P. albimana, F.	Hylemyia? lasciva, Ztt.
Tipula obsoleta, Mg.	Phorbia sp.
T. paludosa, Mg.	Homalomyia armata, Mg.
Chloromyia formosa, Scop.	Scatophaga stercoraria, L.
Beris chalybeata, Forst.	Drosophila sp.
Thereva plebeia, L.	Sciomyza cinerella, Flin.
Stilpon lunata, Wlk.	Loxocera aristata, Pz.
Dolichopus pennatus, Mg.	Lauxania ænea, Flin.
D. popularis, W.	Opomyzia germinationis, L.
D. unguatus, L.	Hydrellia griseola, Flin.
Lonchoptera sp.	Scaptomyza flaveola, Mg.
Syrirta pipiens, L.	S. graminum, Flin.
Siphona geniculata, Deg.	Borborus equinus, Flin.

HYMENOPTERA.

BY J. N. HALBERT.

With the exception of *Bombus terrestris* and the four species of ants, the following Hymenoptera were recorded from Lambay by Mr. H. Gore Cuthbert in the *Irish Naturalist* for 1896.¹ Ants are extremely abundant on the island, especially the species of *Lasius*. Mr. E. Saunders has verified the identification of the races of *Myrmica*.

¹ Vol. v., p. 186.

TUBULIFERA.

Chrysis ignita, L.

Hedychrum lucidulum, Latr.

ACULEATA.

Vespa sylvestris, Scop.

Bombus terrestris, Linn.

Odynerus pictus, Curt.

Formica fusca, Latr.

O. trimarginatus, Zett.

Lasius flavus, De Geer.

O. parietinus, Linn.

L. niger, Linn.

Sphecodes dimidiatus, v. Hag.

race, alienus.

Andrena fulvicrus, Kirby.

Myrmica rubra, Linn.

A. minutula, Kirby.

race, ruginodis.

Megachile maritima, Kirby.

race, scabrinodis.

M. centuncularis, Linn.

LEPIDOPTERA.

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

THE following list being, with a few exceptions, the result of only two or three days' work in June, cannot in any way pretend to be representative, the spring and autumn species not being included. The greater number enumerated belong to widely distributed species not notable for rarity or local distinctive character. But a few are worthy of special reference. *Vanessa io*, the beautiful Peacock Butterfly which some twelve or fifteen years ago was chiefly confined to the southern half of Ireland, and rarely met with in the County Dublin, has of late years vastly extended its range, and is seen in increasing numbers annually throughout the northern counties. Among the Noctuæ it may be noted that the black variety of *Xylophasia monoglypha* is frequent on the islands of Lambay and Ireland's Eye, together with the type and many intermediate aberrations. This is, I think, evidence, in the absence of dark local surroundings (as in the smoke-begrimed districts of English manufacturing and mining counties, or the bare, dark rocks of storm-swept islands that rear their peaks to the west of the Kerry coast); that the melanic variation of this species does not result from protective resemblance to local environment, as in certain instances, but arises as an inherited variation. It will be noted that the only species of the coast-loving genus *Dianthœcia* captured was *D. capsophila* of the normal form, which haunts the whole coast of





Nest and young of Herring Gull.

G. E. Low, Photo.

To face p. 45.

Ireland wherever its food plant grows. The melanic form of this species I have never met with, except on the Blasket Islands. In vain for two nights did we work for *D. luteago* var. *Barrettii* on steep cliff faces which seemed suitable haunts for this local insect. And in a former year, also at the proper season, I failed in my search for it at Lambay. Nevertheless as its headquarters at Howth are so near, it seems probable that it exists also at Lambay, where the steep cliffs afford foothold to plants of *Silene maritima*. Here only its habits would warrant an expectation of its capture, but such places are often inaccessible, and to wield the net from a niche in the face of a sheer cliff after dark needs a good deal of experience and nerve. *Dianthæcia nana* I believe I met with at Lambay on a former occasion, but have not a reliable memorandum. *D. cucubali* and *D. capsicola* are almost certainly to be found there. Among the Geometridæ very few of interest were taken. On a former occasion I took specimens of *Eupithecia succentureata* in bushes near the Coast Guard dwellings, but failed in rediscovering this rather scarce species on my last visit. It will no doubt have followed the fortunes of its food plant *Artemisia vulgaris*¹ wherever its largest patches may be found from time to time. Perhaps I should not pass over without comment the existence of *Orgyia antiqua* on an island about three miles off the coast. Its presence raises the question of how moths whose females are devoid of wings become in many cases widely disseminated, in spite of the fact that the ovigerous females are sluggish, and for the most part do not drag their cumbrous bodies more than a few yards during their short lifetime. How then did *Orgyia antiqua* find its way to Lambay? The only explanation that I can offer is that the larva of this particular species is almost polyphagous, so that if a leaf or stick on which eggs had been laid were accidentally brought over in the cargo of a boat, the young, wherever they emerged, would be almost sure to find food without wandering far. Most lepidoptera are very narrowly restricted as to their food plant, hence the extreme difficulty of introducing most species to a new habitat. The list, it will be seen, contains scarcely any of the group formerly called micro-lepidoptera. Whenever the island is exploited carefully for these small but beautiful moths, rare and interesting species are certain to be

¹ *Artemisia vulgaris* is unknown on the island—R. LL. P'

found, if one may judge from the character of the vegetation of Lambay, the varied contour of the ground, and from the many rare species which are known to inhabit the peninsula of Howth. It is to be hoped that some day a collection may be made of these minute Lepidoptera, even without any attempt at setting, the difficulty of which usually deters a beginner; for if they are merely transfixed with suitable pins, there is no difficulty in identifying the species. *Stigmonota regiana*—a local and interesting kind—which was taken, was doubtless bred from the Sycamores growing near the house. Some years ago a specimen of this pretty species was sent me from Rockabill lighthouse, whither no doubt it had been blown out from the shore four miles away.

RHOPALOCERA.

<i>Pieris brassicæ</i> , L.	<i>V. atalanta</i> , L.
<i>P. napi</i> , L.	<i>V. cardui</i> , L.
<i>Argynnis aglaia</i> , L.	<i>Epinephele janira</i> , L.
<i>Vanessa urticæ</i> , L.	<i>Polyommatus phloæas</i> , L.
<i>V. io</i> , L.	<i>Lycæna icarus</i> , Rott.

HETEROCERA

<i>Acherontia atropos</i> , L. ¹	<i>Phlogophora meticulosa</i> , L.
<i>Macroglossa stellatarum</i> , L.	<i>Habrostola tripartita</i> , Hufn.
<i>Arctia caia</i> , L.	<i>Plusia gamma</i> , L.
<i>Euchelia jacobææ</i> , L.	<i>Euclidia mi</i> , Clerck.
<i>Spilosoma fuliginosa</i> , L.	<i>Cleora lichenaria</i> , Hufn.
<i>S. lubricipeda</i> , Esp.	<i>Gnophos obscuraria</i> , Hb.
<i>S. menthastri</i> F&sp.	<i>Acidalia marginepunctata</i> , Göze.
<i>Hepialus humuli</i> , L.	<i>Abraxas grossulariata</i> , L.
<i>H. velleda</i> , Hb., and var. <i>gallicus</i> .	<i>Larentia didymata</i> , L.
<i>H. hectus</i> , L. (pupa.)	<i>L. viridaria</i> , Fb.
<i>Saturnia pavonia</i> , L.	<i>Eupithecia oblongata</i> , Thub.
<i>Orgyia antiqua</i> , L.	<i>E. succentureata</i> , L.
<i>Xylophasia monoglypha</i> , Hufn.	<i>E. vulgata</i> , Haw.
<i>Charæas graminis</i> , L.	<i>Melanippe montanata</i> , Bork.
<i>Caradrina taraxaci</i> , Hb.	<i>Camptogrammabilineata</i> , L.
<i>Agrotis lunigera</i> , It.	<i>Eubolia limitata</i> , Scop.
<i>A. exclamationis</i> , L.	<i>Aglossa pinguinalis</i> , L.
<i>A. strigula</i> , Thub.	<i>Eurrhypara urticata</i> , L.
<i>Noctua augur</i> , Fb.	<i>Pionea forficalis</i> , L.
<i>Triphæna comes</i> , Hb.	<i>Phycis fusca</i> , Haw.
<i>T. pronuba</i> , L.	<i>Sericoris urticana</i> , Hb.
<i>Tæniocampa stabilis</i> , View.	<i>Stigmonota regiana</i> , Zell.
<i>Dianthœcia capsophila</i> , Dup.	<i>Fumea intermediella</i> , Brd.

¹ Mrs. Perrin of Beau House, Rush, tells me that she saw a Death's-head Moth on Lambay some years ago.—C. B.

COLEOPTERA.

BY J. N. HALBERT.

PREVIOUS to the exploration of Lambay during the last two years, very little was known of the beetle fauna of the island. So far as can be ascertained there are only two published notes one of the occurrence of the Rose Beetle, *Cetonia aurata*, and the other a short list of twelve species collected by Mr. H. Gore Cuthbert during the visit of the Dublin Naturalists' Field Club in the summer of 1896 (*Irish Naturalist*, vol. v., p. 186).

The result of our recent researches is a list of 191 species, including all that have been found on the island. It is mainly the result of three short collecting trips—twice in the month of June, and once in October, supplemented by some species collected by friends while working at other groups of animals.

As might be expected, the beetle fauna of Lambay agrees closely with that of the adjacent mainland, such differences as exist being due to local conditions. As these differences are explained elsewhere, it may be pointed out that aquatic and woodland insects are poorly represented on the island, and almost equally so are the denizens of the sandhills and salt-marshes which are such special features of the opposite coast. The sandhill insects are represented, however, by a few forms such as *Philopodon geminatus* and *Calathus mollis* occurring on the strip of sandy beach in the harbour of Lambay. On account of these differences, the beetle fauna agrees more closely, area for area, with that of the Howth peninsula than with that of the adjacent mainland.

Students of our native Coleoptera will notice several interesting species amongst our captures, such as *Silpha atrata*, var. *subrotundata*, one of the few insects which may be said to be characteristic of Ireland, though it is also found in the Isle of Man. It is notable that the brown variety only was met with on Lambay. The Rose Beetle, *Cetonia aurata*, is also a notable capture; it is known to occur along the south and west coasts of Ireland, but it is extremely rare in the province of Leinster. Perhaps the most interesting species found on the island is the

Pyrenean weevil *Otiorrhynchus auropunctatus*, not an unexpected occurrence, however, seeing that the only known British locality for this insect is our east coast from Wicklow to Down.¹ Elsewhere it has been recorded from the Pyrenees, and the Auvergne Mountains in Central France.

Although Lambay has been inhabited for a very considerable time, yet there are apparently extremely few species which owe their occurrence there to the direct action of man. The ground-beetle *Læmostenus complanatus*, with a wide distributional range and occurring usually in suspicious localities, may be mentioned in this connection. The common cellar-beetle *Blaps mucronata* is no doubt another instance. There are also one or two wood-feeding species which, if they were not directly imported with timber, are very likely comparatively recent arrivals on the island. The weevil *Rhopalomesites Tardyi* is an example: it lives in the Ash and Sycamore trees planted round the castle, the only trees on the island offering a suitable habitat for the species. The Elder trees on the eastern side of the island are infested by the wood-borer *Caulotrypis æneopiceus*, but whether the Elder may not have been planted there is a question for botanists to decide. It is possible, however, that both of these wood-feeders reached the island by means of drifting timber.²

With one possible exception the beetles found on Lambay have all been previously recorded from Ireland. The following species, however, have not been recorded from the county of Dublin:—*Falagria thoracica*, **Homalota triangulum*, **H. ignobilis*, **Actobius cinerascens*, **Lesteva punctata*, **Choleva Watsoni* and *Apion stolidum*. Four of these, indicated by asterisks, are new records for the province of Leinster, and *Homalota ignobilis*, recorded with some reserve, is an addition to the Irish list.

I am indebted to Dr. David Sharp, F.R.S., and to Mr. G. C. Champion, F.Z.S., for assistance in the identification of some of the more critical species.

¹ Occurs also near Derry, No doubt it will be found in intermediate localities in the north-east of Ireland.

² I once found *Caulotrypis* abundantly in a log of wood washed up on the South Bull sands.

LIST OF LAMBAY BEETLES.

<i>Carabus catenulatus</i> , Scop.	<i>Megasternum boletophagum</i> , March.
<i>C. nemoralis</i> , Müll.	<i>Aleochara fuscipes</i> , F.
<i>C. granulatus</i> , L.	<i>A. lanuginosa</i> , Grav.
<i>Notiophilus biguttatus</i> , F.	<i>A. nitida</i> , Grav.
<i>N. aquaticus</i> , L.	<i>Ilyobates nigricollis</i> , Payk.
<i>Leistus fulvibarbis</i> , Dej.	<i>Astilbus canaliculatus</i> , F.
<i>Nebria brevicollis</i> , F.	<i>Homalota vestita</i> , Grav.
<i>Dyschirius globosus</i> , Herbst.	<i>H. circellaris</i> , Grav.
<i>Broscus cephalotes</i> , L.	<i>H. analis</i> , Grav.
<i>Badister bipustulatus</i> , F.	<i>H. trinotata</i> , Kr.
<i>Bradycellus verbasci</i> , Duft.	<i>H. triangulum</i> , Kr.
<i>B. harpalinus</i> , Dej.	<i>H. ignobilis</i> , Sharp.
<i>Harpalus rufibarbis</i> , F.	? <i>H. nigra</i> , Kr.
<i>H. æneus</i> , F.	<i>H. atramentaria</i> , Gyll.
<i>H. latus</i> , L.	<i>H. longicornis</i> , Grav.
<i>Pterostichus madidus</i> , F.	<i>H. fungi</i> , Grav.
<i>P. niger</i> , Schall.	<i>Falagria thoracica</i> , Curt.
<i>P. vulgaris</i> , L.	<i>F. obscura</i> , Grav.
<i>P. nigrita</i> , F.	? <i>Myllæna minuta</i> , Grav.
<i>P. strenuus</i> , Panz.	<i>Conosoma pubescens</i> , Grav.
<i>P. striola</i> , F.	<i>C. lividum</i> , Er.
<i>Amara aulica</i> , Panz.	<i>Tachyporus solutus</i> , Er.
<i>A. bifrons</i> , Gyll.	<i>T. chrysomelinus</i> , L.
<i>A. ovata</i> , F.	<i>T. humerosus</i> , Er.
<i>A. trivialis</i> , Gyll.	<i>T. tersus</i> , Er.
<i>A. communis</i> , Panz.	<i>T. hypnorum</i> , F.
<i>Calathus cisteloides</i> , Panz.	<i>T. brunneus</i> , F.
<i>C. mollis</i> , Marsh.	<i>Tachinus marginellus</i> , F.
<i>C. melanocephalus</i> , L.	<i>Quedius puncticollis</i> , Thoms
<i>Læmostenus complanatus</i> , Dej.	<i>Q. tristis</i> , Grav.
<i>Anchomenus albipes</i> , F.	<i>Q. attenuatus</i> , Gyll.
<i>Bembidium rufescens</i> , Guér.	<i>Creophilus maxillosus</i> , L.
<i>B. littorale</i> , Ol.	<i>Ocypus olens</i> , Müll.
<i>B. lampros</i> , Herbst.	<i>O. ater</i> , Grav.
<i>Trechus lapidosus</i> , Daws.	<i>O. morio</i> , Grav.
<i>T. minutus</i> , F. var. <i>obtusus</i> , Er.	<i>Philonthus intermedius</i> , Boisd.
<i>Dromius linearis</i> , Ol.	<i>P. proximus</i> , Kr.
<i>D. meridionalis</i> , Dej.	<i>P. varius</i> , Gyll.
<i>D. quadrimaculatus</i> , L.	<i>Actobius cinerascens</i> , Grav
<i>D. nigriventris</i> , Thoms.	<i>Xantholinus glabratus</i> , Grav.
<i>Çœlambus inæqualis</i> , F.	<i>X. tricolor</i> , F.
<i>Hydroporus nigrita</i> , F.	<i>X. linearis</i> , Ol.
<i>Limnebius truncatellus</i> , Thoms.	<i>Othius fulvipennis</i> , F.
<i>Chætarthria seminulum</i> , Herbst.	<i>O. melanocephalus</i> , Grav.
<i>Octhebius bicolon</i> , Germ.	<i>Stenus guttula</i> , Müll.
<i>Cercyon hæmorrhoidalis</i> , Herbst.	<i>S. speculator</i> , Er.
<i>C. flavipes</i> , F.	<i>S. brunnipes</i> , Steph.
<i>C. melanocephalus</i> , L.	

- Stenus ossium*, Steph.
S. similis, Herbst.
Platystethus arenarius, Fourc.
Trogophlœus corticinus, Grav.
Lesteva punctata, Er.
Omalius læviusculum, Gyll.
O. riparium, Thoms.
Necrophorus humator, F.
N. ruspator, Er.
Necrodes littoralis, L.
Silpha rugosa, L.
S. subrotundata, Steph.
Choleva grandicollis, Er.
C. fusca, Panz.
C. Watsoni, Spence.
Hister purpurascens, Herbst. var. *niger*.
Saprinus nitidulus, Payk.
Ontophilus striatus, F.
Corylophus cassidioides, Marsh.
Coccinella vii.-punctata, L.
Rhizobius litura, F.
Olibrus æneus, F.
Brachypterus urticæ, F.
Epuræa æstiva, L.
Omosita colon, L.
Meligethes æneus, F.
M. erythropus, Gyll.
Coninomus nodifer, Westw.
Enicmus minutus, L.
Melanophthalma gibbosa, Herbst.
M. fuscula, Hum.
Cryptophagus dentatus, Herbst.
Corticaria elongata, Gyll.
Micrambe vini, Panz.
Atomaria analis, Er.
Typhæa fumata, L.
Aphodius fimetarius, L.
A. ater, De G.
A. rufipes, L.
Geotrupes stercorarius, L.
Cetonia aurata, L.
Athous niger, L.
A. hæmorrhoidalis, F.
Agriotes obscurus, L.
A. lineatus, L.
Dolopius marginatus, L.
Colymbites cupreus, var. *æruginosus*, F.
Dascillus cervinus, L.
Helodes minuta, L.
H. marginata, F.
Telephorus bicolor, F.
Rhagonycha fulva, Scop.
R. limbata, Thoms.
Malthodes atomus, Thoms.
Grammoptera ruficornis, F.
Chrysomela staphylea, L.
Gastroidea polygona, L.
Phædon tumidulus, Germ.
Longitarsus luridus, Scop.
L. piciceps, Steph.
L. jacobææ, Wat.
L. gracilis, Kuts.
L. lævis, Duft.
Phyllotreta undulata, Kuts.
Crepidodera ferruginea, Scop.
Chætocnema hortensis, Fourc.
Plectroscelis concinna, Marsh.
Blaps mucronata, Latr.
Crypticus quisquilius, L.
Helops striatus, Fourc.
Lagria hirta, L.
Rhinosimus planirostris, F.
Apion stolidum, Germ.
A. radiolus, Kirby.
A. carduorum, Kirby.
Otiorrhynchus ligneus, Ol.
O. sulcatus, F.
O. rugifrons, Gyll.
O. auropunctatus, Gyll.
Trachyphlœus scaber, L.
Strophosomus coryli, F.
Sciaphilus muricatus, F.
Barypeithes sulcifrons, Boh.
Philopædon geminatus, F.
Barynotus obscurus, F.
B. Schönherri, Zett.
Sitones hispidulus, F.
Orthocætes setiger, Beck.
Cœliodes iv.-maculatus, L.
Ceuthorrhynchus contractus, Marsh.
C. erysimi, F.
C. pollinarius, Forst.
C. pteurostigma, Marsh.
C. rugulosus, Herbst.
Rhopolomesites Tardyi, Curt.
Caulotrypis æneopiceus, Boh.

NOTES ON RARER SPECIES.

Læmostenus complanatus, Dej.—Found under lumber in an out-house near the castle, October, 1906. This species is no doubt an importation into Lambay, as it seems to be frequently carried about from place to place in ships. Mr. S. W. Kemp has recently found a specimen under boxes on board the "Saturn," at Ballinakill. In the Dublin Museum there are unrecorded specimens of this species taken at Tempo, Co. Fermanagh; near Belfast; and one in the Hogan Collection labelled "Trinity College, Dublin, 1853." This species has a very wide distribution, occurring throughout the Mediterranean region, in the Atlantic islands, and in various American localities as far south as Tierra del Fuego.

Trechus lapidosus, Daws.—Common amongst shingle in a small cave in the cliffs at Sunk Island Bay. Many specimens were found hiding under corks which had been washed into the cave. This is a local species in Ireland, the only previous Dublin record is an old one—Killiney beach—in Hogan's list.

Ilyobates nigricollis, Payk.—Under stones in a dry ditch near castle. Previously recorded from Malahide.

Falagria thoracica, Curt.—Found under clumps of *Silene*.

Homalota trinotata, Kr.—A single specimen with the antennæ rather broader than usual, but can only be referred to this species (*vide* Dr. Sharp).

H. triangulum, Kr.—Occurred in a dead gull found lying on the shore. There is only one previous Irish record (Armagh) for the species (*vide* Dr. Sharp).

H. ignobilis, Sharp.—A *Homalota*, of which only one specimen was collected, is referred to this species by Dr. D. Sharp, but with some reserve. It has not been previously recorded from Ireland.

Myllæna minuta, Grav. (?)—Not uncommon in moss.

Quedius puncticollis, Thoms.—One specimen taken on the N.W. of the island. Recorded from the opposite shore at Skerries.

Actobius cinerascens, Grav.—Found under moss.

Stenus guttula, Müll.—Taken by Mr. Cuthbert in 1896.

Lesteva punctata, Er.—Found in a marshy place at Raven's Well. Not previously recorded from Leinster.

Silpha atrata, L., var. **subrotundata**, Steph.—Rather common under stones. It is remarkable that the brown form only of this insect was found on the island.

Choleva grandicollis, Er.—Common in dead birds.

C. watsoni, Spence.—A few specimens in a dead gull. New record for Leinster.

Hister purpurascens, Herbst.—A single specimen with no trace of the usual red spots (var. **niger**). The only previous Irish record for this black form is the North Bull sands.

- Corylophus cassidioides**, Marsh.—Taken rather commonly by sweeping rushes in damp places.
- Oilbrus æneus**, F.—Abundant on *Matricaria*.
- Meligethes erythropus**, Gyll.—Rare.
- Typhæa fumata**, L.—Abundant under bark of felled stumps in castle grounds.
- Cetonla aurata**, L.—First taken on Lambay by Mr. H. B. Jones, as recorded in *British Naturalist* (vol. i., 1891, p. 159), and rediscovered by Mrs. Baring, who captured a specimen on the top of Tinian Hill. The Rose Beetle is curiously frequent in its occurrence in island faunas. It is abundant on Inishmore in Galway Bay, and Wollaston found it on Lundy Island. The only recorded locality in the province of Leinster is Howth.
- Grammoptera ruficornis**, F.—A very common species on the mainland, but notable as the only “longhorn” found on the island.
- Chætocnema hortensis**, Fourc.—Frequent.
- Crypticus quilsquilius**, L.—Under stones on the shore.
- Lagriä hirta**, L.—Locally common on the landward side of the island.
- Aplon stolidum**, Germ.—A few specimens found by sweeping plants. The only recorded Irish locality is Laytown, on the adjoining coast.
- Otlorrhynchus iligneus**, Ol.—
- O. rugifrons**, Gyll.—
- } Both of these species are common,
} especially under large tufts of
} *Silene* on the coast.
- O. auropunctatus**, Gyll.—One specimen found on Iris, and another on bramble on the steep banks facing Carnoon Bay. It is well known to occur in various places along our east coast from Wicklow to Down, with an outlying locality near Derry, but it has not so far been discovered in the south or west of Ireland. An interesting account of this species will be found in the *Irish Naturalist* for 1895 (vol. iv., p. 213).
- Trachyphlœus scaber**, L.—One example taken on the eastern cliffs. This is the second record of this local insect for the Province of Leinster.
- Orthocætes setiger**, Beck.—Under stones near Sunk Island.
- Ceuthorrhynchus rugulosus**, Herbst.—Occurs on *Matricaria* on the coast, near the Coast-guard Station.
- Rhopalomesites Tardyl**, Curt.—Abundant in the Ash and Sycamore trees round the castle, and under bark of felled stumps. Its borings were very noticeable in places where the trees had been injured and the bark partially removed.
- Calotrypīs æneoplœus**, Boh.—Infests the Elders growing in Calico Hole some of the trees being badly riddled by its borings.

HEMIPTERA.

BY J. N. HALBERT.

THE following list of forty species of Hemiptera can only be considered as a contribution towards a more complete list. There are no previous records of these insects from the island.

The family Aphidæ remains to be investigated. Only a single species, found abundantly in ants' nests, was collected. A species of "Mealy-bug" (*Dactylopius citri*) also occurs in nests of the small brown ant *Lasius fuscus*.

Of the species recorded, *Dicyphus errans* is an addition to the Irish list. *Microphysa elegantula*, found on lichens growing on old Hawthorn trees, and *Piesma quadrata* have not been previously found in the Dublin district. A few of the Homoptera, notably *Liburnia leptosoma* and *L. mesomela*, are rather local insects in Ireland.

HETEROPTERA.

Acanthosoma hæmorrhoidale, L.	Anthocoris confusus, Reut.
Stygnus arenarius, Hahn.	A. sylvestris, L.
Scolopostethus affinis, Schill.	Triphleps minuta, L.
S. neglectus, Edw.	Microphysa elegantula, Baer.
Piesma quadrata, Fieb.	Pithanus Maerkeli, H. S.
Orthostira brunnea, Fall.	Leptopterna ferrugata, Fall.
Velia currens, Fab.	Rhopalotomus ater, J.
Nabis flavomarginatus, Scholtz.	Dicyphus errans, Wolff.
Salda saltatoria, L.	Plagiognathus viridulus, Fall.

HOMOPTERA.

Cixius cunicularis, L.	Cicadula sexnotata, Fall.
Liburnia leptosoma, Flor	Dicraneura sp.
L. pellucida, Fab.	Eupteryx vittatus, L.
L. limbata, Fab.	E. urticæ, Fab.
L. mesomela, Boh.	E. stachydearum, Hardy.
Dicranothropis hamata, Boh.	Aphalara exilis, Web. and Mohr.
Philænus spumarius, L.	Psylla peregrina, Först.
P. lineatus, L.	Trioza urticæ, L.
Megophthalmus scanicus, Fall.	Dactylopius citri (Risso). In nest of <i>Lasius fuscus</i> .
Acrocephalus nervosus, Schr.	Forda formicaria, Heyd. At roots of grasses, and in ants' nests.
A. albifrons, L.	
Athysanus obsoletus, Kbm.	

APTEA.

BY PROF. GEO. H. CARPENTER, B.SC.

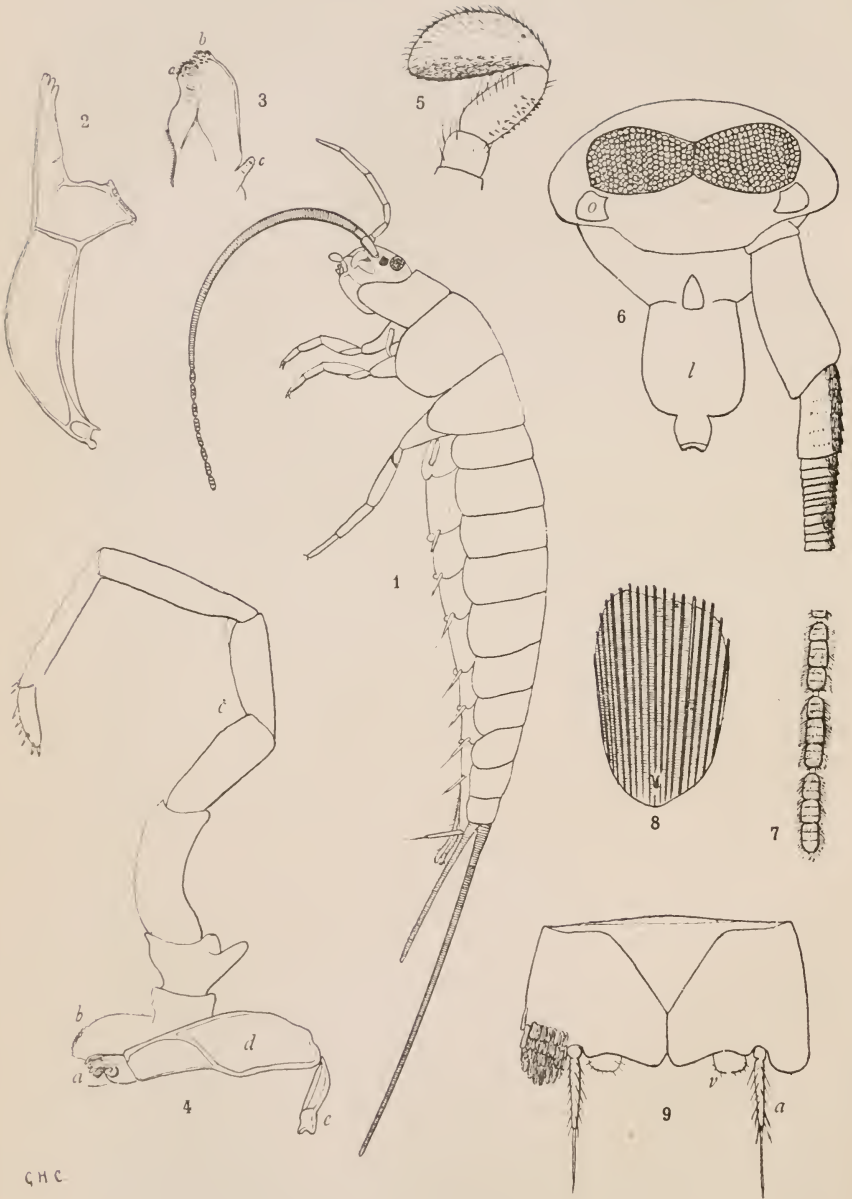
A NUMBER of Springtails and Bristle-tails were gathered by J. N. Halbert during his several visits to Lambay, and from these it has been possible to compile the following list, which includes eleven species of the former and three of the latter group. All the Collembola are common Irish species, except *Xenylla humicola*, which is a shore-haunting Springtail, northern in its range and new to the Irish fauna. The complete absence of Sminthuridæ and of several large genera like Achorutes is remarkable. The great interest of the collection, rests however in the Thysanura (Bristle-tails). The examination of the Machilidæ has shown that some of the Lambay specimens, together with a number of Irish specimens from various localities, which I had erroneously regarded as *Machilis polyypoda* (Linn.) belong to the genus *Præmachilis* which Silvestri has recently¹ proposed for a number of Italian and exotic species. The result is thus a remarkable and unexpected addition to the southern section of the Britannic fauna. *Præmachilis* may be readily distinguished from *Machilis* by the presence of only one pair of exsertile vesicles in association with the abdominal appendages. In *Machilis* there are two pairs of these vesicles from the second to the fifth abdominal segments inclusive. The central sternal sclerite of an abdominal segment in *Præmachilis* is regularly triangular in form (see Plate 16, fig. 9).

COLLEMBOLA.

ENTOMOBRYIDÆ.

- Entomobrya muscorum** (Nic.) Tullb.—Freshwater Bay, one specimen, October, 1906.
- E. albocincta** (Templ.)—N.W. coast, three specimens, October, 1906.
- Orchesella cincta** (De Geer).—N.W. coast, two specimens, October, 1906. One in June, 1906.
- Tomocerus plumbeus** (Linn.) (*longicornis*, Müll).—Freshwater Bay and N.W. coast, common, October, 1906.
- T. tridentiferus** (Tullb.)—Same localities as preceding, but apparently less common.
- Lepidocyrtus cyaneus**, Tullb.—Freshwater Bay, October, 1906.
- Isotoma viridis** (Bourl.)—N.W. coast, October, 1906.
- Anurophorus laticlis** (Nic.)—Common in moss.

¹ *Redia*, ii., 1904, p. 2.



CHC

PRÆMACHILIS HIBERNICA.

To face page 55.

ACHORUTIDÆ.

Xenylla humicola (Fab.)--N.W. coast, numerous in October, 1906.

As mentioned above, this is an addition to the Irish list. It was added to the British list by Carpenter and Evans in 1899 (*Proc. R. Phys. Soc. Edinb.*, xiv.). Its foreign distribution--North Germany, Novaya Zemlya, Spitzbergen, and Greenland--shows clearly that it belongs to the northern section of our fauna.

Anurida maritima (Leach).--This familiar denizen of the rock-pools was found abundantly in June, 1906.

THYSANURA.

CAMPODEIDÆ.

Campodea stapylinus, Westw.--Common in mould under stones both in June and October, 1906.

MACHILIDÆ.

Machilis maritima (Leach).--Common under stones above high-water mark, June, 1906.

Præmachilis hibernica, sp. nov.

(Plate 16).

Length 12 mm. Eyes twice as broad as long, with a very short median contact (fig. 6). Ocelli widely separated, situated at the lateral corner of the eye, subquadrate in form (figs. 1, 6). Feelers more than half as long as body, with basal segment twice as long as broad succeeded by a long multiarticulate region after which come seven regions, each composed of three segments. Prothorax produced into large lateral rounded lobes (fig. 1). Median cercus more than half as long as body, paired cerci three-sevenths length of median (fig. 1). Ovipositor in female extending almost as far as the tips of the stylets. Penis of male not reaching the tips of the lateral processes of the ninth abdominal segment.

The above characters suffice to distinguish this species from its congeners. Its nearest ally appears to be *Præmachilis italicus* (Grassi)¹, in which the lateral cerci are only one-third the length of the median, and the feelers three-quarters the body-length. *P. hibernicus* agrees however with *P. italicus* in the shape and position of the ocelli--a character which is also shared by a Chinese species--*P. confucius*, Silv.²

Examination of the jaws of *P. hibernicus* shows some features of interest. The mandibles have the apical region straight as in *Machilis maritima*, but the apex is armed with four distinct rounded teeth (fig. 2). The maxillulæ are stout (fig. 3) with the galea and lacinia equal in size and evenly

¹ *Bull. Soc. Ent. Ital.* xix., 1887, pp. 53-4: xxi., 1889, p. 5.

² *Redia*, iii., 1905, pp. 229-230.

rounded, while the palp shows faint but recognisable traces of jointing, and carries a few small bristles. The maxillary palps have an acute basal process on the first segment, the second, third, and fourth segments are equal to one another in length, the fifth half as long again as the fourth and the sixth nearly as long as the fifth. The terminal (seventh) segment is short and stout in the male, being only two-fifths as long as the sixth segment; in the female, however, the seventh segment is two-thirds as long as the sixth (figs. 1, 4); the labial palp is remarkable for the presence of numerous strong spines on its second segment, and for its very broad and lobate terminal segment in both sexes (fig 5).

The abdominal appendages carry long terminal bristles, two-thirds the length of the appendage. The form of the sternum of the fifth abdominal segment, with the arrangement of the appendages and exsertile vesicles, is shown in figure 9. The appendages of the ninth abdominal segment are half as long again as those of the anterior segments, but their terminal bristles are only slightly longer than those of the other appendages. The scales (fig. 8) are very dark, giving the insects a smoky appearance where uninjured.

The three specimens which may be regarded as types of the species were taken on Lambay in June, 1906. Other localities in which the insect has been collected are Glencullen, Co. Wicklow; Mote Park, Co. Roscommon; Inishmore, Aran, Co. Galway; Mitchelstown, Co. Cork; and Enniskillen, Co. Fermanagh. Evidently, therefore, this genus—hitherto unknown in Northern Europe—has a wide distribution in Ireland.

EXPLANATION OF PLATE 16.

Fig. 1.	<i>Præmachilis hibernicus</i> .	Female.	Lateral view, × 6.
2.	"	"	Male. Mandible, × 45.
3.	"	"	Maxillula— <i>a</i> , lacinia; <i>b</i> , galea; <i>c</i> , palp, × 45.
4.	"	"	Maxilla— <i>a</i> , lacinia; <i>b</i> , galea; <i>c</i> , palp; <i>d</i> , stipes; <i>e</i> , cardo, × 30.
5.	"	"	Palp of labium, × 30.
6.	"	"	Head showing compound eyes, ocelli (<i>o.</i>); labrum (<i>l.</i>), and base of feeler × 30.
7.	"	"	Female. Terminal segments of feeler, × 30.
8.	"	"	Scale from abdominal segment, × 220.
9.	"	"	Male. Fifth abdominal sternum, with appendages (<i>a</i>), and exsertile vesicles, (<i>v</i>), × 30.

MYRIAPODS.

BY PROF. GEO. H. CARPENTER, B.SC.

THE three classes of Arthropods usually included under the term "Myriapoda" are all represented on Lambay, and some of the species are evidently common. Notable absentees from the lists, however, are the large banded centipede *Lithobius variegatus*, Leach, our two largest snake-millipedes *Iulus niger*, Leach, and *I. sabulosus*, Linn, and the Pill-millipede *Glomeris marginata*, Vill. A few critical species still await determination.

CHILOPODA.

Geophilus longicornis, Leach.—Common; specimens obtained in June and October.

Linoetænia maritima (Leach).—Common on the coast.

Lithobius forficatus (Linn).—Common under stones.

L. melanops, Newp.—A few specimens, October, 1906.

SYMPHYLA.

Scutigereilla immaculata (Newp.).—Common under stones, both in summer and autumn.

DIPLOPODA.

Polyxenus lagurus (Linn).—Common under stones in south-west of island (J. N. H.).

Iulus punctatus, Leach.—A few specimens, June, 1905.

I. britannicus, Verhoeff.—Abundant in moss—June, October, and November, 1906.

Polydesmus complanatus (Linn).—A single specimen.

Brachydesmus superus, Latzel.—Two specimens, June, 1906.

CRUSTACEA THORACOSTRACA.

BY WILLIAM RANKIN.

DECAPODA.

PALÆMONIDÆ.

Leander squilla (Linn.)—Fairly common between tide-marks.

HIPPOLYTIIDÆ.

Hippolyte varians (Leach).—On W. shore at L.W. mark.

H. cranchi (Leach).—In rock pool at Carrickdorrish.

CRANGONIDÆ.

Crangon vulgaris (Linn.)—In sand, generally distributed.

ASTACIDÆ.

Homarus vulgaris (Bel.)—Caught in large numbers by fishermen around the shores.

GALATHEIDÆ.

Galathea squamifera (Leach).—Under stones on W. shore. Not common.

PAGURIDÆ.

Eupagurus bernhardus (Linn.)—Generally distributed.

PORCELLANIDÆ.

Porcellana longicornis (Linn.)—Abundant.

P. platycheles (Penn.)—Common.

MAIIDÆ.

Hyas araneus (Linn.)—Generally distributed.

H. coarctatus (Leach).—In 6 fms. off N. shore.

CANCRIDÆ.

Cancer pagurus, Linn.—Abundant--of small size - on all rocky shores. Large specimens are taken by the lobster catchers.

Pilumnus hirtellus (Linn.)--Not uncommon under stones on S.W. shore and Carrickdorrish.

PORTUNIDÆ.

Portunus arcuatus (Leach).—Off N. shore.

P. depurator (Linn.)—Fairly common in 6 fms. off N. shore.

P. holsatus (Fabr.)—One specimen dredged off N. shore in 6 fms.

P. puber (Linn.)—Common on rocky shores.

Carcinus mænas (Penn.)—Common everywhere.

CORYSTIDÆ.

Corystes cassivelaunus (Penn.)—Off N. shore, 6 fms.

SCHIZOPODA.

Macromysis flexuosa (Muller).--From *Zostera* bed at harbour.

CRUSTACEA ARTHROSTRACA.

BY H. J. BUCHANAN-WOLLASTON AND DENIS R. PACK-BERESFORD.

THE small extent of sandy shore makes the collection of marine representatives of this group difficult. Consequently the records of Amphipoda and marine Isopoda are but scanty. On the other hand, the terrestrial Isopoda ("Woodlice") have been somewhat fully studied.

AMPHIPODA.

GAMMARIDÆ.

Gammarus locusta (L.)—Common throughout littoral region.

HYPERIIDÆ.

Hyperia galba (Mont.)—Numerous specimens were found on a *Rhizostoma* cast up into a shore pool on the S.W. of the island, some alive and some (in the stomach) in a partly digested condition.

ATYLIDÆ.

Tritæta gibbosa (Sp. Bate).—One specimen from a shore pool on S.W. of island (from weeds growing in pool).

ISOPODA.

SPHÆROMIDÆ.

Næsa bidentata (Adams).—One specimen found in weed torn from rock pool on S.W. of island. Several specimens (male and female) from Talbot's Bay and near Carrickdorrish.

IDOTHEIDÆ.

Idothea baltica (Pallas).—Common among weed in shore pools. Young specimens common.

LIGIIDÆ.

Ligia oceanica (L.)—All round the shore.

TRICHONISCIDÆ.

Trichoniscus pusillus (Brandt.)—Common in damp places.

ONISCIDÆ.

Oniscus asellus (Linn.).—Common from the highest point of the island to the sea shore, and specimens of exceptional size.

Philoscia muscorum (Scopoli).—Everywhere.

Porcellio scaber (Latreille).—Common.

Porcellio pictus (Brandt.).—A handsome specimen in our host's dining room; also in and about the little guest house on the hill. Only recorded in Ireland from Dublin, Belfast, Galway, and Carlow.

ARMADILLIDÆ.

Armadillidium vulgare (Latreille.)—Very common.

PYCNOGONIDA.

BY PROFESSOR GEO. H. CARPENTER, B.SC.

THE only species of pycnogon collected was *Pycnogonum littorale*, Stroem, of which N. Colgan took several examples of both sexes in pools near the harbour on April 16, 1906. The specimens are, however, remarkable on account of their small size; an egg-bearing male measures only 5 mm. in length, and an adult female only 8 mm. Structurally, the Lambay specimens are not different from ordinary large forms of the species. In correlation with the small size of these insular animals, it may be worth mentioning that Colgan dredged in 13-14 fms. off Skerries, an adult male of this species measuring only 7 mm. in length.

PHALANGIDA.

BY PROF. GEO. H. CARPENTER, B.SC.

THE "Harvestmen" collected on Lambay are for the most part common on the mainland. Only *Acantholophus tridens* can be considered as, in any way, a scarce phalangid. The five species represented, out of the fourteen now known to occur in Ireland, are as follows:—

Liobunum rotundum (Latr.)—Freshwater Bay. Four males and one female, Oct., 1906; N.W. shore, one male and four females, Oct., 1906.

Phalangium opilio, Linn.—An adult male and a few young specimens June, 1906; four males and two females on N.W. shore, Oct., 1906. The October males are richer in colour than the June specimen and have larger and more prominent chelicerae.

Mitopus morio (Fab.)—Three adult females and several immature specimens, June, 1906; an adult male and two females in October.

Acantholophus tridens (C. L. Koch.)—Three adult males of this rather local species on the N.W. shore, October, 1906.

Nemastoma lugubre (Müller).—Four males and two females; in one male the typical pair of white spots are almost obsolete; Freshwater Bay, October, 1906.

A noteworthy feature is the absence from the list of the conspicuous *Megabunus diadema* (Fab.) which is so widely distributed over Ireland generally.

ARANEIDA.

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

As might be expected, owing to the almost entire absence of shrubs on the island, the spiders of Lambay are confined to a very great extent to the ground-inhabiting species.

I took a few specimens of the common *Araneus diadematus*, *A. cornutus*, *Meta segmentata*, and *Tetragnatha extensa*, in the little bays along the south coast, and a few *Xilla atrica* on the furze bushes on the western slope of the island, but these, with the addition of one or two immature Theridions, constitute the sole representatives of these usually abundant kinds, taken either by myself in October or by Mr. Halbert in June. By far the commonest species is *Drassodes cupreus*, which I found in large numbers in the crevices of the rocks on the south and west coasts, and I also found a large colony of the handsome *Dysdera crocata* on the coast between the harbour and Scotch Point.

Of the rarer kinds, the most interesting are *Lophocarenum stramineum*, Menge, which has not been recorded before in the British Isles; *Porrhomma errans* (Bl.) and *Attus pubescens*, Fab. both of which are new to Ireland; *Micryphantes innotabilis* (Cb.) of which there is only one previous Irish record, and which is a scarce species both in England and on the continent of Europe. *Micariosoma festivum*, Koch, which, though very common in France and fairly so in England, has only been recorded once previously in Ireland; *Prosthesima subterranea*, Koch, of which species Professor Carpenter records only one Irish example, from Co. Wicklow, though I have taken a single adult female myself in Co. Waterford; and *Hilaira reprobata* (Cb.) of which only a single female had previously been taken in Ireland.

Except where otherwise noted I took the spiders myself during a very pleasant three days' visit in October last.

My best thanks are due to Professor Carpenter for kindly naming some of the species, which I was unable to identify, and also for confirming my identification of some of the rarer kinds. The Rev. O. Pickard Cambridge has also examined the specimen of *Lophocarenum stramineum*. In the list which follows I have adopted the nomenclature given by Professor Carpenter in his "List of the Spiders of Ireland" (*Proc. R. I. Acad.* (3) vol. v.)

DYSDERIDÆ.

Dysdera crocata, Koch.—Common in crannies in the rocks between the harbour and Scotch Point.

Harpactes Hombergii (Scop.)—Fairly numerous in similar situations round the south and west coasts.

Segestria senoculata (L.)—Common.

OONOPIDÆ.

Oonops pulcher, Templeton.—Several mature males and one immature female.

DRASSIDÆ.

Prothesima subterranea, Koch.—A single mature female taken by Mr. Halbert in June '06. There is only one previous Irish record of this spider according to Professor Carpenter, being an adult male taken in Co. Wicklow.

Drassodes cupreus (Bl.)—Very common.

D. troglodytes (Koch.)—One immature female of this not very common spider was found on the sea shore.

CLUBIONIDÆ.

Clubiona terrestris, Westr.—One adult female taken by Mr. Halbert in June, 1905, and an immature female taken in October.

C. reclusa, Cb.—One adult female in June taken by Mr. Halbert.

Micariosoma festivum, Koch.—A single adult female taken by Mr. Halbert in June, 1906, the only previous Irish record of this spider being an immature male taken in 1895 by Professor Carpenter in Galway.

Agroeca proxima, Cb.—Several mature females taken under tufts of dead heather.

THOMISIDÆ.

Oxyptilia trux (Bl.)—One female taken by Mr. Halbert in June, 1905.

O. horticola (Koch.)—An adult pair.

Xysticus cristatus (Clerck.)—Several.

AGELENIDÆ.

Tegenaria domestica (Clerck.)—Common in the buildings.

Textrix denticulata (Oliv.)—Common on the north side of the island.

Hahnla elegans (Bl.)—A couple of females in the bog above Fresh-water Bay.

DICTYNIDÆ.

Amaurobius fenestralis, Stroem.—Common in buildings.

A. similis (Bl.) }
A. ferox (Walck.) } Common in buildings.

THERIDIIDÆ.

Theridion lineatum (Clerck).—A single immature specimen.

T. denticulatum (Walck).—A single immature male.

Pedanostethus lividus (Bl.)—A few mature females and one adult male.

Lophocarenum stramineum, Menge.—Two adult males, one taken by myself in October and one by Mr. Halbert in June. There is no previous record of this spider having been taken in the British Isles. M. Simon in "Les Arachnides de France" says, "The distribution of this species is remarkable. In France it only inhabits the South and the lower parts of the Alps; it belongs nevertheless to the northern fauna of Europe. It was discovered in Prussia by Menge and we have received it from Denmark from M. Budde-Lund."

Tiso vagans (Bl.)—A single male was taken in June, 1905, by Mr Halbert.

Diplocephalus fuscipes (Bl.)—A single male of this species.

Walckenaera accuminata (Bl.)—An adult female taken.

Neriene rubens (Bl.)—Adults of both sexes found under tufts of dead heather in October.

Dicyphus bituberculatus (Wid.)—Two immature males.

Stylothorax retusus (Westr.)—One adult female.

Erigone atra (Bl.)—Both sexes adult.

E. dentipalpis, Wid.—Both sexes adult.

Maso Sundevallii (Westr.)—One adult female and one immature.

Micryphantès innotabilis (Cb.)—A single adult male taken in the cave near Sunk Island, being only the second Irish record of this rare spider, the previous one being a female taken at Bray by Prof. Carpenter.

Tmeticus bicolor (Bl.)—Fairly common, both sexes adult.

T. Huthwaitli (Cb.)—A single pair adult.

Hillara reprobata (Cb.)—An adult male and three females; also three immature males in the Seal Hole. Three females elsewhere on the coast. This interesting spider, which haunts the tidal margin, is recorded by Carpenter from the Co. Dublin shore (North Bull), but has not been met with elsewhere in Ireland. It is now known from the Scottish, Welsh, and English (west and south) coasts.

Porrhomma microphthalma (Cb.)—Two adult males and one adult female taken in the cave near the Sunk Island.

P. errans (Bl.)—Two adult males taken by Mr. Praeger at Easter, 1906. This is the first Irish record of this spider, of which Rev. O. P. Cambridge says that it is rare at Bloxworth, but appears to be more plentiful in the North of England and Wales.

- Bathyphantes gracilis** (Bl.)—Both sexes adult.
- B. concolor**, Wid.—Both sexes adult, common in the ruined houses near the summit.
- B. variegatus** (Bl.)—Both sexes adult and fairly common under dead heather.
- Leptyphantes tenuis** (Bl.)—Common.
- L. Blackwallii**, Kulcz.—Common.
- L. pallidus** (Cb.)—A single adult female in October.
- L. leprosus**, Ohl.—A single adult female in October.
- Stemonyphantes bucculentus** (Cl.)—Several of both sexes adult in October under dead heather and on the sea shore.
- Bolyphantes luteolus** (Bl.)—Several adults of both sexes.
- Tapinopa longidens** (Wid.)—Several adult females and one male taken in the bog near Freshwater Bay.

TETRAGNATHIDÆ.

- Pachygnatha De Geerli**, Sund.—A single immature specimen.
- Tetragnatha extensa** (L.)—An adult pair taken in June by Mr. Halbert.

ARGIOPIDÆ.

- Meta segmentata** (Cl.)—A few specimens.
- M. merianæ** (Scop.)—Both sexes adult in the cave near Sunk Island.
- M. Menardii** (Latr.)—Mr. Praeger brought me a single immature female out of the Seal Hole cave, but tells me there were plenty more there.
- Zilla atrica** (Koch.)—A few specimens on the furze bushes on the western slope.
- Araneus diadematus** (Cl.)—Two or three adult females.
- A. cornutus**, Cl.—One adult female and several immature.

LYCOSIDÆ.

- Pisaura mirabilis** (Cl.)—A few immature.
- Lycosa pulverulenta** (Cl.)—Two females.
- L. terricola**, Thorell.—One adult female taken in June by Mr. Halbert.
- Pirata piraticus** (Clerck.)—One adult female taken in June by Mr. Halbert.
- Pardosa palustris** (Linn.)—An adult female and an immature male taken in June by Mr. Halbert.
- P. nigriceps**, Thorell.—A few immature.
- P. pullata** (Clerck.)—An adult female taken in June by Mr. Halbert.
- P. amentata** (Clerck.)—Several immature.

ATTIDÆ.

Heliophanus cupreus (Walck.)—One adult male and a number of adult and immature females taken by Mr. Halbert in June.

Attus pubescens, Fab.—One adult female and one immature taken in June by Mr. Halbert. This is the first Irish record of this spider, which M. Simon says is common all over Europe. In England it is, Mr. Cambridge says, rare at Bloxworth, but plentiful at one or two places in Hampshire, and has been found in other parts of England.

ACARINA.

BY J. N. HALBERT.

DURING a visit to Lambay in October last I collected a large number of mites, a group of animals which, with the exception of the family Hydrachnidæ, are well represented on the island. Those of the family Oribatidæ or "Beetle-mites," have been identified with the assistance of Dr. Michael's fine monograph on the British species.¹ Of the twenty-two species of these mites collected, the most interesting is *Hermannia carinata*, a species first described from Greenland. At the time of the publication of the part of the "Tierreich," dealing with the Oribatidæ, it had not been recorded from any other locality, and I cannot find that it has since been found in the Britannic area. The remaining species are widely distributed.

This appears to be the first list of Irish Oribatidæ that has been published, and all the species here recorded are new to this country. The nomenclature used is that of the "Tierreich" Oribatidæ, A. D. Michael (Berlin, 1898).

The nests of the small yellow ant (*Lasius flavus*), an extremely abundant insect on the island, are tenanted by two kinds of myrmecophilous mites belonging to the family Uropodidæ. One of these is apparently an undescribed species.

¹ A. D. Michael, "British Oribatidæ." 2 vols. London (*Ray Soc.*), 1884-88.

ORIBATIDÆ.

Oribata globula, Nic.

O. lapidaria, H. Luc.

O. Lucasi, Nic.

O. ovalis, C. L. Koch (= *O. punctata*, Nic.).

O. setosa, C. L. Koch.

Scutovertex maculatus, Michael.—A few specimens of this species were found amongst lichens on rocks near the sea coast.

Cepheus tegeocranus (Herm.).

Carabodes labyrinthicus (Michael).—Common in moss.

Notaspis bipilis, Herm.

N. exilis, Nic.

N. lucorum (C. L. Koch).—Very common, occurring in numerous colonies on drift wood on the shore.

Damæus clavipes, Herm.

D. geniculatus (L.), C. L. Koch. } Common in moss.

Hermannia convexa (C. L. Koch) (= *H. picea* Michael). Not uncommon in moss.

H. carinata, P. Kramer.—A single specimen of an Oribatid found amongst moss has been identified as *H. carinata*, P. Kramer (see "Tierreich," p. 63). The following note refers to some of the points in which it contrasts with the allied species *H. bistriata* (Nic.). The most striking difference in the cephalothorax is the presence of two small hair-bearing processes on the front margin of the raised part behind the rostrum, much as in some species of *Nothrus*. The central ridge is not straight sided, but curves posteriorly towards the pseudostigmata. The abdomen is more ovate, and less truncated on its hinder margin, where there are three pairs of small prominences furnished with hairs (these are broken off in my specimen). The marginal band is not ridged, nor is there a circular depression at the end of the dorsum. The marginal hairs are long, and lie close against the sides of the body; there is another row of hairs on each outer side of the median carinæ (Plate 17, fig. 1).

H. nanus (Nic.)

H. reticulata, Thorell.—Rare.

Nothrus horridus (Herm.).—Nymph.

N. spinifer, C. L. Koch.—One specimen in moss sent by Mr. Baring in November.

Neollodes theleproctus (Herm.).—Common on the under sides of stones among heather.

Hoploderma dasypus (Ant. Dug.) } Frequent in moss.

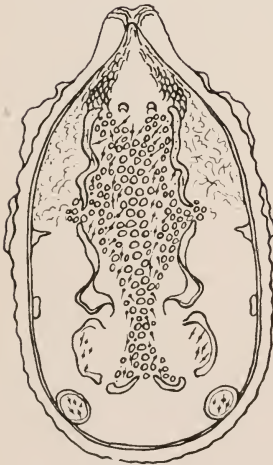
H. magnum, Nic.

UROPODIDÆ.

Urotrachytes formicarius (Lubbock).—A few specimens of this beautiful species were found under stones in the galleries of *Lasius flavus*, a few yards above high-water mark. It has not been



1



2



3

ACARINA FROM LAMBAY.

- FIG. 1. *Hermannia carinata*. Dorsal view, legs not shown, $\times 68$.
 2. *Trachyuropoda ceitica*. Dorsal view, legs not shown, $\times 72$.
 3. " " Ventral view, showing legs, &c., of right side, $\times 68$.

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previously recorded from Ireland. This species has been taken in numbers in nests of *Lasius flavus* at Land's End by Dr. Michael. Wasmann has also found it with the same ant in Luxemburg.

Trachyuropoda celtica, n. sp.

(Plate 17, figs. 2, 3).

A small species (length, 768 μ ; breadth, 410 μ .) of a bright red colour, allied to *T. coccinea* (Mich.) and *T. excavata* (Wasm.).

FEMALE.—In general shape the body is narrower and more parallel-sided than it is in the allied species. (Pl. 17, figs. 2, 3). The dorsum is deeply sculptured with comparatively strong marginal crenations, which become more feeble towards the posterior margin ; the latter is fairly even in outline. The rostral projection resembles that of *T. excavata*, except that it is decidedly longer in the present species, and its lamellæ do not form a continuous margin to the shoulders, as they do in *T. coccinea* and other species of the genus. The raised central part of the dorsum is comparatively narrow ; it is highest in the middle line, and is margined for more than two-thirds of its length by two-paired chitinous ridges arranged in a line. The first of these is ribbon-like, followed by a second, which is broader and raised posteriorly. Following this last is an oval-raised part (supported on a crescentic ridge of chitin), separated by a depression from the central part of the back. The latter is coarsely areolated as indicated in the figure, and bears a continuous row of minute T-shaped hairs on each side of the middle line. At each corner of the posterior margin there is another small prominence supported on a thick basis of chitin.

The ventral surface is very similar to that of *T. coccinea*, except that the margins are very deeply and evenly crenulated. The epigynum is long and rather narrow, much as in *T. laminosa* (C. et B.). The ventral foveæ are well developed ; the intermediate area bearing a few T-shaped hairs. There are also two hair-bearing ridges sloping outwards towards the sides of the body.

LOCALITY.—A single specimen occurred in company with the preceding species in a nest of *Lasius flavus*, on the south-western coast of Lambay Island.

POLYCHÆTA.

BY PROFESSOR GREGG WILSON, D.SC.

ONLY four species of marine annelids are represented as the result of shore-collecting at Lambay. They are *Nereis cultrifera*, Gr., *Harmothoe imbricata*, Linn., *Lepidonotus squamatus*, Linn., and *Sthenelais boa*, Jnstn.

OLIGOCHÆTA.

BY ROWLAND SOUTHERN.

THE conditions prevailing on Lambay are not very favourable for Oligochæte worms. There is very little cultivated land, and very few trees. Beyond a few wells and boggy patches, there are no suitable places for the aquatic members of the order. Worms are, however, able to exist under very unfavourable conditions, and the collections have yielded a large number of species. Of the 34 species found on Lambay, 15 are new to the Irish fauna, and 10 of these to the Britannic fauna. Of the others, three are new to science.

One of the most striking characteristics of the Lambay Oligochætes is the great variability exhibited by some of the species, and this is especially the case among the Lumbricidæ. As a whole, the forms are of smaller size than on the mainland. For instance, 10 specimens of *Lumbricus rubellus* taken at random had an average length of 74 mm. The average length of an equal number from all parts of Ireland was 92 mm. The Enchytræidæ were also smaller than the corresponding forms on the mainland. The chief variations will be described under the various species.

The only family of Oligochætes which is sufficiently well known in Ireland, to be of any value for comparative purposes, is the Lumbricidæ, or Earthworms proper. No fresh records among these were made, even for Co. Dublin. The chief point of interest was the absence of such common forms as *Helodrilus longus*, *H. Eiseni*, *Lumbricus papillosus*, and *L. festivus*, which all occur on the mainland, close to Lambay. A closer examination, however, would be necessary before inferences could be drawn from the absence of these forms.

All figures (Plates 18, 19) are drawn from living specimens, unless stated otherwise.

List of Species.

Those marked × are new for the whole Britannic area; those marked * are new for Ireland, but are already recorded from Great Britain.

NAIDIDÆ.

Nais elinguis, Müll. Oerst.*

ENCHYTRAEIDÆ.

<i>Henlea ventriculosa</i> (Udek.)*	<i>Fridericia variata</i> , Bret. ×
<i>Dicksoni</i> (Eisen.) ×	<i>striata</i> (Levins.)*
<i>hibernica</i> , n. sp.	<i>Bretscheri</i> , nonn. nov. ×
<i>Mesenchytræus setosus</i> , Mchlsn. ×	<i>aurita</i> , Issel. ×
<i>Marionina semifusca</i> (Clap.)*	<i>glandulosa</i> , n. sp.
<i>Enchytræus albidus</i> , Henle.	<i>connata</i> , Bretsch. ×
<i>Bucholzii</i> , Vejd.	<i>Perrieri</i> (Vejd.)*
<i>minimus</i> , Bret. ×	<i>polychæta</i> , Bret. ×
<i>argenteus</i> , Mchlsn.	<i>minuta</i> , Bret. ×
<i>Fridericia bulbosa</i> (Rosa). ×	<i>galba</i> (Hoff.)
	<i>Achæta minima</i> , n. sp.

LUMBRICIDÆ.

<i>Eiseniella tetraedra</i> (Sav.), <i>typica</i> .	<i>Helodrilus</i> (<i>Dendrobæna</i>) <i>rubidus</i>
<i>Eisenia foetida</i> (Sav.)	var. <i>subrubicunda</i> (Eisen.)
<i>rosea</i> (Sav.)	<i>mammalis</i> (Sav.)
<i>Helodrilus</i> (<i>Allolobophora</i>) <i>chloro-</i>	<i>Octolasion lacteum</i> (Orley).
<i>ticus</i> (Sav.)	<i>Lumbricus rubellus</i> , Hoffmstr.
<i>caliginosus</i> (Sav.), <i>typicus</i> .	<i>castaneus</i> (Sav.)
(<i>Dendrobæna</i>) <i>rubidus</i> (Sav.),	<i>terrestris</i> , L.
<i>typicus</i> .	

The arrangement of species is that adopted by Michaelsen in the "Tierreich" *Oligochaeta* (vol. x.), to which reference should be made for the full synonymy.

NAIDIDÆ.

Nais elinguis, Müll.*

1891. N. E. Benham, *Q.J.M.Sc.*, vol. xxxiii., p. 212.

1900. Michaelsen. "Tierreich," vol. x., p. 25.

Several specimens were obtained from Sphagnum, near the Raven's Well. They were very minute, 1-2 mm. long, and consisting of only about 11 segments. No sexually mature forms were found. Numerous spherical corpuscles were observed, floating freely in the cœlome. There was practically no difference between the ventral setæ of the anterior and posterior segments.

DISTRIBUTION—England—Oxford (Benham).

Western Europe; North America.

ENCHYTRÆIDÆ.

Special attention was paid to the Enchytræidæ of Lambay. The littoral forms were not of so much importance as those occurring inland, and only one species, *Marionina semifusca*, was collected. Altogether 21 species were obtained. The genus *Fridericia*, as usual, predominated with 11 species.

Henlea ventriculosa (Udek.)*

1896. Friend, *Essex Naturalist*, vol ix., p. 110.

1900. Michaelsen, "Tierreich," vol. x., p. 69.

I have found this worm in various parts of Ireland.

DISTRIBUTION.—England—Essex (Friend). Common in Europe.

Henlea Dicksoni (Eisen). ×

1900. Michaelsen, "Tierreich," vol. x., p. 68.

Two specimens of this worm were found. They were very small, 4-5 mm. in length. Number of segments, 34. Salivary glands were not observed. Prostate gland very large. The brain is straight behind, not concave, as described. It is concave in front, and the sides diverge backwards. The spermatheca (Pl. 19, fig. 5) consists of an oval ampulla, with an efferent duct twice as long as the ampulla. The duct leading into the œsophagus is equal in length to the efferent duct.

DISTRIBUTION.—Nova Zembla. Germany. Switzerland.

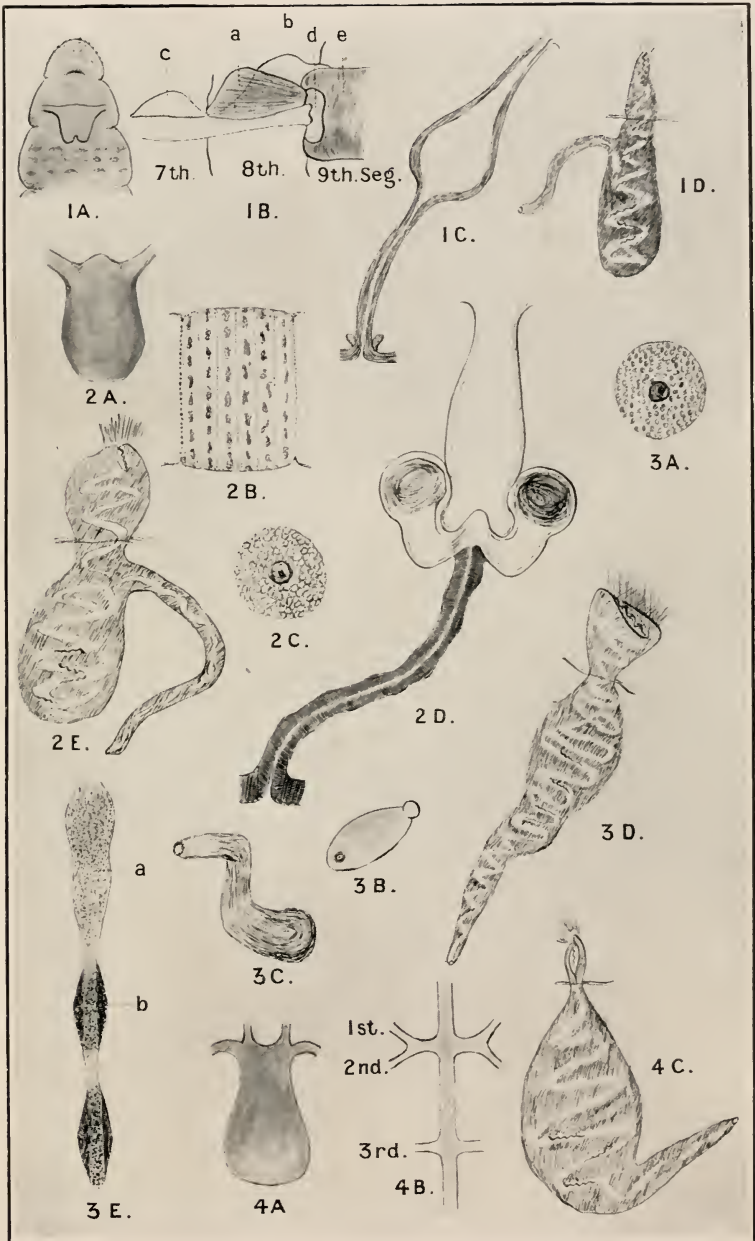
Henlea hibernica, n. sp.

Henlea hibernica is a stout worm of a greyish-white colour. It is very opaque, owing to the glandular epithelium.

Length, 15-20 mm. Number of segments, 60.

The head-pore shows as a large transverse slit, between the prostomium and the first body segment (Pl. 18, fig. 1A.) Ventral setæ 5-9 in a bundle, lateral setæ 5-7. They are slightly curved, and the inner ones are shorter than the outer ones. The clitellum occupies segments $\frac{1}{2}$ 11-13.

The brain (Pl. 18, fig. 1A), is longer than broad. It is slightly convex in front, and emarginate behind. The cœlomic corpuscles are circular discs, granular and nucleated. The salivary glands are long and twisted, lying on the ventral surface of the œsophagus. The œsophagus passes suddenly into the mid-gut at the boundary between the 8th and 9th segments (Pl. 18, fig. 1B). The œsophagus projects into the mid-gut, forming a valve-like structure (*d*). From the front of the mid-gut two œsophageal glands (*a*) project into the 8th segment. They lie dorso-laterally to the œsophagus. The dorsal vessel rises in the 8th-9th segmental groove, and has 3 contractile swellings in the 8th, 7th, and 6th segments (*b, c*). The nephridium (Pl. 18, fig. 1D), consists of a long narrow anteseptal portion, a broad post-septal $1\frac{1}{2}$ -2 times as long as the anteseptal. The duct rises near the septum. The speru funnel is 3-4 times as long as broad, with parallel sides. The duct is fairly long.



Details of Oligochaete Worms.

R. Southern, del.

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The spermatheca (Pl. 18., fig. 1C), consists of a pear-shaped ampulla, gradually narrowing till it enters the œsophagus. The duct is sharply defined, and is equal in length to the rest of the spermatheca. It frequently has several small glands at the external opening.

This species is very closely related to *Henlea nasuta* (Eisen). It differs from the latter in the number of setæ, in the shape of the nephridium and sperm funnel, but chiefly in the position of the two œsophageal glands, and the origin of the dorsal vessel, which has three contractile hearts and not two, as Vejdovsky states for *Henlea nasuta* (1., page 56). *Henlea nasuta* has not yet been found in Ireland. I have found *Henlea hibernica* in various places, including Co. Kerry, and the Boyne valley, Co. Meath, and all these specimens agree closely in their characters with each other.

Marionina semifusca (Clap.)*

1900. Michaelsen, "Tierreich," vol. x., p. 76.

Worms belonging to this species were found under stones between tide marks near the harbour. The species was described by Claparède (1., p. 76), from specimens collected in the Hebrides. It does not seem to have been recorded since.

Mesenchytræus setosus, Mchlsn. ×

1900. Michaelsen, "Tierreich," vol. x., p. 85.

1901. *Mesenchytræus megachæctus*, Bretscher, *Revue Suisse Zool.*, vol. ix., p. 210.

1904. *M. setosus*, Bretscher, *Rev. Suisse Zool.*, vol. xii., p. 263.

Two specimens of this species were obtained in soil, in November. It appears to be mature in the winter, as immature forms were found in Co. Kerry in June. They agree very well with Michaelsen's description (2, p. 494), except that the brain may be straight, convex, or slightly emarginate behind. The dorsal vessel rises in the 16th segment, and is covered with greenish brown glands. The nephridium (Pl. 19., fig. 6), has a very long and narrow anteseptal; the post-septal consists of two large lobes. The sperm funnel is small, about twice as long as broad, and the duct is very short.

DISTRIBUTION.—Germany. Switzerland.

Enchytræus albidus, Henle.

1900. Michaelsen, "Tierreich," vol. x., p. 89.

1906. Southern, *Irish Naturalist*, vol. xv., p. 184.

This species was found in June with *Fridericia bulbosa*, in soil which had collected in a depression of the rocks, near Saltpan Bay. They were also found mature in November.

DISTRIBUTION.—Ireland, England, common in Europe, New Zealand, Kerguelen Island, &c.

Enchytræus Bucholzi, Vejd.

1900. Michaelsen, "Tierreich," vol. x., p. 90.

1906. Southern, *Irish Naturalist*, vol. xv., p. 184.

One mature specimen was found in November, in soil. Like the last-named species, it appears to be mature all the year round.

DISTRIBUTION.—Ireland, Europe, Patagonia, &c.

Enchytræus argenteus, Mchlsn.

1897. *Enchytræus parvulus*, Friend, *Zoologist*, ser. 4, vol. i., p. 349.

1902. " " " " *Irish Naturalist*, vol. xi., p. 110.

1900. Michaelsen, "Tierreich," vol. x., p. 91.

This species was recorded by Friend as the "Aster Worm." He afterwards recognised it as identical with *E. argenteus*, Mch. The name *Enchytræus parvulus* has since been applied to another species by Bretscher (1, page 18). It is common in soil, and is occasionally injurious to plants.

DISTRIBUTION.—Ireland, England, Germany, Switzerland.

Enchytræus minimus, Bretscher. ×

1899. Bretscher, *Revue Suisse Zool.*, vol. vi., p. 402.

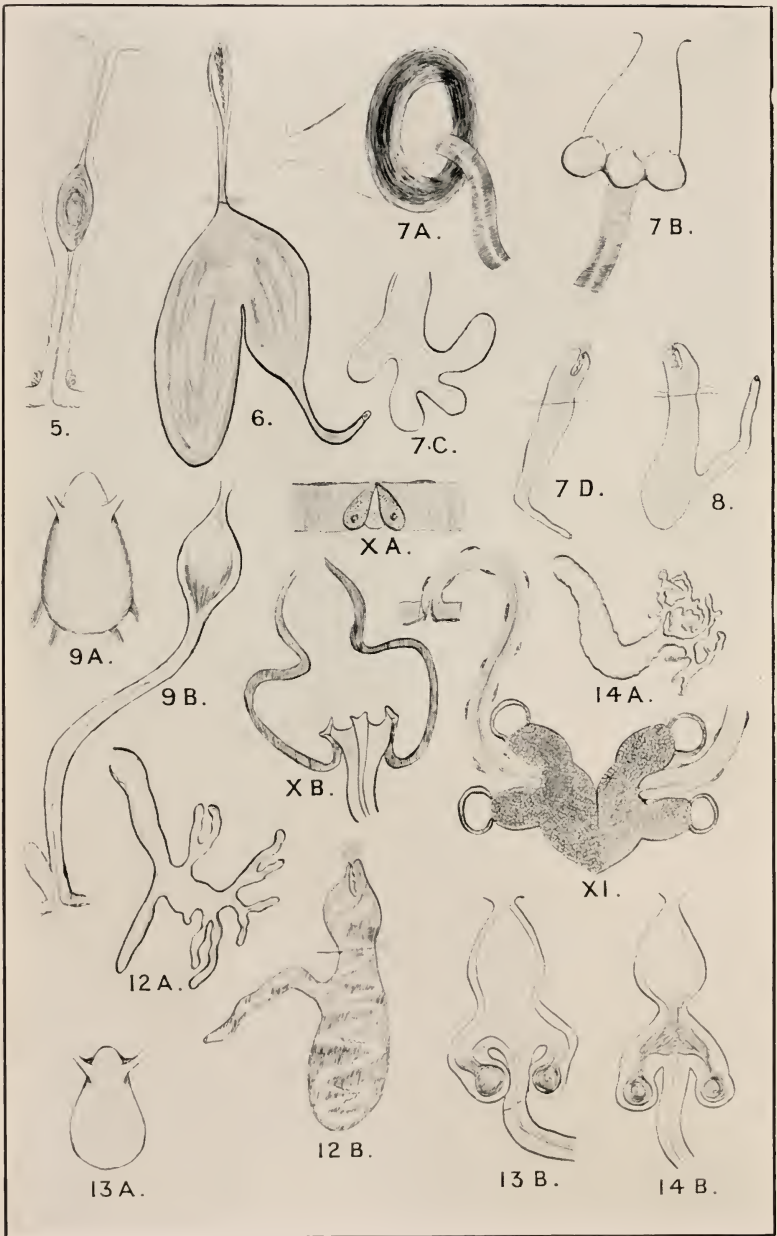
Several specimens were found on Lambay. I also found it in large numbers at Glencar, Co Kerry. They agreed in all respects with Bretscher's description. Michaelsen (1, p. 93) stated that this species is probably the same as *E. argenteus*. After examining both species, I find there is no ground for this statement, and *E. minimus* must be regarded as a distinct species. Bretscher's paper was not illustrated, so I have given figures of the brain (Pl. 18, fig. 4 A), the nephridium (fig. 4 C), and the front part of the dorsal vessel (fig. 4 B). The two anterior branches of the latter, on each side, have a common origin. The ante-septal of the nephridium consists of the funnel only, a sharp distinction from *E. argenteus*. The specimens were very small, 2.5-3.5 mm. long. The dorsal vessel rises in the 13th segment.

DISTRIBUTION.—Ireland, Switzerland.

Fridericia bulbosa (Rosa). ×

1900. Michaelsen, "Tierreich," vol. x., p. 96.

This was the commonest Enchytræid on Lambay. It showed great variation in some of its characters. Length 10-12 mm. Setæ usually 4, occasionally 6 in a bundle. Brain longer than broad, concave or slightly convex in front; behind concave, convex, or straight. Salivary glands usually unbranched. Occasionally the distal end bifurcates once or twice (Pl. 19, fig. 7, C). The dorsal vessel rises in the 19th-21st segment. The post-septal of the nephridium (fig. 7 D) gradually merges into the duct. The sperm funnel is 3-6 times as long as broad. The spermatheca



Details of Oligochaete Worms.

R. Southern, del.

To face p. 73.

is very characteristic. When mature, the ampulla is very large and cone-shaped (fig. 7 A). At the base of the cone is a large ring-shaped diverticulum, which contains most of the sperm. In several specimens the ring of the spermatheca on one side of the body seemed to be broken up into diverticula-like pouches (fig. 7 B), whilst the spermatheca on the other side was normal. The cœlomic corpuscles are of two sizes, some large, clear, and disc-shaped, others small and spindle-shaped.

DISTRIBUTION.—Germany, Switzerland, Italy, Nova Zembla, Philadelphia.

Fridericia variata, Bretscher. ×

1902. Bretscher, *Rev. Suisse Zool.*, p. 19.

Bretscher described this species as resembling *F. bulbosa* in everything except the nephridia and the position of the spermatheca. In the nephridia (Pl. 19, fig. 8), the duct may rise from any part of the post-septal, whereas in *F. bulbosa* it always rises from the end. The spermatheca are connected with the gut in the dorsal mid-line, instead of laterally, as in *F. bulbosa*. I found specimens on Lambay, which differed from the typical form of *F. bulbosa* in these two points only. As regards the nephridia, the point of origin of the duct is very variable in many species of this genus. The second difference does not seem of much importance. Under these circumstances, and taking into consideration also the fact that the two forms were obtained from the same locality, I am inclined to regard *F. variata* as only a variation of *F. bulbosa*, which is liable to occur in different localities.

DISTRIBUTION.—Switzerland.

Fridericia striata (Levins).*

1898. Friend, *Zoologist*, p. 121.

1900. Michaelsen, "Tierreich," p. 96.

This species is easily recognised by its spermatheca, which have two large glands at the external aperture. It was recorded by Friend from Yorkshire in 1898.

DISTRIBUTION.—England, Denmark, Germany, Switzerland; Chili, Uruguay.

Fridericia Bretscheri, nom. nov. ×

1902 *Fridericia parva*, Bretscher, *Rev. Suisse Zool.*, p. 25 (non *F. parva*, Moore in *Proc. Acad. Phil.* 1895, p. 343.)

The name *F. parva* given to this species by Bretscher, had already been used by Moore, so I have changed it to *F. Bretscheri*, after Professor Bretscher, of Zurich, who first described it.

Numerous specimens were obtained from Lambay. Whilst corresponding well with Bretscher's Swiss species, there are several differences. The setæ are usually four in a bundle, though in one specimen only two were

found. The salivary glands are long sacs, and not branched, as Bretscher states. Length, 6 mm. The epidermis bears several rows of large green glands in each segment. The cœlomic corpuscles are large, granular, oval to round. The dorsal vessel rises in the 17th or 18th segment. First dorsal pore in the 7th segment. The brain projects prominently in front (Pl. 19, fig 9 A). The spermatheca (fig. 9 B) consists of a small oval ampulla, lying dorsally on the œsophagus. The duct is very long, and there is a single large gland at the external aperture.

DISTRIBUTION.—Switzerland.

Fridericia aurita, Issel. ×

1905. Issel, *Zool. Jahrb.*, vol. xxii., p. 468.

This species was found in large numbers. It is easily recognised by the characteristic diverticula of the spermatheca.

Length, 10-18 mm. Setæ usually four in a bundle, sometimes not more than three. The œsophagus is covered with large greenish glands. The dorsal vessel rises in the 21st segment. The dorsal pores begin in the 7th segment. They are surrounded by four or five pear-shaped gland cells (Pl. 19, fig. x A). In the anterior segments, the duct of the nephridium rises from the middle of the post-septal. In the posterior segments it rises from the base. The spermatheca consists of a long duct and a pear-shaped ampulla, bearing two ear-shaped diverticula near its base. The ampulla is constricted near the junction with the diverticula. Occasionally small glands are found near the external opening of the duct. The appearance of the spermatheca varies very much, according to its degree of maturity. When filled with sperm, the diverticula appears more cylindrical than ear-shaped. A figure showing the appearance of the ampulla, after the expulsion of the sperm, is given (fig. x B).

DISTRIBUTION.—Piedmont, Italy. (700-1,150 metres).

Fridericia minuta, Bret. ×

1900. *Fridericia minuta*, Bret., *Rev. Suisse Zool.*, p. 33.

1900. *Fridericia auriculata*, Bret., *ib.* p. 34.

In 1902 Bretscher (1, p. 22) united these two forms, which he had previously regarded as distinct. The Lambay specimens agree very closely with his description. Setæ, 6-7 in a bundle. The dorsal vessel rises in the 18th-21st segment. The two anterior branches on each side are given off separately. The salivary glands (Pl. 19, fig. 14 A) divide into several short branches at the distal end. The nephridia vary in form according to their position. There are no glands at the external opening of the spermatheca. The two diverticula are cylindrical, and the ampulla is slightly constricted off from the diverticula at its base (fig. 14 B). Length, 10-15 mm.

DISTRIBUTION.—Switzerland.

Fridericia connata, Bret. ×

1902. Bretscher, *Rev. Suisse Zool.*, p. 20.

Several specimens of this worm were obtained. Bretscher states in his description, that it resembles *F. bisetosa* closely, except as regards the form and disposition of the spermathecæ. The remarkable feature about the latter organs, in *F. connata*, is that they lie dorsally on the œsophagus, and the basal parts of the ampulla are fused (Plate 19, fig. 11). The diverticula have long stalks, with hemispherical receptacles for the sperm. The ampulla and stalks are coarsely granular. The duct is long, and dotted with unicellular glands. In *F. bisetosa* the diverticula are globular and almost sessile, the ampulla is small, not granular, and enters the œsophagus laterally. In *F. connata* the epidermis round the spermatheca pore is very glandular. The salivary glands are twisted, but unbranched. The dorsal vessel rises in the 23rd segment. In *F. bisetosa* it rises in the 18th segment. Length, 10–20 mm. Setæ, 2 in a bundle. Brain twice as long as broad, convex behind. Corpuscles large and disc-shaped. The duct of the nephridium rises variously on the post-septal.

DISTRIBUTION.—Switzerland.

Fridericia Perrieri (Vejd.).*

1900. Michaelser, "Tierreich," vol. x., p. 98.

Friend (I., p. 196) recorded this species from England, but gave no details of its structure. The specimens from Lambay, and others from various parts of Ireland, which I refer to this species, show several points of difference from those described by Vejdovsky (I, p. 58). In the first place, the salivary glands (Pl. 19, fig. 12 A) bear only a distant resemblance to the figure given by Vejdovsky, though it is just possible to say that the branches rise in two bundles. Secondly, the anteseptal of the nephridium (fig. 12 B) is oval, not slender, and the duct rises from the front or middle of the post-septal. Vejdovsky does not state the origin of the dorsal vessel. In my specimens it rises in the 22nd segment. The Lambay specimens agree with Vejdovsky's description as regards size, brain, setæ, spermathecæ, sperm-funnel, and in the common origin of the two anterior branches of the dorsal vessel. On the whole, the evidence points to the identity of these specimens with *F. Perrieri*.

DISTRIBUTION.—Denmark, Bohemia, Switzerland, Italy, Germany, England (?).

Fridericia polychæta, Bret. ×

1900. Bretscher, *Rev. Suisse Zool.*, p. 450.

This species was obtained in November in soil and moss. In several points the specimens differed from Bretscher's description. They are 15–25 mm. long. The epithelium is somewhat opaque, owing to the presence of

several rows of dark glands in each segment. Ventral setæ, 7-9, occasionally 10; lateral setæ, 5-8. The dorsal pores commence in the front of the 7th segment. The girdle occupies segs. 12- $\frac{1}{2}$ 13. It is very prominent, and composed of closely-set glands. The brain (Pl. 19, fig. 13 A) projects in front. Bretscher describes it as concave. The salivary glands have numerous small, short branches. The dorsal vessel rises in the 22nd segment. The two anterior branches originate separately. The spermatheca (fig. 13 B) has two stalked diverticula, which curve in towards the duct. There are no glands at the external opening of the duct.

DISTRIBUTION.—Switzerland.

Fridericia glanduosa, n. sp.

Only one specimen of this worm, fortunately mature, was obtained in October.

Length, 25 mm. Setæ, 6-8 in a bundle. The worm is very opaque, and the internal organs are difficult to observe. The opacity is due to the large number of dark glands on the epidermis. In each segment (Pl. 18, fig. 2 B) there are about 7 rows of minute dotted glands, alternating with rows of large irregular glands. These glands are very numerous and conspicuous on the 4th and 5th segments, in the vicinity of the openings of the spermatheca. The girdle occupies segments 12- $\frac{1}{2}$ 13. It is covered with a mosaic pattern of granular glands, roughly arranged in rows, with clear intermediate spaces. The brain (fig. 2 A.) is 1 $\frac{1}{2}$ times as long as broad, projecting in front, and convex behind. The cœlomic corpuscles are oval to round (fig. 2 C), finely granular. The salivary glands were not observed with certainty, but they appeared to be long and tubular, apparently dividing into two long branches, which stretched into the 6th segment. The nephridia (fig. 2 E) are composed of a large anteseptal portion, and a somewhat larger post-septal. The duct rises near the septum, and is longer than the post-septal. The spermatheca (fig. 2 D) has two large-stalked diverticula swollen at the distal end. They curve round, away from the duct, and lie alongside the ampulla. The latter is long, and not very wide. The duct is dotted with flat, unicellular glands. There are no glands at the opening. The sperm-funnel is several times longer than broad. The sperm-duct ends in a large prostate.

This species resembles *F. polychata* more than any other. It is distinguished from those members of the genus which have two-stalked diverticula by (1) the number of setæ, (2) glands of the epithelium, (3) salivary glands, (4) form of the spermatheca.

Fridericia galba (Hoff.).

1898. Friend, *Irish Naturalist*, vol. vii., p. 196.

1900. Michaelsen, "Tierreich," p. 101.

This species has already been recorded from Ireland by Friend. It is fairly common here. In all the specimens I have examined, the duct of

the nephridium rises near the front end, or middle of the post-septal. Vejdovsky (I., Pl. vii., fig. 4) figures it as rising near the posterior end. The dorsal vessel rises in the 21st segment. In one specimen there were three diverticula on one spermatheca, four on the other.

DISTRIBUTION.—Ireland, Europe.

Achæta minima, n. sp.

Only one specimen of this new worm was found in soil from Lambay. Fortunately it was fully mature when I found it in June. Owing, however, to its small size and fragile nature, only a brief examination of the living animal was possible. After it was stained and mounted, some of the organs could not be made out clearly, and the description of them must be left over till more material is available. Sufficient was seen to mark it as a distinct species of this remarkable genus.

Achæta minima is a minute, transparent worm, 3 mm. long. Number of segments 22. A large head-pore is present at the tip of the prostomium. Of the internal glands representing the setæ only the dorsal pair are present. These are oval cells with the nucleus at the distal end (Pl. 18, fig. 3 B). The epithelium is faintly dotted with glands. The girdle occupies the 12th segment. Its glands are in transverse rows. The brain is about $1\frac{1}{2}$ -2 times as long as broad. It is convex before and behind. The sides converge to the anterior end, which, in the preserved state, is much narrower than the posterior. The ganglia of the ventral nerve cord are very conspicuous when stained. The ganglia of the first four segments are united into a single large mass (fig. 3 E, a). The edges of the ganglia appear to be curved round to the ventral side (b). The septal glands lie in the 4th, 5th, and 6th segments, those in the 6th being very large. The cœlomic corpuscles (fig. 3 A) are circular discs, nucleated, coarsely granular, and brown in colour. The salivary glands could not be made out with certainty. The alimentary canal is covered with large brown cells. The dorsal vessel rises in the 6th segment, and there are three dilations in the 6th, 5th, and 4th segments, those in the 6th and 5th being very large. The nephridia (Fig. 3 D) commence in the 6/7 septum. The anteseptal is almost semicircular in outline, with a straight anterior border. The post-septal is 4-5 times as long, and is not distinct from the duct. The duct is not dilated, and there are no glands at the external pore. The sperm-funnel is 4-6 times as long as broad. The duct is long and spirally wound, as in *A. Eiseni*, but more loosely. The spermathecae (fig. 3 C) are simple sacs lying in the 5th segment, and opening ventrally. They lie at the sides of the œsophagus. There is no distinction between ampulla and duct.

This species is most nearly related to *A. bohémica* (Vejl.), which it resembles in only having the dorsal setal glands developed, and also in the vascular system. It is distinguished from it by its small size, cœlomic corpuscles, nephridia, and spermathecae.

LUMBRICIDÆ.

Eleven species and one variety belonging to this family were collected on Lambay. In the whole Irish fauna, twenty species and three varieties are known. The Lambay Lumbricidæ are of interest, chiefly because of the great variability shown by some of the species. Some forms common on the adjacent mainland were not found at all.

Eisenlella tetrædra (Sav.), *typica*.

1893. Friend. *Allurus tetrædrus*, + *A. t.* var. *obscurus* + *A. t.* var. *luteus* + *Allurus amphispæna* + *Allurus flavus*. *Proc. Roy. Ir. Acad.* (3), vol. ii., p. 462.

1900. Michaelsen, "Tierreich," p. 471.

This semi-amphibious Earthworm was found in all places sufficiently damp for it. It is common in Ireland.

DISTRIBUTION.—Common in Europe.

Eisenia foetida (Sav.).

1836 *Lumbricus annularis*, R. Templeton, *Mag. Nat. Hist.*, vol. ix., p. 234.

1900. Michaelsen, "Tierreich," p. 475.

In garden soil, at the castle.

DISTRIBUTION.—Common in Europe, Asia, North America. Introduced into various parts of the world.

Eisenia rosea (Sav.).

1893. *Allolobophora mucosa*, Friend, *Irish Naturalist*, p. 122.

1900. Michaelsen, "Tierreich," p. 478.

1900.? *Eisenia rosea*, var. *macedonica* (Rosa). Michaelsen, "Tierreich," p. 479.

The Lambay worms referable to this species vary widely in some of their characters. The variety *macedonica* was first separated from the type form by Rosa (I., p. 428), because of the presence of small ventral papillæ on segments 26-33, at the border of the girdle. The Lambay specimens include all intermediate forms, from worms with no papillæ at all, to forms with papillæ on segments 9-12, 24 and 25, and 27-33. The girdle occupies segments 25.26- $\frac{1}{2}$ 32.32. Taking these facts into consideration, it does not seem justifiable to regard the form *macedonica* as a distinct variety. The male pores may be small, and confined to the 15th segment, or large, and slightly overstepping it. The tubercula pubertatis are on segments 29-31. In one specimen they only occupied segments 29-30.

DISTRIBUTION.—Common in Europe, Asia, North America,

Helodrilus (Allolobophora) caliginosus, (Sav.). *typicus*.

? 1836. *Lumbricus gordianus* + *Lumbricus lividus*, R. Templeton, *Mag. Nat. Hist.*, vol. ix., p. 135.

1893. *Allolobophora turgida*, Friend, *Irish Naturalist*, p. 122.

1900. Michaelsen, "Tierreich," p. 483.

Common in Ireland.

DISTRIBUTION.—Common in Europe; North America.

Helodrilus (Allolobophora) chloroticus (Sav.).

1865. *Lumbricus vividis*, Johnston, "Cat. Brit. Non-par. Worms," p. 60.

1893. *Allolobophora cambrica*, Friend, *Irish Naturalist*, vol. ii., p. 122.

1893. *Allolobophora chlorotica*, Friend, *loc. cit.*

1900. Michaelsen, "Tierreich," p. 486.

Very common on Lambay. Some of the specimens showed great variation from the type. In one specimen the right side was normal, but on the left the male pore was on the 16th seg., and the tubercula pubertatis consisted of papillæ on segments 31-36 inclusive. Another specimen showed a similar abnormality, except that the male pores were both on the 15th segment. In a third specimen the tubercula on the left side were only on segments 31 and 33.

DISTRIBUTION.—Common in Europe and North America. Introduced species in many parts of the world.

Helodrilus (Dendrobæna) rubidus (Sav.) *typicus*.

1892. *Allolobophora (Dendrobæna) arborea*, Friend, *Journ. Linn. Soc., Zool.*, vol. xxiv., p. 301.

1893. *Dendrobæna arborea*, Friend, *Irish Naturalist*, vol. ii., p. 239.

1900. Michaelsen, "Tierreich," p. 490.

One specimen of this rare form was found on Lambay. There were no papillæ on the 16th segment. The girdle occupies segments 26-31. The tubercula pubertatis are on segments 29 and 30.

DISTRIBUTION.—British Isles (rare), Germany, France, Switzerland, Siberia.

Helodrilus (Dendrobæna) rubidus, var. **subrubicunda** (Eisen.).

1836. ? *Lumbricus xanthurus*, R. Templeton, *Mag. Nat. Hist.*, vol. ix., p. 235.

1893. *Allolobophora subrubicunda*, Friend, *Irish Naturalist*, p. 238.

1900. Michaelsen, "Tierreich," p. 490.

This worm is very common in Ireland. The Lambay specimens were very variable. One was remarkable for the number and size of the papillæ on which the ventral setæ were placed. These papillæ

occurred on segments 16, 17, 23-34. They were especially large on segments 33 and 34, occupying the whole ventral surface, and fairly large on segments 24 and 30. The girdle of this specimen occupied segments 25-32. The tubercula pubertatis were also very variable. In some cases they were divided by the intersegmental furrows, in others they were continuous.

DISTRIBUTION.—Europe, North America.

Helodrilus (Dendrobæna) mammalis (Sav.).

1893 *Allolobophora (Dendrobæna) celtica* (Rosa), Friend, *Irish Naturalist*, p. 219.

1893. *Allolobophora celtica*, var. *rosea*, Friend, *Irish Naturalist*, p. 220.

1900. Michaelsen, "Tierreich," p. 493.

This worm is very common in Ireland.

DISTRIBUTION.—British Isles; France.

Octolasion lacteum, Orley.

1893. *Allolobophora profuga*, Rosa. Friend, *Irish Naturalist*, vol. ii., p. 121.

1900. Michaelsen, "Tierreich," p. 506.

This species seems to be fairly common in the British Isles.

DISTRIBUTION.—Central and South Europe, North Africa, &c.

Lumbricus rubellus, Hoff.

1893. Friend, *Irish Naturalist*, vol. ii., p. 8.

1900. Michaelsen, "Tierreich," vol. x., p. 509.

This is the commonest Earthworm in Ireland.

DISTRIBUTION.—Europe, Asia, North America.

Lumbricus castaneus (Sav.).

1893. *Lumbricus purpureus* (Eisen). Friend, *Irish Naturalist*, vol. ii., p. 8.

1900. Michaelsen, "Tierreich," vol. x., p. 510.

Very common in Ireland.

DISTRIBUTION.—Europe, North America.

Lumbricus terrestris, L.

1856. Thompson, "Nat. Hist. of Ireland," vol. iv., p. 428.

1900. Michaelsen, "Tierreich," p. 511.

This species, though known as the "Common Earthworm," is not by any means so common as many others. Two specimens were obtained on Lambay. One of these had large ventral papillæ on segments 31-38.

DISTRIBUTION.—Europe, North America.

BIBLIOGRAPHY.

- BRETSCHER, K.—I. "Beobachtung über die Oligochaeten der Schweiz." *Revue Suisse de Zoologie*, vol. x., 1902.
- CLAPAREDE, E.—I. "Études Anatomiques sur les Annélides, etc., observés dans les Hébrides." *Mém. Soc. Phys. Genève*, xvi., 1861.
- FRIEND, H.—I. "New Irish Annelids." *Irish Naturalist*, vol. vii., 1898.
- MICHAELSEN, W.—I. Oligochaeta, in "Das Tierreich," vol. x., 1900.
2. "Beiträge zur Kenntniss der deutschen Enchytraeiden-Fauna." *Arch. Mikr. Anat.*, vol. xxxi., 1888.
- ROSA, D.—I. "Revisione dei Lumbricidi." *Mem. R. Acad. Torino* (2), vol. xliii., 1893.
- VEJDovsky, F.—I. "Monographie der Enchytraeiden," 1879.

DESCRIPTION OF PLATES.

PLATE 18.

- Fig. 1. A.—Anterior region of *Henlea hibernica*, n. sp., showing head-pore, brain, and glands on epidermis.
B.—*a*, Cæsophageal glands of *H. hibernica*; *b*, *c*, dilations of the dorsal vessel; *d*, projection of cæsophagus into mid-gut; *e*, mid-gut.
C.—Spermatheca of *H. hibernica*.
D.—Nephridium of *H. hibernica*.
- Fig. 2. A.—Brain of *Fridericia glandulosa*, n. sp.
B.—Segment of *F. glandulosa*, showing glands.
C.—Cælomic corpuscle of *F. glandulosa*.
D.—Spermatheca of *F. glandulosa*.
E.—Nephridium of *F. glandulosa*.
- Fig. 3. A.—Cælomic corpuscle of *Acheta minima*, n. sp.
B.—Setal gland of *A. minima*.
C.—Spermatheca of *A. minima*.
D.—Nephridium of *A. minima*.
E.—Anterior region of ventral nerve-cord of *A. minima*—*a*, massed ganglia of 1-4 segments; *b*, folded border of the ganglion.
- Fig. 4. A.—Brain of *Enchytraeus minimus*, Bret.
B.—Anterior region of dorsal vessel of *E. minimus*, showing common origin of 1st and 2nd branches.
C.—Nephridium of *E. minutus*.

PLATE 19.

- Fig. 5. Spermatheca of *Henlea Dicksoni* (Eisen).
Fig. 6. Nephridium of *Mesenchytraeus setosus*, Mchlsn

- Fig. 7. A.—Spermatheca of *Fridericia bulbosa* (Rosa).
 B.—Spermatheca of *F. bulbosa* (Rosa), showing the lobed appearance of the ampulla.
 C.—Termination of salivary gland of *F. bulbosa*.
 D.—Nephridium of *F. bulbosa*.
- Fig. 8. Nephridium of *Fridericia variata*, Bret.
- Fig. 9. A.—Brain of *Fridericia Bretscheri*, nom. nov.
 B.—Spermatheca of *F. Bretscheri*.
- Fig. x. A.—Dorsal pore of *Fridericia aurita*, Issel, showing the gland-cells surrounding it.
 B.—Spermatheca of *F. aurita*, after expulsion of the sperm.
- Fig. xi. Spermatheca of *Fridericia connata*, Bret.
- Fig. 12. A.—Salivary gland of *Fridericia Perrieri* (Vejd.).
 B.—Nephridium of *F. Perrieri*.
- Fig. 13. A.—Brain of *Fridericia polychata*, Bret.
 B.—Spermatheca of *F. polychata*.
- Fig. 14. A.—Salivary gland of *Fridericia minuta*, Bret.
 B.—Spermatheca of *F. minuta*.

POLYZOA.

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

The following Polyzoa were obtained during three days' shore collecting at Lambay, Easter, 1906 :—

- Eucratea chelata** (L.)—A specimen on *Sertularia operculata* from Talbot's Bay.
- Gemellaria loricatea** (L.)—Common on shore north of harbour.
- Scrupocellaria scruposa** (L.)—A specimen.
- S. reptans** (L.)—Very common, especially on *Flustra foliacea*.
- Bugula avicularia** (L.)—A specimen.
- Cellaria fistulosa** (L.)—Common.
- Flustra foliacea** (L.)—Very common on shore north of harbour.
- F. papyracea** (E. & S.)—A specimen on shore north of harbour.
- Membranipora pilosa** (L.)—Common everywhere.
- M. membranacea** (L.)—Very common on fronds of *Laminaria*.
- M. ilneata** (L.)—On a stone from low-water mark near Carrickdorrish.
- Cribrellina punctata** (Hassall.)—On stones, common.
- Microporella cillata** (Pallas.)—A specimen.
- M. impressa** (Audouin.)—On valves of *Mytilus edulis* from Talbot's Bay.

- Chorizopora Brongniartii** (Audouin).—On a stone with *M. lineata* and *C. punctata* from low-water near Carrickdorrish.
- Schizoporella unicornis** (Johnston).—Very common on stones at low-water mark.
- S. spinifera** (Johnston).—Common on roots and stems of *Laminaria*.
- S. linearis** (Hassall).—Common on stones from near low-water mark.
- S. hyalina** (L.).—Common on *Laminaria*.
- Lepralia pallasiana** (Moll.).—Very common on stones from near low-water mark.
- Mucronella Peachii** (Johnston).—Common on stones.
- M. cocclinea** (Abildgaard).—Common on stones, &c., near low-water mark.
- Cellepora pumicosa**, L.—A few specimens.
- C. avicularis**, Hincks.—Common on *Hydrallmania falcata*, &c.
- C. Costazii** (Audouin).—A few specimens on roots of *Laminaria*.
- Crisia eburnea** (L.).—Very common on shore north of harbour and Talbot's Bay.
- C. aculeata**, Hassall.—A few specimens.
- C. cornuta** (L.).—Common on shore north of harbour.
- Idmonea serpens** (L.).—Common.
- Lichenopora hispida** (Fleming).—Specimens on *Sertularia abietina*, etc.
- Alcyonidium hirsutum** (Fleming).—Talbot's Bay, low water.
- Flustrella hispida** (Fab.).—Very common on Fuci.
- Vesicularia spinosa** (L.).—Very common on shore north of harbour.
- Amathia lëndigera** (L.).—Talbot's Bay, &c., common
- Valkeria uva** (L.) and var. **cuscata**, L.—On *Corallina* from Talbot's Bay.

Microporella impressa.—The specimens are referable to the type and not to the var. *cornuta*, Busk, which was recorded by Busk as having been found at Lambay by W. Thompson.

Chorizopora Brongniartii is rare on the Dublin coast, and has only previously been recorded by Hassall, who described *Lepralia tenuis* and *L. assimilis* from specimens he found in Dublin Bay; both these forms are *C. Brongniartii*, Aud.

Cellepora Costazii has only once been previously recorded from Dublin coast; the specimens figured by Hassall in *Annals and Magazine of Natural History*, vol. vii., and referred by him with doubt to *C. bimucronata*, Lam., seem to be *C. Costazii*, Aud., and were probably collected in Dublin Bay.

NEMATOMORPHA.

BY ROWLAND SOUTHERN.

Numerous specimens belonging to the species *Gordius violaceus*, Baird ("Catalogue of the Entozoa in the British Museum," 1853, p. 36) were found on Lambay. Apparently the only species recorded from Ireland is *Gordius aquaticus* (Thompson's "Natural History of Ireland," vol. iv.). The Lambay specimens agree very closely with the description and figures given by Villot ("Revision des Gordiens," in the *Annales des Sciences Naturelles*, 1886, p. 307). The first parasitic stage of a species of *Gordius* was found in numerous Enchytræids from Lambay, viz., *Enchytræus albidus*, *Mesenchytræus setosus*, and *Fridericia bulbosa*.

TURBELLARIA.

BY ROWLAND SOUTHERN.

Dr. Scharff found specimens of the Planarian *Rhyncodemus terrestris* (Mull.) in June, 1905. It was also present in some moss sent by Mr. Baring to the Museum. Several other Planarian worms occur on Lambay, but they have not been identified.

ECHINODERMATA.

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

ASTEROIDEA.

Asterina gibbosa (Penn.)—Very common, of small size, among weeds in rock pools near high-water mark on S.W. shore (H.J.B.-W.). Two adult specimens at low-water mark, Talbot's Bay.

Henricia sanguinolenta (O.F.M.)—Several specimens were found on the rocks on S.W. shore (H.J.B.-W.). One specimen, Talbot's Bay.

Asterias rubens (L.)—Two specimens were found between tide-marks on S.W. shore (H.J.B.-W.). Common, Talbot's Bay.

OPHIUROIDEA.

- Ophiura albida** (Forbes).—Several specimens were obtained by dredging in about 5 fms. off the N. side of the island.
- Amphlura elegans** (Leach).—Common in shore pools on S.W. shore and near Carrickdorrish (H.J.B.-W.). A few specimens Talbot's Bay.
- Ophlopholis aculeata** (L.).—Fairly common in rock crevices and among sponges, between tide-marks on S.W. shore and near Carrickdorrish (H.J.B.-W.). Common, Talbot's Bay.
- Ophlothrix fragilis** (Abilg.).—Common in rock pools on S.W. shore and shore near Carrickdorrish (H.J.B.-W.). Common, Talbot's Bay.

ECHINOIDEA.

- Echinus millaris** (L.).—A few specimens under stones inside the harbour.
- E. esculentus** (L.).—Several specimens were taken on S.W. shore (H.J.B.-W.). Several very fine living specimens were obtained in Talbot's Bay and Carnoon Bay, and a few near Carrickdorrish, at low water.
- Echinocardium cordatum** (Penn.).—Several more or less broken specimens were found on the shore in and near harbour.

COELENTERATA.

BY JANE STEPHENS, B.SC., AND H. J. BUCHANAN-WOLLASTON.

ZOANTHARIA.

[H. J. B.-W.].

- Actinia equina** (L.).—Common everywhere among rocks.
- Metridium senilis** (L.).—Common—of small size—under large overhanging rocks on shore near Carrickdorrish.
- Sagartia miniata** (Gosse).—Abundant in rock pools near Carrickdorrish. Fairly common on S.W. shore.
- S. nivea** (Gosse).—Abundant near Carrickdorrish, generally in pools rather nearer low-water mark than the preceding species. Sometimes the two occur in separate clusters in the same pool.
- S. venusta** (Gosse).—In pools near Carrickdorrish. Not common.
- Urticina felina** (L.).—Common everywhere among rocks.

ALCYONARIA.

[H. J. B.-W.]

Alcyonium digitatum (L.)—Common under large overhanging rocks between tide-marks near Carrickdorrish.

HYDROZOA.

[J. S. & H. J. B.-W.]

The following Calyptoblastic Hydroids were collected by Mr. A. R. Nichols :—

Coryne fruticosa (Hicks).	Sertularella polyzonias (L.).
Tubularia indivisa (L.).	Sertularia pumila (L.).
Halecium halecinum (L.).	S. operculata (L.).
Campanularia flexuosa (Hincks).	S. abietina (L.).
Clytia Johnstoni (Alder).	S. argentea (Ellis & Solander).
Dipharia rosacea (L.).	Hydrallmania falcata (L.).
	Antennularia antennina (L.).

PORIFERA.

BY ROBERT KIRKPATRICK.

Sycon compressum (Fleming).	Hymeniacidon carunculum (B.)
S. coronatum (Ellis & Solander).	H. sanguineum (G.)
Haliclondria panicea (Pallas).	Ophlitaspongia serlata (G.)
Dendoryx Incrustans (Esper).	Gellius angulatus (B.) var.
Pachychalina limbata (Mont.).	

These were principally found at Carrickdorrish and along the seaward side of the island.

Dendoryx incrustans was living on the under side of an overhanging rock ledge. Spicula :—megascleres—long thin oxeas, and monactinal entirely spined styli; microscleres—isocheleæ, and sigmata. Skeleton reticulate. The smooth thin oxeas of the ectosome are arranged in separate clumps.

Pachychalina limbata was a small sponge of a pale translucent fawn colour growing round the branches of *Corallina officinalis*.

Hymeniacidon carunculum.—There are two sizes of tylostyles (or pin-shaped spicula), and with this exception this sponge agrees with Bowerbank's description of the species, as he only mentions styles. The large dermal tylostyles measured .36mm. long; the small thin dermal tylostyles measured .24mm. long.

Hymeniacidon sanguineum when alive was red, but when examined from spirit was a dark brown and dirty grey in places.

[*Gellius angulatus* does not appear to have been previously recorded from Ireland; the Lambay specimen was found at low water near Carrickdorrish. Miss J. Stephens found that the dimensions of the various spicules differed from those given in "Challenger" Report for *G. angulatus*, but that the specimen otherwise agreed closely with the description of this species. Mr. Randolph Kirkpatrick has kindly compared it with Bowerbank's type in the British Museum, and considers it a variety of *G. angulatus*, though he is in some doubt as to whether it should not be regarded as a new species; he has also sent me the following list (with accompanying remarks) of the comparative measurements of the spicules of the type and the Lambay specimen:—

—	—	Oxeas.	Toxa.	Sigmata.
I.	Type .	298×6.5 μ	55.25 μ long breadth from .7-1.2 μ	9.75 μ long. 6.5 μ broad. very slender.
II.	Lambay .	185×6.5 μ	64 μ long. very slender.	7.3 μ long. 4 μ broad. very slender.

i.e., the oxeas of II. are considerably smaller but otherwise with same characters as I.; the toxa of II. are longer, and the sigmata smaller, but again of about the same character in other respects.—A. R. N.]

FORAMINIFERA.

BY JOSEPH WRIGHT, F.G.S.

[The shell-sand gathered near high-water mark inside the harbour at Lambay, which yielded so many small mollusca to Mr. Colgan's list, was crowded with Foraminifera, a few common species, such as *Miliolina subrotunda*, *Massilina secans*, and *Truncatulina lobatula*, largely predominating. Samples of this material, and also of sand dredged off the harbour, and shell-sand collected at Talbot's Bay, were submitted to Mr. Wright, who kindly reports as follows.—R. L. P.]

SHELL-SAND, LAMBAY HARBOUR.

<i>Miliolina trigonula</i> (Lamk.), r.	<i>Lagena Williamsoni</i> (Alcock), f.
<i>M. seminulum</i> (Linné), c.	<i>L. squamosa</i> (Montag.), v.r.
<i>M. auberiana</i> (d'Orb.), r.	<i>L. lucida</i> (Will.), r.
<i>M. Ferussacii</i> (d'Orb.), v.r.	<i>Polymorphina gibba</i> , d'Orb., f.
<i>M. subrotunda</i> (Montag.), v.c.	<i>Discorbina globularis</i> (d'Orb.), c.
<i>M. contorta</i> (d'Orb.), r.	<i>D. rosacea</i> (d'Orb.), r.
<i>M. bicornis</i> (W. & J.), r.	<i>D. nitida</i> (Will.), v.r.
<i>Massilina secans</i> (d'Orb.), v.c.	<i>Planorbulina mediterraneensis</i> ,
<i>Haplophragmium canariense</i>	d'Orb., f.
(d'Orb.), v.r.	<i>Truncatulina lobatula</i> (W. & J.), v.c.
<i>Textularia gramen</i> , d'Orb., v.r.	<i>T. variabilis</i> , d'Orb., v.r.
<i>T. conica</i> , d'Orb., v.r.	<i>Rotalia Beccarii</i> (Linné), c.
<i>Verneuilina polystropha</i> (Rss.), v.r.	<i>Gypsina inhærens</i> (Schulze), v.r.
<i>Bulimina pupoides</i> , d'Orb., f.	<i>Nonionina depressula</i> (W. & J.), c.
<i>B. elongata</i> , d'Orb., v.r.	<i>N. asterizans</i> (F. & M.), r.
<i>Bolivina punctata</i> , d'Orb., v.r.	<i>N. pauperata</i> , B. & W., v.r.
<i>Lagena sulcata</i> (W. & J.), v.r.	<i>Polystomella crispa</i> (Linné), c.
<i>L. costata</i> (Will.), v.r.	<i>P. macella</i> (F. & M.), c.
<i>L. semistriata</i> , Will., v.r.	<i>P. striato-punctata</i> (F. & M.), c.

DREDGINGS OFF LAMBAY HARBOUR 2 FMS., LOW WATER.

<i>Miliolina seminulum</i> (Linné), f.	<i>Discorbina globularis</i> (d'Orb.), c.
<i>M. subrotunda</i> (Montag.), r.	<i>Truncatulina lobatula</i> (W. & J.), c.
<i>Massilina secans</i> (d'Orb.), c.	<i>Rotalia Beccarii</i> (Linné), v.r.
<i>Bulimina pupoides</i> , d'Orb., v.r.	<i>Nonionina asterizans</i> (F. & M.), f.
<i>Bolivina punctata</i> , d'Orb., v.r.	<i>Polystomella crispa</i> (Linné), v.r.
<i>B. plicata</i> , d'Orb., v.r.	<i>P. striato-punctata</i> (F. & M.), c.
<i>Lagena lucida</i> (Will.), v.r.	

TALBOT'S BAY, ROCK HOLLOWES.

Miliolina trigonula (Lamk.), r.	Lagena Williamsoni (Alcock), f.
M. seminulum (Linné), f.	L. squamosa (Montag.), f.
M. subrotunda (Montag.), c.	L. hexagona (Will.), v.r.
M. auberiana (d'Orb.), v.r.	L. lucida (Will.), f.
M. bicornis (W. & J.), r.	L. orbignyana (Seg.), v.r.
Massilina secans (d'Orb.), c.	Polymorphina lactea (W. & J.)? v.r.
Ophthalmidium carinatum, B. & W., v.r.	var. oblonga (Will.), v.r.
Cornuspira involvens, Rss., v.r.	Uvigerina angulosa, Will., v.r.
Haplophragmium canariense (d'Orb.), f.	Globigerina bulloides, d'Orb., r.
Trochammina squamata, J. & P., r.	Patellina corrugata, Will., r.
Textularia conica, d'Orb., v.r.	Discorbina globularis (d'Orb.), f.
Verneuilina polystropha (Rss.), f.	D. rosacea (d'Orb.), r.
Bulimina pupoides, d'Orb., c.	D. obtusa (d'Orb.), f.
B. marginata, d'Orb., v.r.	D. Wrightii, Br., v.r.
B. fusiformis, Will., v.r.	D. nitida (Will.), r.
B. elegantissima, d'Orb., r.	Planorbulina mediterraneusis, d'Orb.
B. minutissima, Wright, v.r.	r.
Bolivina punctata, d'Orb., r.	Truncatulina lobatula (W. & J.), c.
B. plicata, d'Orb., r.	Pulvinulina auricula (F. & M.), v.r.
Cassidulina crassa, d'Orb., v.r.	Rotalia Beccarii (Linné), c.
Lagena globosa (Montag.), v.r.	Nonionina depressula (W. & J.), c.
L. lævis (Montag.), v.r.	N. asterizans (F. & M.), c.
var. clavata (d'Orb.), r.	N. pauperata, B. & W., r.
L. semistriata, Will, r.	Polystomella crispa (Linné), c.
L. sulcata (W. & J.), f.	P. macella (F. & M.), f.
	P. striato-punctata (F. & M.), c.

Bulimina elongata, *B. minutissima*, *extularia conica*, and *Truncatulina variabilis* have not hitherto been recorded from Dublin, neither have the following—*Miliolina auberiana*, *Discorbina obtusa*, *Nonionina asterizans*, and *Polystomella macella*, but these last four I have from Dublin gatherings.

PHANEROGAMS AND VASCULAR CRYPTOGAMS.

BY R. LLOYD PRAEGER.

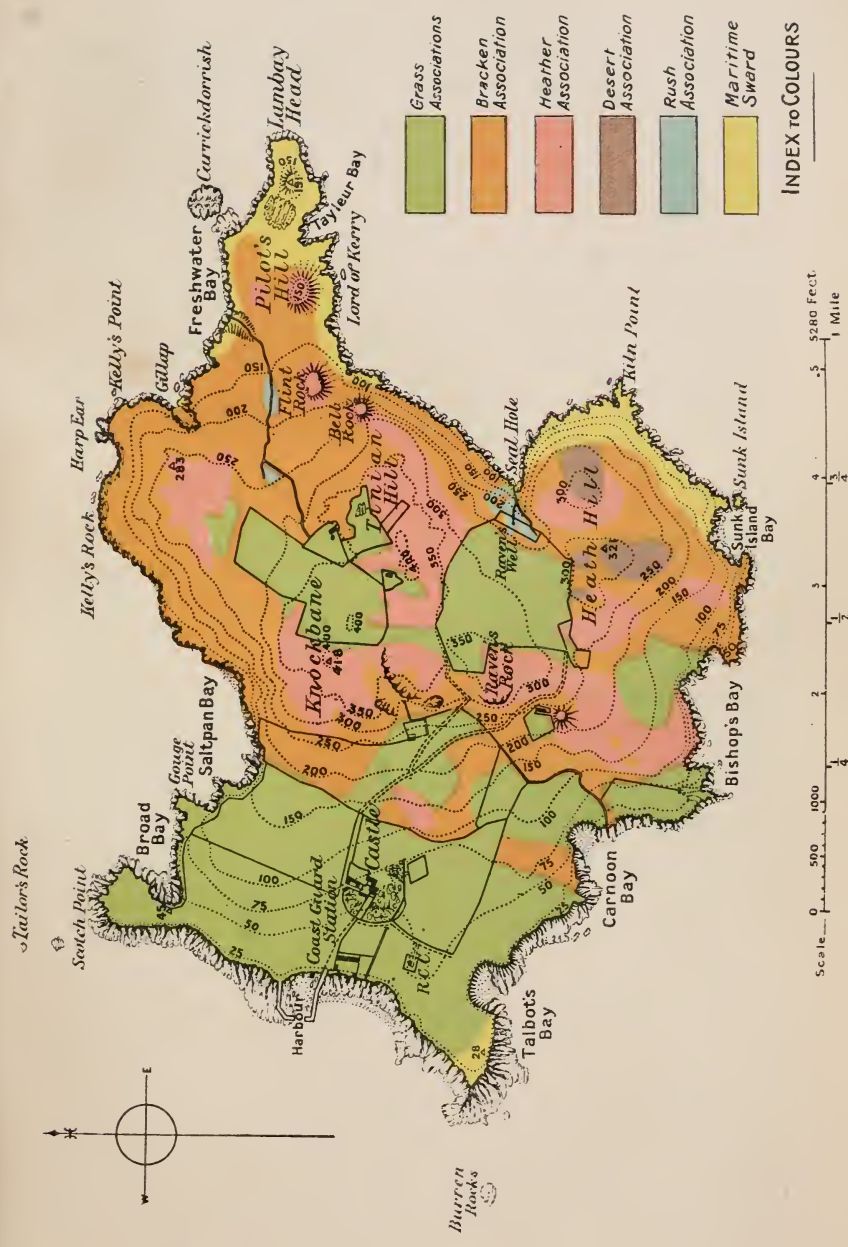
THE plants of Lambay (Phanerogams and Higher Cryptogams) were thoroughly investigated, from the floristic standpoint, by H. C. Hart in 1881-2, and the results of his researches published in full by the Royal Irish Academy in 1883.¹ The completeness of his survey leaves little to be added to the list of Lambay plants; but notes on a few additional species found, as well as on the rarer species which occur, appear later on in the present section (p. 97). The remarks which follow will deal with the flora mainly from an ecological standpoint.

The chief conditions affecting the vegetation as a whole are exposure to sea winds from all sides, a shallow soil (save at the western end), with the rock frequently breaking through, and a climate which, though rendered moist by the influence of the sea, is nevertheless a dry one for Ireland, Lambay lying on the edge of the area of least rainfall in the country. Cultivation, formerly practised to a considerable extent, has for many years been confined to an acre or two of garden. Cattle, and a constantly increasing herd of Fallow Deer, which now number about 75, as well as swarms of Rabbits, have exercised an important controlling influence on the vegetation.

Save for the clump of introduced trees which surrounds the castle, arboreal vegetation is almost absent, and the only species rising more than a yard or two in height is the Elder, which forms clumps of greenery in many sheltered hollows on the island.

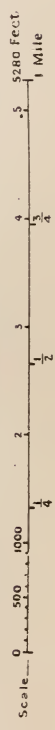
The character of the prevailing rocks of Lambay is not such as greatly to influence vegetation. The shallow soil is loamy or peaty, and usually non-calcareous. The only limestone on the island (near Kiln Point) exercises no influence on the vegetation; but the travelled lime in the Boulder-clay makes itself felt, as will be referred to later on.

¹ *Proc. R.I.A.* (2), vol. iii. (*Science*), pp. 670-693.



- Grass Association
- Bracken Association
- Heather Association
- Desert Association
- Rush Association
- Maritime Sward

INDEX to COLOURS



VEGETATION MAP OF LAMBAY. By R. Lloyd Praeger.

PLANT ASSOCIATIONS.

The plant associations which cover the surface of Lambay are in general distinct and well defined, with tolerably sharp boundaries. These boundaries are in part natural (the effect of variation of the ecological factors which control the vegetation) and in part artificial (the result of farming operations). Following on the halophile flora of the beaches and sea-cliffs, the three main associations of the island exhibit in general a zonal arrangement according to altitude—namely (in ascending order), grass land, bracken, and heath (see Plate 22); but this order is not without many local exceptions. The remaining two associations are presided over by *Sedum anglicum* and *Juncus obtusiflorus* respectively, and represent opposite extremes as regards the water factor.

Maritime Associations.

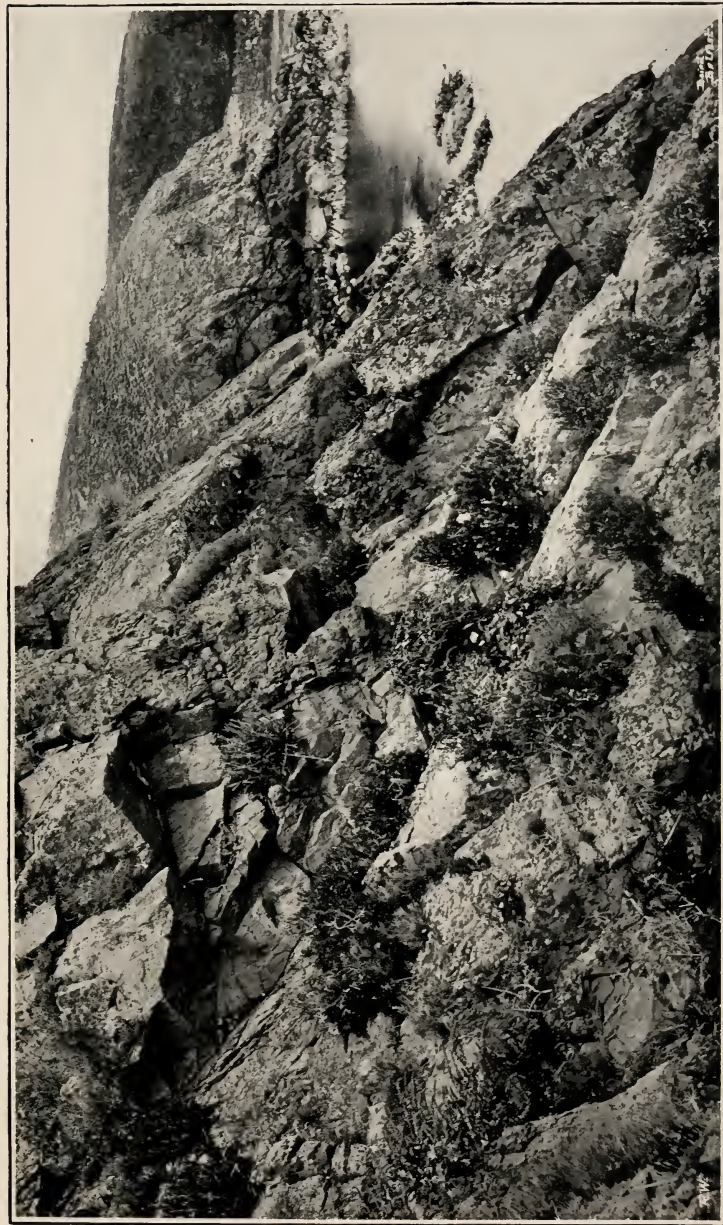
Except on the western side, the ground rises steeply from the water's edge. Even on the west, the flattish grass lands are raised well above tide-level. In consequence, salt-marsh is absent, and the halophile vegetation is confined mainly to a very narrow strip surrounding the island.

A sandy shore occurs at the harbour, yielding Sea Holly (*Eryngium maritimum*), Sea Purslane (*Arenaria peploides*), Sea Whin (*Salsola Kali*), *Polygonum Raii*, *Agropyron junceum*, which have here their only station; elsewhere the maritime vegetation is largely confined to rocks and shingle, and characterized by an abundance of Samphire (*Crithmum maritimum*), Golden Samphire (*Inula crithmoides*), and Sea Beet (*Beta maritima*) (Plate 21). Above this zone, maritime sward, of one type or other, is extensively developed, and forms a characteristic feature of the vegetation of Lambay, rising to no less than 200 feet above sea-level. The main areas which it occupies are along the east side of the island, as shown by the map (Plate 20), and the ornithologist will at once notice that they correspond with the principal breeding colonies of the Herring Gull. There can be no doubt that the presence of these birds is, to a large extent, accountable for the peculiar vegetation which here prevails. During the breeding season the plants composing the sward are seen to be much trampled

and torn, and littered with guano ; and quantities of the leading plants, especially Sea Campion (*Silene maritima*), go to line the innumerable nests that are scattered about. This vegetation is composed of a limited number of species, but varies in density and in the relative abundance of the plants composing it. *Silene maritima* is often dominant ; sometimes Sea-pink (*Armeria maritima*) takes its place (Plate 24), or Scentless Feverfew (*Matricaria inodora*), or species of *Atriplex*. On the north side of Lambay Head Scurvy-grass (*Cochlearia officinalis*) is absolutely dominant during the spring months, clothing considerable areas with a snowy sheet of blossom, and forming one of the most striking sights on the island ; but during the summer, before the seedling plants attain a considerable size, *Matricaria inodora* makes a brave display on the *Cochlearia* ground. In other spots the sward takes the form of a dense sheet of *Spergularia rupestris*, with *Atriplex*, &c., as subdominant forms. The Yellow Stonecrop (*Sedum acre*) also has here its headquarters ; and Henbane (*Hyoscyamus niger*), Curled Dock (*Rumex crispus*), Hemlock (*Conium maculatum*), Cow-Parsnip (*Heraclium Sphondylium*) form colonies. At the great Puffin villages, under Flint Rock, the trampling and digging operations are so severe as almost to exterminate vegetation, and result in certain places in bare slopes of crumbling brown earth.

The Grass Associations.

The grass areas still correspond closely with the limits of the old farm-land, as shown by the remains of fences, and by the older editions of the Ordnance maps. It is difficult here to distinguish between cause and effect, and to decide in how far the old fences may have been erected along the limits of natural grass formations, or how far they show the extent to which other associations have been cleared off the land. It is probable that the lower grass-land in the west is a natural formation, and that it is in a state of equilibrium, and will remain so as long as the present abundance of graminivorous animals is there to check the Brambles, or Bracken, that might otherwise invade it. The upland grass is, more probably, a relic of husbandry, and will, in part at least, eventually be destroyed by the Bracken and Heath associations which



Halophile vegetation, south shore. *Reta maritima*, *Crithmum maritimum*, and *Inula crithmoides*.
R. Welch, Photo. To face p. 92.

surround it. Yet it must be noted that, after many years of dereliction, it is being invaded but slowly. The Bracken has crept in from five to fifteen yards in many places, and is steadily advancing. As to the heaths, Purple Heather (*Erica cinerea*) is forming luxuriant dense patches a yard or more across within the margins of the upland grass. The Ling (*Calluna vulgaris*) appears to be a less successful colonist, its outliers being closely nibbled down by rabbits.

To the relative abundance of the various species of Gramina in the grass-lands, no special attention was paid. The Bent (*Agrostis vulgaris*) is everywhere abundant, and often dominant. In the upland areas, mosses of a few species are abundant, particularly *Hylacomium squarrosum* and *H. loreum*; also the lichen *Cladonia gracilis*. The Wood Violet (*Viola Riviniana*) is a remarkably abundant ingredient, and Heath Bedstraw (*Galium saxatile*) in some parts forms numerous roundish patches six to twelve feet in diameter, which in June are snow-white with blossom. Other abundant ingredients of the upland grass-land are *Trifolium repens*, *Lotus corniculatus*, *Potentilla Tormentilla*, *Senecio Jacobæa*, *Cnicus arvensis*, *C. palustris*, *Veronica Chamædrys*, *Teucrium Scorodonia*, *Rumex Acetosella*.

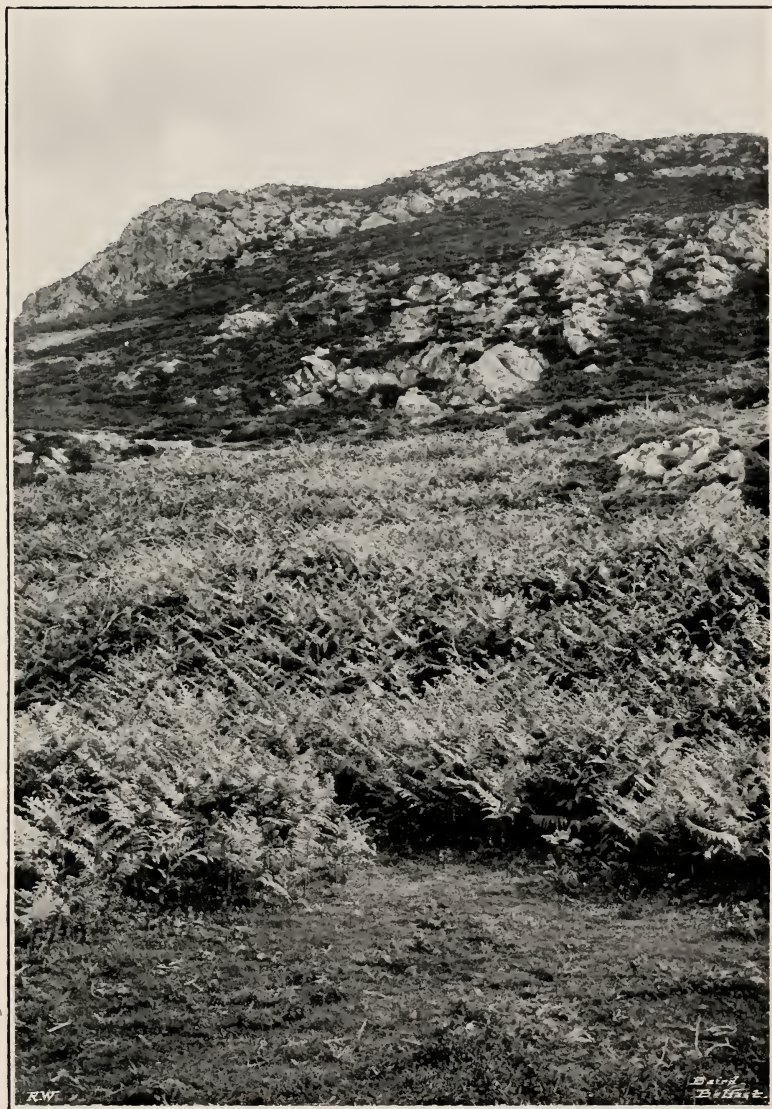
The Bracken Association.

Next to grass-land, the Bracken (*Pteris Aquilina*) occupies the largest area of any plant or group of plants on the island. The boundary between the grass and the Bracken usually represents the limit of the clearing of the land by the former husbandmen—in other words, the limit of the more level ground, deeper soil, or greater shelter, which made agriculture productive. The Bracken areas present dense and luxuriant beds of this fern. Of subdominant plants, sub-species of Bramble (*Rubus fruticosus*) are the most important, and occur in great quantity, but limited variety, *R. pulcherrimus* Neum., and *R. leucostachys* Schleich being the prevailing forms. Under the Bracken, shade plants grow in immense profusion, and the sheets of Primroses (*Primula vulgaris*), Wild Hyacinths (*Scilla nutans*), Lesser Celandine (*Ranunculus Ficaria*), and Ground Ivy (*Nepeta Glechoma*) that deck the *Pteris* areas in spring, before the fresh crop of fronds arises, form one of the

most striking and delightful features of the vegetation of the island. Certain tall herbaceous perennials are abundant in the Bracken areas, more on account of the shelter from wind which there obtains, than of the shade which the Bracken gives—such are the Red Campion (*Lychnis diurna*), *Agri-
monia odorata*, and Cow-Parsnip (*Heracleum Sphondylium*). On the steep northern sea-slopes, as about Saltpan Bay, where the sun but seldom strikes, the shade plants are reinforced by large quantities of Male Fern (*Lastrea Filix-mas*), growing luxuriantly quite open to the sky and sea, and mixed with great Lady Ferns (*Athyrium Filix-femina*). Many of the procumbent root-stocks of the Male Fern are three feet in length.

The Heath Associations.

The highest parts of the island are generally occupied by heath. The upward dying out of the Bracken is undoubtedly often due to exposure, since along its junction with the heather it is constantly seen filling the hollows, while Heather crowns the surrounding knolls. But other influences are at work, since, in some places (see map), the Heather descends to the coast-line, breaking through the enclosing cordon of Bracken. Probably these lowland patches of heath cover a soil too shallow for the creeping rhizomes of *Pteris*. The absence of deep soil would appear to be, as regards the change from Bracken to Heath, a factor equally important with that of exposure to wind. Only two Ericaceæ occur on the island—namely, the Purple Heather (*Erica cinerea*) and the Ling (*Calluna vulgaris*), and these two appear to be usually in direct competition for mastery on the heath areas. Sometimes *Erica* is absolutely dominant—this is usually on the steeper and more rocky places. Elsewhere it is so much reduced in quantity that an almost pure Callunetum results. Over much of the area the two species are mixed in more or less equal quantity. *Calluna* appears to stand exposure better than its congener, and often forms ragged bushes rising from a closer lower growth of *E. cinerea*. *Hypnum cuspidatum* is the most abundant moss of the heath area, and *Cladonia rangiferina* the commonest lichen. These two are the only abundant species which can be classed as dependent; but there is a



R. Welch, Photo.

Looking east from Hill Cottage, showing typical succession of associations—Grass, Bracken, and Heath.

To face p. 94.

good admixture of heath plants, such as *Viola sylvatica*, *Lotus corniculatus*, *Potentilla Tormentilla*, *Sedum anglicum*, *Galium saxatile*, *Veronica officinalis*, *Teucrium Scorodonia*.

The Rush Association.

The course of streamlets at Raven's Well and above Freshwater Bay is marked by a dense even growth of Rushes, and it is interesting to note that the species which almost monopolizes these places is one which is by no means generally common in county Dublin—namely, *Juncus obtusiflorus*. *J. glaucus* and *J. effusus* are also present in smaller quantity. The ground here is mostly very wet and mossy, the prevailing mosses being *Hypnum cupressiforme* and *H. cuspidatum*. *Chara vulgaris* grows mixed with them. Other species which find here their head quarters on Lambay are *Mentha hirsuta*, *Apium modiflorum*, *Ranunculus acris* and *R. Flammula*, *Spiræa Ulmaria*, *Carex flava*, *Anagallis tenella*, &c.

The presence of *Juncus obtusiflorus*, *J. glaucus*, and *Chara vulgaris* in the marshy places points to the presence of limy water, and further evidence of this is seen in the deposits of calc-sinter in the roofs of caves and on cliffs where streamlets empty themselves into the sea—notably at the foot of the Freshwater stream. This lime is no doubt derived from the drift, though its quantity is greater than the distribution and nature of the Boulder-clay might lead one to expect.

The Desert Association.

One of the most remarkable features of Lambay is the occurrence in the south-east of considerable patches of almost bare crumbling rock and soil, on which a flora of desert type maintains a precarious existence (Plate 23.) In these places soil is practically absent; the volcanic rock shows through, or is covered by the merest skin of decayed fragments, mixed with a little dry humus. The peculiar type of vegetation which here prevails is the result of deficient moisture. The leading plant of these "deserts" is the English Stonecrop (*Sedum anglicum*), which grows in profusion. At flowering time the sun has tinted the leaves and stems a brilliant red, which can be seen from a great distance, and the numerous star-like

white flowers in this gaudy setting form a very lovely object. The Sea Stork's-bill (*Erodium maritimum*) is also extremely abundant, mostly in the form of tiny unbranched plants, often only half an inch across, and growing close together in thousands, so as to form a micro-sward of tiny rosettes. These two species compose almost the whole vegetation where the "desert" type attains its best development, being accompanied only by *Cerastium tetrandrum*, the grass *Aira præcox*, and stunted Wood Sage (*Teucrium Scorodonia*).

An area above the sea at Thornchase Valley, near Bishop's Bay, exhibits a transition between this desert type and the grass land. Here the ground is fairly covered with a starved vegetation. The grasses *Agrostis vulgaris* f. *pumila* and *Festuca ovina* are dominant. They are accompanied by Tormentil (*Potentilla Tormentilla*), Scarlet Pimpernel (*Anagallis arvensis*), Centaury (*Erythraea Centaureum*), Bird's-foot Trefoil (*Lotus corniculatus*), Sea-Pink (*Armeria maritima*), English Stonecrop (*Sedum anglicum*), Lady's Bedstraw (*Galium verum*), clumps of Heather (*E. cinerea*) and Wood Sage (*Teucrium Scorodonia*), Lesser Sorrel (*Rumex Acetosella*), Creeping St. John's-wort (*Hypericum humifusum*), Common Speedwell (*Veronica officinalis*), Ragweed (*Senecio Jacobæa*), and Field Thistle (*Cnicus arvensis*).

FLORISTIC NOTES.

The foregoing account of the vegetation may be usefully supplemented by some brief notes respecting the rarer plants found on the island. The total flora of Lambay (Phanerogams and Vascular Cryptogams) as now known numbers about 322 species and sub-species—a large flora for an Irish island of 617 acres. Of the plants which occur, the rarest in Ireland is the Small-flowered Crane's-bill (*Geranium pusillum*), which still occupies the station near the castle discovered by Mr. Hart over twenty years ago. Hard by, along the western shore, the Soft Knotted Trefoil (*Trifolium striatum*) occupies grassy knolls from Scotch Point to Talbot's Bay. As already stated, the Sea Stork's-bill (*Erodium maritimum*) occurs in great quantity, and is, moreover, widely distributed, growing even in shady ditches under bushes. The Early Scorpion-grass



Sedum desert, Heath Hill.

R. Welch, Photo.

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(*Myosotis collina*) is a local species that grows with it in abundance; and to these may be added the Dwarf Spring Vetch (*Vicia lathyroides*). The sea-rocks are specially noticeable for the quantity of Golden Samphire (*Inula crithmoides*) which accompanies the Common Samphire (*Crithmum maritimum*) in such situations. Its bright yellow flower-heads are set off in August by the masses of the Rock Sea-Lavender (*Statice occidentalis*) which grow around. The sward above the sea rocks is brightened in May by sheets of the grey-blue flowers of the Vernal Squill (*Scilla verna*), growing amid sheets of Sea-Pink, Sea-Campion, and Scurvy-grass. Introduced plants are few in number, and in general confined to the neighbourhood by the dwellings near the harbour. Two of the most remarkable of the exotic species are *Iris fatidissima* and *Chenopodium Bonus-Henricus*, which occur in stations remote from former cultivation or houses.

Additions to Mr. Hart's list of the Lambay flora.

- Cochlearia danica**, L.—On the harbour piers, and near Lambay Head.
- Brassica campestris**, L.—Frequent about the castle and garden.
- Viola canina**, L.—Near Gillap (Miss Knowles!)
- V. arvensis**, Murr.—In the garden (Miss Knowles!) Probably a recent introduction.
- Arenaria serpyllifolia**, L.—Sparingly on the northern coast.
- Hypericum humifusum**, L.—Near Trinity Well, and in a number of other spots.
- Rubus plicatus**, Wh. & N.—In the centre of the island.
- R. pulcherrimus**, Neum.—Abundant in the Bracken areas.
- R. leucostachys**, Schleich.—As abundant as the last.
- Potentilla procumbens**, Sibth.—Of frequent occurrence.
- Agrimonia odorata**, Mill.—Abundant among the Brambles and Bracken, seemingly replacing *A. Eupatoria*, which I did not notice.
- Peplis Portula**, L.—Wet places on the south shore.
- Epilobium montanum**, L.—A weed in the castle garden.
- Daucus Carota**, L.—Talbot's Bay.
- Gnaphalium sylvaticum**, L.—One plant near Trinity Well.
- Achillæa Millefolium**, L.—Sparingly near the centre of the island.
- Crepis virens**, L.—Scotch Point.
- Calystegia sepium**, R. Br.—A weed in the castle garden.
- Linaria Cymbalaria**, Mill.—At the old well among the trees near the castle.

Lamium Intermedium, Fr.—About the castle and harbour.

Chenopodium Bonus-Henricus, L.—A flourishing colony in a hollow of maritime sward, 100 yards north of Sunk Island, and another far down the steep slopes east of the Seal Hole. The stations are curious, being far from traffic or former cultivation. Gulls breed in numbers around, and possibly the seed was bird-borne.

Orchis maculata, L.—Here and there in the heathy ground.

Juncus effusus, L.—Freshwater stream, and no doubt elsewhere.

J. obtusiflorus, Ehrh.—The commonest Rush on the island, though very local. Forms large beds along rivulets above the Seal Hole, and also along the Freshwater stream. Also seen on the shore at Carnoon Bay.

Luzula erecta, Desv.—On a bank near the centre of the island.

Carex pilulifera, L.—A large colony near Freshwater Bay.

Trisetum flavescens, Beauv.—Pastures near the harbour.

Koeleria cristata, Pers.—Rocky knolls near Talbot's Bay.

Festuca rottbœllioides, Kunth.—On walls at the harbour.

F. rubra, L.—Near the harbour.

Asplenium Ruta-muraria, L.—Wall near the castle.

Chara vulgaris, L.—Harper's Well, and frequent along the Freshwater stream.

Miscellaneous Notes on Mr. Hart's list.

Thlaspi arvense, L.—Appeared again about the castle in 1904-6, after the ground had been disturbed by building operations.

Silene maritima, With.—Grows near the middle of the island on Raven's Rock, 300 feet elevation. *Armeria maritima* crowns the summit of Knockbane (418 feet.)

Cerastium tetrandrum, Curt.—Is abundant.

Hypericum pulchrum, L.—Is frequent.

Sedum acre, L.—Appears confined to the neighbourhood of the sea, while *S. anglicum* occurs chiefly inland.

Conium maculatum, L.—Frequent and widespread.

Cnicus palustris, Willd.—Very abundant.

Hyoscyamus niger, L.—Fine colonies on slopes near Sunk Island, and from the Seal Hole to Flint Rock, and by the shore south of the harbour. Appears to be greatly increasing.

Euphrasia officinalis, L.—Is very frequent, in a number of forms.

Beta maritima, L.—Also on the eastern and north-western shores.

Orchis incarnata, L.—Abundant in its old station in 1904-6. This is the *O. latifolia* of Hart's list.

Scilla nutans, L.—The white-flowered form is rather abundant (C. Baring).

Arum maculatum, L.—The form with spotted leaves occurs locally below Tinian Hill.

Additional stations were noted for the following plants, for which Mr. Hart gives one station only :—

Cardamine pratensis.	Juncus lamprocarpus.
Geranium Robertianum.	Carex vulpina.
Solanum Dulcamara.	Molinia cærulea.
Myosotis cæspitosa.	Glyceria fluitans.
Anagallis tenella.	Agropyron repens.
Lemna minor.	

MOSSES.

BY DAVID M'ARDLE.

IN the latter part of June, 1905, and in April, 1906, I spent some days searching for these interesting plants, and on one of my first trips carefully collected on the north side of the island from the harbour on to Scotch Point and Lambay Head; and around the east coast by Talbot's Bay. Except near the harbour the absence of sandy shore is remarkable. On the south-west side there is also some shingle and few traces of salt marsh. A few streams run into the sea, which afford collecting ground. On the rocks around the coast line there is a remarkable abundance of a few genera, such as *Grimmia*, *Weissia*, *Trichostomum*, &c., which will flourish in the absence of woods and sheltered ravines, where alone many other species grow. A visit by boat to the remarkable caves on the north coast was interesting, but here quite a few species were in absolute possession, such as *Weissia verticillata* and *Hypnum commutatum*. However, the rare *Amblystegium confervoides* and some other interesting mosses were collected. During this most pleasant expedition the sea was calm, and we pulled the boat far under the land into the dark. In collecting in the centre portion of the island and places adjacent to the sea it will be observed that the genus *Hypnum* is very well represented, and one species, *H. squarrosum*, disputes possession with the short pasture. A remarkable form of *Hypnum splendens* occurs in some quantity in pasture among rocks on the face of the hill above the castle, which I have not met with before in Ireland, and for the benefit of fellow-workers I have given a brief description of the plant and named it var. *lambayensis*. As

the result of my collecting on the island, I enumerate 71 species and varieties. Thirteen of these are new to the Co. Dublin list. Three varieties are probably additions to the Irish flora. I have spared no trouble to make the list as complete as possible, and for that purpose I searched every available place on the island, and got excellent help from some of the pleasant companions who were engaged in other branches of natural history, whose names appear after the plants they collected.

In the list which follows plants new to Co. Dublin are marked *, and those probably new to the Irish flora **.

- Sphagnum acutifolium**, Ehrh.—Marshy ground, N.E. side, very scarce, April, 1906.
- Polytrichum commune**, L.—Marsh, N.E. side, very scarce, April, 1906.
- Ceratodon purpureus**, Brid.—Sandy ground, N. side, April, 1906. Bank by a stream near plantation, June, 1905.
- Campylopus fragilis**, B. & S.—Bank near the Seal Hole, April, 1906. Moist bank on E. side, 1905.
- Dicranum scoparium**, Hedwig.—Marsh, N. side, 1905. In neat tufts among rocky pasture, E. side, April, 1906.
- *Var. **spadiceum**, Boul.—Among rocks, N. side, 1906. On the hill, east side, 1906. In the plantation near the castle, 1905.
- D. fuscescens**, Turn.—Among rocks, E. side, 1906.
- Fissidens bryoides**, Hedwig.—Bank, N. side, April, 1906.
- ***Grimmia apocarpa**, Hedwig.—On rocks, E. side, 1906.
- G. maritima**, Turn.—Rocks near the sea, April, 1906. Caves on N. shore, 1906. At the Seal Hole, June, 1905, R. L. P., common.
- G. pulvinata**, Smith.—Old walls and rocks, April, 1906.
- G. trichophylla**, Grev.—On rocks, E. side, June, 1905, M'A. On rocks, N. side, W. F. de V. Kane, 1905.
- G. patens**, B. & S.—Among wet rocks, N. side, June, 1905.
- Racomitrium lanuginosum**, Brid.—On heaths among rocks, 1905-6.
- Pottia Helmlii**, Fühnr.—Bank near the sea, abundant, 1905-6. Damp ground near the sea, R. L. P., 1905. Caves, N. side, April, 1906.
- Tortula atrovirens**, Lindb.—Old walls near the sea, 1905. Wet rocks, E. side, 1906.
- T. muralis**, Hedw.—Rocky bank near the sea, 1906. Old walls, near castle, 1905.
- T. lævipila**, Schwgr.—On the trunks of trees in the plantation, June, 1905.
- Barbula fallax**, Hedwig.—Old walls, N.E. side, 1906. Bank in plantation, 1905. About Trinity Well; in moist, stony places, E. side, 1906
- ***B. cylindrica**, Schp.—Rocky bank, N. side, 1905.



Top of eastern cliffs in June, looking S. from Flint Rock—*Armeria maritima* in bloom in front,
Matricaria inodora (dark foliage) behind.

R. Welch, Photo.

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- Barbula convoluta**.—Old wall and bank, N. side, 1905. Very scarce.
- ***Weissia rupestris**, C. M.—Caves, N. side, R. Ll. P., 1905. Plentiful on rocks near the sea, 1905-6.
- W. curvirostris**, C. M.—Among rocks, E. side, 1905-6. Rare.
- W. verticillata**, Brid.—Wet rocks, N. side, 1905. Seal Hole, R. Ll. P., June, 1905. Wet bank near Seal Hole, 1906. This very abundant and distinct plant is often encrusted with calcareous matter, when the lower half becomes as hard as the rock it grows on. Easily known by the glaucous colour, and by the toothed basal margin of the leaves, when not in fruit.
- Trichostomum crispulum**, Bruch.—Rocks on the E. side, April, 1906.
- ***T. mutabile**, Bruch.—Bank near the sea, 1905-6.
- T. flavo-virens**, Bruch.—Rocks near the Seal Hole and near the sea on E. side, 1906.
- ***T. tenuirostre**, Lindb.—At the Seal Hole, R. Ll. P., June, 1905.
- ***T. nitidum**, Schp.—Rocks on E. side, 1906.
- Ulota phyllantha**, Brid.—On trees, W. F. de V. Kane, June, 1905. On rocks, 1905. On trees in plantation, 1905-6.
- Physcomitrium pyriforme**, Brid.—Damp bank of stream which flows through the plantation, 1905. Moist bank near the sea, E. side, 1906.
- Philonotis calcarea**, Schp.—Marshy ground, N. side, 1905.
- ***Bryum pseudotriquetrum**, Schwgr.—Bank near the well, N.E. side, 1906. Bank near cottages on hill, 1906. Banks near the sea, April, 1906.
- B. erythrocarpum**, Schwgr.—Among rocks, E. side, Nov., 1906.
- ***B. murale**, Wils.—On old walls near castle, 1905.
- B. argenteum**, Linn.—Bank near the harbour, 1906.
- Mnium hornum**, Linn.—Bank near the sea, N. side, R. Ll. P., 1905.
- M. punctatum**, Linn.—In a damp place, N. side, W. F. de V. Kane, 1905. Bank in the plantation, 1905-6.
- Neckera complanata**, Hüb.—On trees, E. side, 1905-6.
- Heterocladium heteropteron**, B. & S.—Damp bank at well, E. side, April, 1906. Very scarce.
- Pleuropus sericeus**, Dixon.—On trees in plantation, 1905. Rocks in caves, R. Ll. P., June, 1905. Rocks on hill, E. side, April, 1906. Rocks about Hill Cottage, 1906.
- Brachythecium rivulare**, B. & S.—Seal Hole, R. Ll. P., June, 1905.
- **Var. **tenuis**, Dixon.—Seal Hole, R. Ll. P., 1905.
- B. plumosum**, B. & S.—Rocks in marsh, N. side, 1905. Rocks near stream, E. side, 1906.
- B. purum**, Dixon.—In pasture and among rocks, 1906.
- Eurhynchium crassinervium**, B. & S.—Among stones, N. side, 1905.
- E. speciosum**, Schp.—Caves, N. side, June, 1905.

- Eurhynchium praelongum**, B. & S.—In the plantation, about the roots of trees, 1905, and on damp banks.
- E. confertum**, Milde.—Rocks near the Seal Hole, 1906. Bank on E. side, 1906. About the roots of trees in plantation, 1905.
- Plagiothecium Borrerianum**, Spruce.—About the roots of trees in plantation, 1905.
- P. denticulatum**, B. & S.—Bank on N. side, 1906.
- ***Amblystegium confervoides**, B. & S.—Caves on N. side, April, 1906.
- A. serpens**, B. & S.—Damp bank, E. side, April, 1906. Caves on N. side, 1906.
- A. fillcinum**, De Not.—Bank of stream in plantation, 1905. On stones, N. side, 1905. Trees in plantation, 1905. Caves, N. side, R. Ll. P., June, 1905. Damp bank, E. side, April, 1906.
- **Var **gracilescens**, Schp.—Marsh, E. side, 1906. Very slender, prostrate, deep green; stems tomentose, leaves small.
- Hypnum elodes**, Spr.—Marsh on E. side, April, 1906. Near the stream on N. side, 1906. Caves, N. side, R. Ll. P., June, 1905.
- H. polygamum**, Schp.—Wet banks, E. side, 1906.
- H. stellatum**, Schreb.—Banks among rocks, N.E. side, 1906.
- H. chrysophyllum**, Brid.—Bank among rocks, E. side, April, 1906. A beautiful little moss, attractive by its slender silky compact growth. Very scarce.
- H. uncinatum**, Hedw.—Marsh, N. side, April, 1906.
- H. intermedium**, Lindb.—Peaty bank, N. side, 1906.
- H. commutatum**, Hedw.—Bank of a stream, E. side, 1906. Caves on N. side, 1906. Seal Hole, R. Ll. P., June, 1905. About the roots of trees near stream, 1905. Marsh near the well on E. side, June, 1905. In the plantation stream, 1905. Marsh on N. side, R. Ll. P., Sept., 1905.
- H. cupressiforme**, L.—Rocky pastures, E. side, 1906.
- Var. **filiforme**, Wils.—On the trunks of trees in the plantation, 1906.
- H. molluscum**, Hedw.—Caves, N. side, R. Ll. P., June, 1905.
- H. cuspidatum**, Linn.—Marsh, E. side, 1905. In pasture among rocks, April, 1906. Marsh, N. side, 1905.
- H. Schreberi**, Linn.—In grass among rocks, generally distributed, 1905.
- Hylocomium splendens**, B. & S.—Cave, N. side, R. Ll. P., June, 1905.

Var. nov. **lambayensis**, McA.

This is a very distinct form, with erect stems well furnished with shortened branches from the base to the upper half, where they become larger and slightly arcuate, giving the plant a plumose appearance, and quite different to the flat spreading branches of the type plant. The colour is a bright copper; the leaves show the well marked double nerve. I spent some time investigating this

interesting moss, which in many ways resembles *H. umbratum*, but I always returned to where I started with *H. splendens*. I therefore sent a specimen to H. N. Dixon, F.L.S., of Northampton, who says it has a slight approach to the var. *gracilis*. It is plentiful on the hill above the castle facing east. I have not seen this interesting form previously in Ireland.

H. squarrosus, B. & S.—Very common, infesting pasture.

H. triquetrum, B. & S.—In rocky pastures and about the roots of trees, generally distributed.

HEPATICÆ.

BY DAVID M'ARDLE.

The absence from Lambay of many species of Hepatics may be accounted for when we consider the exposed situation and the absence of woods and shaded glens where they love to grow. Nevertheless, I was disappointed as regards the variety of Scale-mosses, and I cannot do better than copy from my note-book a few notes made on a beautiful June evening. "Collected in part of the plantation near the castle. Followed a little stream, and was struck by the absence of Liverworts. *Conocephalus conicus* appeared against a ditch-bank as an old friend; *Pellia epiphylla* very scarce. The hill stream led me to the sea, where I hoped to find on its terminating banks some species of Fossombronia, but no such luck. At present time I am much interested in the genus *Aneura*, but I did not find even a form of the common *A. multifida*. I searched along the ditch banks for *Jungermania crenulata* without success. Such a remarkable difference between this island and the Howth peninsula, nine miles away, is very striking."

In the following list I enumerate 20 species, but out of this short list two, I am glad to say, are additions to the well-worked flora of Co. Dublin. These are marked * below.

In my last¹ paper on Howth Liverworts I enumerated 55 species from that in many respects similar area.

¹ Additions to the Hepaticæ of the Hill of Howth, with a table showing their geographical distribution.—*Proc. R.I.A.*, 3rd Ser., vol. iv., no. I., 1897.

- Frullania Tamarisci**, Linn.—On rocks at the Seal Hole, R. Ll. P., June, 1905. On trees in the plantation, 1905. On rocks on E. coast, 1906. On a bank and on trees near the well, N.E. side, 1906.
- F. germana**, Taylor.—On rocks. N.E. side, 1906, very scarce.
- F. dilatata**, Linn.—On rocks, W. F. de V. Kane, June, 1905. On trees in the plantation, June, 1905. On rocks near the sea, N.E. side, 1906.
- Lejeunea serpyllifolia**, Dicks.—Bank near the well, N.E. side, April, 1906, Nov., 1906. Very scarce.
- L. flava**, Swartz.—In a rocky hollow near the sea on the N. side, very scarce; the only station.
- Radula complanata**, Linn.—On the trunks of trees in the plantation, 1905-6, very scarce.
- Cephalozia bicuspidata**, Linn.—Bank near the well, N.E. side, 1906, very scarce.
- C. divaricata**, Smith.—Marsh, N. side, 1905, very scarce.
- *Scapania compacta**, Roth.—Bank on the N. side, 1905, rare.
- Lophocolea bidentata**, Linn.—Bank, N. side, April, 1906. About the roots of trees in the plantation, 1906.
- *L. cuspidata**.—Caves on the N. side, April, 1906. Damp bank near the Seal Hole, 1906.
- Plagiochila spinulosa**, Dicks.—Among rocks on the hill, E. side, 1906. Bank on N. side, 1906.
- Jungermania turbinata**, Raddi.—Caves on the N. side, April, 1906. On a damp clay bank in the plantation, 1905.
- J. ventricosa**, Dicks.—Marsh on N. side, 1905. Damp bank on the E. side, 1906.
- Saccogyna viticulosa**, Linn.—Bank on the N. side, 1906.
- Pellia epiphylla**, Linn.—Caves on the N. side, R. Ll. P., 1905. Marsh on the E. side, 1905-6.
- P. calyclina**, Taylor.—On a wet bank, W. F. de V. Kane, June, 1905. Among the cliffs, N. side, R. Ll. P., Sept., 1905. Wet banks, E. side, near the sea, April, 1906.
- Metzgeria furcata**, Linn.—On the trunks of trees in the plantation, 1905-6. Bank on the N. side, 1906.
- Var. **prolifera**.—Bank near the well on the E. side, April, 1906
- Marchantia polymorpha**, Linn.—Bank of a stream near the sea, N. side, Nov. 1906.
- Conocephalus conicus**, Neck.—Damp places, N. cliffs, R. Ll. P., 1905. Caves on the N. side, 1905-6. Bank about the well, E. side, April, 1906. Side of a stream in the plantation, 1905. Damp bank near the sea where a stream is constantly flowing. Very common.

FUNGI.

BY DAVID M'ARDLE.

The following list is provisional only, as my time for collecting these plants—two November days—was very short. A small but choice collection was sent to me last October for identification; they were gathered by Mr. and Mrs. Praeger, and are marked * in list.

It will be observed that some very remarkable species have been found, which one would not expect to come across in such an exposed locality. *Lepiota procera*, a very uncommon plant, attained large dimensions, quite as luxuriant as specimens which grow at Glasnevin and in other more favourable situations. Near it was a group of *Pholiota squarrosa*, a very distinct plant, and on a grassy bank *Hygrophorus coccineus* flourished. *Agaricus campestris*, var. *pratensis* was frequent in pastures with *Cortinarius violaceus*, which was also found in the shelter of the plantation, and was identified with some others by Professor E. J. M'Weeney, M.D. The curious *Cantharellus cibarius* was very attractive, as was *Stropharia æruginosa*. I made a search for the "Jew's ear," *Hirniola Auricula-judæ*, and found a few specimens on old wood under a hedge near the castle. It was mostly furnished with *Hypoloma fascicularis* in various stages. By far the most productive spot for fungi was the plantation, mostly of Ash and Sycamore, which surrounds the castle.

**Nidularia pisiformis*, Tul.—On the ground.

**Lycoperdon gemmatum*, Batsch.—In pasture. Common on grassy banks, Nov. 1906.

L. cælatum, Bull.—Plentiful in pastures and on grassy banks.

Hymenochæta rubiginosa, Lev.—On a tree near the castle.—(C.B.)

Hirniola Auricula-judæ, Berk. (Jew's Ear).—On old timber under hedge near the castle, rare.

**Clavaria fastiglata*, Linn.—In pasture, McA., Nov., 1906.

**Coniophora sulphurea*, Mars.—On wood, rare.

Polystictus versicolor, Fries.—On old wood.

Fomes fomentarius, Fries.—On the trunks of trees near the ground in plantation.

Polyporus squamosus, Fries.—On old wood.

**P. velutinus*, Fr.—In plantation.

Fistulina hepatica, Fries.—On the trunks of trees in plantation.

Coprinus comatus, Fries.—In pasture,

- Coprinus tomentosus**, Fries.—On dung in pasture.
- C. dellquescens**, Fries.—In dense tufts on ground in plantation.
- Anellaria separata**, Karst.—On cow-dung.
- Hypoloma fascicularis**, Huds.—On old stumps of trees, common.
- ***Stropharia æruginosa**, Curt.—In pastures. A beautiful species, bright bluish green.
- ***Agaricus campestris**, Linn.—In pastures, M'A., Nov., 1906.
Var. **pratensis**, Vitta.—In pastures.
- ***A. arvensis**, Schæff.—In pastures, M'A., Nov., 1906.
- ***Paxillus involutus**, Fries.—On old wood, M'A., Nov., 1906.
- ***Cortinarius varius**, Fries.—In plantation, M'A., Nov., 1906.
- C. violaceus**, Linn.—Very fine in plantation and on grassy banks.
- Galera hypnorum**, Batsch.—Among moss in pasture.
- G. rubiginosa**, Pers.—Among moss in pasture.
- Nancoria pediades**, Fries.—In pasture.
- Pholiota squarrosa**, Müll.—On stumps of trees in plantation.
- ***Cantharellus cibarius**, Fries.—In plantation, M'A., Nov., 1906.
- Hygrophorus coccineus**, Schæffer.—On a grassy bank. A beautiful species, often of a bright crimson colour.
- H. psittacinus**, Schaeffer.—On a grassy bank.
- Pleurotus mitis**, Pers.—On old wood in plantation.
- Clitocybe candicans**, Pers.—On decayed leaves.
- Laccaria laccata**, Scop.—Common in plantation.
- ***Russula alutacea**, Fries.—In plantation.
- Collybia platyphylla**, Fries.—On decayed wood.
- C. velutipes**, Fries.—In plantation.
- C. longipes**, Bull.—On old wood.
- Marasmius urens**, Fries.—In pasture.
- M. personatus**, Fries.—In plantation.
- ***M. oreades**, Fries.—In pastures, forming the well-known fairy rings, M'A., Nov., 1906.
- Tricholoma fulvellum**, Fries.—In plantation.
- T. luridum**, Fries.—In plantation.
- T. terreum**, Schæffer.—In plantation.
- T. panæolum**, Fries.—On a grassy bank.
- Armillaria mellea**, Vahl.—In plantation.
- Lepiota procera**, Scop.—In plantation and about old stumps on the east side of the island; very fine.
- L. cristata**, Alb. & Schw.—Grassy banks, common.
- L. mesmorphus**, Bull.—On banks, very scarce.
- Humaria granulata**, Sacc.—On cow-dung, common.
- ***Peziza vesiculosa**, Bull.—One specimen, very fine.
- ***Geoglossum difforme**, Fries.—In plantation near the garden gate.
- ***Xylaria hypoxylon**, Grev.—In plantation.



Reseda Luteola,
growing 5 feet high near Carnoon Bay.

R. Welch, Photo.

To face p. 106.



ALGÆ.

A PRELIMINARY LIST OF THE MARINE ALGÆ.

BY EDW. A. L. BATTERS, B.A., LL.B., F.L.S.

In the month of April, 1906, I spent a week on Lambay enjoying the hospitality of the Hon. Cecil Baring, to whom I am much indebted for this opportunity of studying the marine flora of a most interesting and beautiful locality. The rocky nature of the coast, with its precipitous cliffs, pierced here and there by deep gloomy caves, alternating with stretches of turf running down to the water's edge, with a bed of *Zostera marina* (unfortunately not exposed at low tide) to the west of the harbour, render the island an ideal collecting ground for the algologist. During my visit I collected, and preserved for future examination, a large amount of material, which I have since worked out at my leisure, the result being the following list of species. So far as I am aware no previous attempt has been made to catalogue the Marine Algæ of Lambay, nor indeed of any limited portion of the coast of County Dublin. The only mention of the island in algological literature known to me is in the late Prof. W. H. Harvey's "Phycologia Britannica" where it is recorded that *Ectocarpus (Phlæospora) brachiatus* was found by Mr. W. Thompson at "Lambray" (*sic*) in 1883. The present list, although comparatively long, is nothing more than an enumeration of the spring species, and since many quite common species have not yet been recorded from the island there can be no doubt that a careful examination of its shores in summer and autumn would result in adding a large number of plants to those enumerated below. Not a single species of *Oscillatoria* or *Phormidium* has been recorded from the island, and at the time of my visit such common plants as *Himanthalia lorea*, *Callophyllis laciniata*, *Nitophyllum punctatum*, and *Dilsea edulis* were conspicuous by their absence; whilst only one species of *Monostroma*, very few *Ectocarpi*, and not a scrap of *Stilophora rhizodes*, *Alaria esculenta* or any species of *Daseya* was met with; I was also unable to find any trace of *Myriactis pulvinata* on its usual host-plant, *Cystoseira ericoides*, which was fairly plentiful in the deep rock-pools. On the whole, the marine flora of Lambay resembles most nearly that of the Isle of Man or the islands of the Clyde sea-area, and I have little doubt that

further research will show that it is equally rich in species. Up to the present time a little more than 200 species have been found on the island, and of these no fewer than 20, distinguished in the list by an asterisk, have not previously, so far as I am aware, been recorded from the coasts of Ireland.

MYXOPHYCEÆ.

- | | |
|----------------------------------|--|
| *Aphanocapsa marina, Hansg. | *Plectonema norvegicum, Gom. |
| *Glœocapsa crepidinum, Thur. | Calothrix confervicola, Ag. |
| *Aphanothece pallida, Rabenh. | C. scopulorum, Ag. |
| Dermocarpa prasina, Bornet. | C. pulvinata, Ag. |
| *D. Schousbœi, Bornet. | *Dichothrix gypsophila, Born. et Flah. |
| *Pleurocapsa fuliginosa, Hauck. | Isactis plana, Thur. |
| Hyella cœspitosa, Born. et Flah. | Rivularia Biasoletiana, Menegh. |
| Lyngbya æstuarii, Liebm. | R. atra, Roth. |
| L. majuscula, Harv. | R. nitida, Ag. |
| Symploca hydnoides, Kütz. | Mastigocoleus testarum, Lagerh. |

CHLOROSPERMEÆ.

- | | |
|---------------------------------|------------------------------------|
| Chlorochytrium Cohnii, Wright. | Endoderma Flustræ, Batt. |
| *Glœocystis adnata, Schm. | Tellamia contorta, Batt. |
| Prasiola stipitata, Suhr. | Chaetomorpha tortuosa, Kütz. |
| *P. polyrhiza, Jons. | C. ærea, Kütz. |
| Pringsheimia scutata, Rke. | C. Melagonium, Kütz. |
| *Ulvella confluens, Rosenv. | Rhizoclonium riparium, Harv. |
| Monostroma Grevillei, Wittr. | Cladophora pellucida, Kütz. |
| Enteromorpha clathrata, J. Ag. | C. Hutchinsiae, Harv. |
| E. torta, Reinb. | C. rupestris, Kütz. |
| E. compressa, Grev. | C. utriculosa, Kütz. |
| E. Linza, J. Ag. | C. Balliana, Harv. |
| E. intestinalis, Link. | C. arcta, Kütz. |
| E. micrococca, Kütz. | C. lanosa, Kütz. |
| Ulva lactuca, L. | Gomontia polyrhiza, Born. et Flah. |
| Ulothrix flacca, Thur. | Bryopsis plumosa, Ag. |
| Bolbocoleon piliferum, Pringsh. | Vaucheria sphærospora, Nordst. |
| Blastophysa rhizopus, Rke. | Codium tomentosum, Staçkh. |
| *Endoderma Wittrockii, Wille. | |

FUCOIDEÆ.

- | | |
|----------------------------------|---------------------------------|
| Desmarestia viridis, Lamour. | Punctaria plantaginea, Grev. |
| D. aculeata, Lamour. | P. tenuissima, Grev. |
| Dictyosiphon fœniculaceus, Grev. | P. undulata, J. Ag. |
| D. hippuroides, Kütz. | Phyllitis Fascia, Kütz. |
| Litosiphon pusillus, Harv. | Scytosiphon lomentarius, J. Ag. |
| Phœospora brachiata, Born. | Asperococcus fistulosus, Hook. |

- Asperococcus bullosus*, Lamour.
Streblonema Zanardinii (Crn.).
 **Ectocarpus brevis*, Sauv.
E. luteolus, Sauv.
 **E. tomentosoides*, Farlow.
E. confervoides, Le Jol.
E. fasciculatus, Harv.
E. tomentosus, Lyngb.
Pylaiella litoralis, Kjellm.
Isthmoplea sphaerophora, Kjellm.
Myriotrichia claviformis, Harv.
M. filiformis, Harv.
Elachistea fucicola, Fries.
Sphacelaria radicans, Harv.
S. britannica, Sauv.
S. cirrhosa, Ag.
Cladostephus spongiosus, Ag.
C. verticillatus, Ag.
Stypocaulon scoparium, Kütz.
Myrionema strangulans, Grev.
 **Hecatonema maculans*, Sauv.
Ascocyclus orbicularis, Magn.
Ralfsia verrucosa, Aresch.
- Chordaria flagelliformis*, Ag.
Mesogloia vermiculata, Le Jol.
Castagnea virescens, Thur.
Leathesia difformis, Aresch.
Chorda filum, Stackh.
Laminaria saccharina, Lamour.
 var. *Phyllitis*, Le Jol.
L. digitata, Lamour.
L. hyperborea, Foslie.
Saccorhiza polyschides, Batt.
Aglaozonia reptans, Crn.
Fucus ceranoides, L.
F. spiralis, L.
F. vesiculosus, L.
 var. *angustifolius*, Turn.
 var. *balticus*, J. Ag.
F. serratus, L.
Ascophyllum nodosum, Le Jol.
Pelvetia canaliculata Dcne. et Thur.
Halidrys siliquosa, Lyngb.
Cystoseira ericoides, Ag.
Achinetospora pusilla, Born.
Dictyota dichotoma, Lamour.

FLORIDÆ.

- Goniotrichum elegans*, Le Jol.
 **G. ramosum*, Hauck.
Erythrotrichia carnea, J. Ag.
Porphyra leucosticta, Thur.
P. linearis, Grev.
P. umbilicalis, Kütz.
 **Acrochaetium Chylocladiæ*, Batt.
A. virgatulum, J. Ag.
A. secundatum, Næg.
Choreocolax polysiphoniæ, Reinsch.
Gelidium crinale, J. Ag.
G. pusillum, Le Jol.
G. latifolium, Born.
Chondrus crispus, Stackh.
Gigartina stellata, Batt.
Phyllophora epiphylla, Batt.
P. Traillii, Holm. et Batt.
P. membranifolia, J. Ag.
Gymnogongrus Norvegicus, J. Ag.
Ahnfeltia plicata, Fries.
Actinococcus peltæformis, Schm.
Colacolepis incrustans, Schm.
- Sterrocolax decipiens*, Schm.
Cystoclonium purpureum, Batt.
Catenella repens, Batt.
Rhodophyllis bifida, Kütz.
Gracilaria confervoides, Grev.
Calliblepharis ciliata, Kütz.
Rhodymenia palmata, Grev.
Lomentaria articulata, Lyngb.
L. clavellosa, Gaill.
Chylocladia kaliformis, Hook.
C. ovata, Batt.
Plocamium coccineum, Lyngb.
Nitophyllum ramosum, Batt.
Phycodrys rubens, Batt.
Delesseria sanguinea, Lamour.
D. alata, Lamour.
D. hypoglossum, Lamour.
Rhodomela subfusca, Ag.
Laurencia obtusa, Lamour.
L. cæspitosa, Lamour.
L. pinnatifida, Lamour.
Chondria dasyphylla, Ag.

- | | |
|--|--|
| Polysiphonia macrocarpa, Harv. | Ptilota plumosa, Ag. |
| P. fibrata, Harv. | Antithamnion Plumula, Thur. |
| P. urceolata, Grev., var. patens, J. Ag. | Ceramium diaphanum, Roth. |
| P. elongata, Grev. | C. circinnatum, J. Ag. |
| P. fastigiata, Grev. | C. rubrum, Ag. |
| P. nigrescens, Grev. | C. flabelligerum, J. Ag. |
| P. fruticulosa, Spreng. | C. acanthonotum, Carm. |
| Pterosiphonia parasitica, Schm. | Dumontia incrassata, Lam. |
| Brongiartella byssoides, Bory. | Furcellaria fastigiata, Lam. |
| Heterosiphonia plumosa, Batt. | Polyides rotundus, Grev. |
| Spermothamnion Turneri, Aresch. | Cruoriella Dubyi, Schm. |
| *S. irregulare, Ardiss. | Hildenbrandtia prototypus, Nardo. |
| *Trailliella intricata, Batt. | Schmitziella endophleca, Born. et Batt. |
| Griffithsia flosculosa, Batt. | Melobesia farinosa, Lam. |
| Monospora pedicellata, Sol. | M. corallinae, Solms. |
| Rhodochorton membranaceum Magn. | Dermatolithon macrocarpum, Fosl., f. Laminariae, Fosl. |
| Rh. Rothii, Näg. | D. hapalidioides, Fosl. |
| Rh. floridulum, Näg. | Lithophyllum incrustans, Fosl. |
| Callithamnion byssoides, Arn. | Lithothamnion lichenoides, Fosl. |
| C. polyspermum, Ag. | L. Lenormandi, Fosl. |
| C. Hookeri, Ag. | L. corticiforme, Fosl. |
| C. tetragonum, Ag. var. β brachiatum, J. Ag. | Phymatolithon polymorphum, Fosl. |
| Plumaria elegans, Schm. | Corallina officinalis, L. |

GENERA OF DOUBTFUL AFFINITY.

- | | |
|----------------------------|------------------------------|
| *Rhododermis elegans, Crn. | *Rhodophysema Georgii, Batt. |
|----------------------------|------------------------------|

LICHENS.

BY DAVID M'ARDLE.

Only a very little time was available for the collection of the Lichens of Lambay, and the following list represents but a small portion of the Lichen flora. I believe that an adequate examination of the island with regard to these plants would result in a list which would compare favourably with that of similar areas elsewhere.

Cladonia pyxidata, L.—On peaty banks, Nov., 1906.

C. gracilis, L.—Near the well on the east side, among rocky heaths, rare.

- C. rangiferina**, L.—Heathy banks on hill. E. side near cottages, not common. Var. **sylvatica**, L.—Abundant on heathy banks and at the base of rocks in pasture. Var. **alpestris**, L.—On heathy banks, rare, Nov., 1906.
- Ramalina callicaris**, Fries.—On trees in plantation, Nov., 1906. Var. **fraxinea**, L.—Very common on trees in the plantation, Nov., 1906.
- R. scopulorum**, Retz.—Plentiful on rocks near the sea, Nov., 1906.
- Peltigera canina**, L.—Frequent on heathy banks.
- Parmella saxatilis**, L.—On rocks near the Seal Hole, Nov., 1906.
- P. physodes**, L.—On trees in the plantation, Nov., 1906.
- P. olivacea**, L.—On trees in the plantation, Nov., 1906.
- Physcia parietina**, L.—On trunks of trees, old pales, rocks, and walls, common.
- Lecanora subfusca**, L.—On the trunks of trees, old pales, &c., common, Nov., 1906.
- L. pallescens**, L.—On rocks on the east coast, Nov., 1906.
- Graphis scripta**, L.—On the bark of trees in the plantation, Nov., 1906.
- Sphærophoron coralloides**, Pers.—On rocks, common, Nov., 1906.

ORIGIN OF THE FAUNA AND FLORA.

BY H. J. SEYMOUR and R. LLOYD PRAEGER.

THE age and origin of the fauna and flora of the island are very important questions, the solution of which offers difficulties of various kinds. Professor Carpenter and the writers have discussed this question together, from the zoological, geological, and botanical standpoint respectively, and in the remarks which follow the contributions of each towards the arriving at some satisfactory explanation are included. That the bulk of the present fauna and flora was neither sea-borne, wind-borne, nor ice-borne appears to us probable, if not certain; and we must, therefore, look to a former land-connection across which the animals and plants could have passed from the mainland. That this connection was not one which existed only prior to the Glacial Period appears fairly established by the geological evidence, which goes to show that during that time the heavy ice of the Irish Sea glacier over-rode the whole island, moving south-westward; and it is difficult to conceive of the fauna and flora as having persisted on the island through this time.

We therefore look for a Post-glacial land connection. The channel which separates Lambay from the mainland is two to three miles wide. Its depth is tolerably uniformly six to seven fathoms. There is no evidence of this being a recent channel. Post-glacial subsidence of sufficient amount to form the channel where formerly there was dry land plays no part in the annals of local geology; nor are physical conditions such as would account for its formation by marine denudation within that period. It is true that along a line drawn from the Burren Rocks on Lambay to Portrane coastguard station on the mainland a kind of reef runs, on which the maximum depth is $5\frac{1}{4}$ fathoms. This is probably formed of the hard andesitic rocks which appear on each side of the channel; in any case, it cannot be looked on as the wreck of a former land bridge. The channel has all the appearance of being a Pre-glacial depression, its origin being possibly very much Pre-glacial.

How, then, are we to get our land-connection? The suggestion which seems to us to offer fewest difficulties involves the former extension seaward, upon the shallow shelf which fringes the present coast-line, of the boulder-clay which mantles the country all along the east coast—material brought southward by the Irish Sea ice, and accumulated along the edge of the land. In many places, as around Clew Bay and Galway Bay, the solid geology of the coast is masked below heavy drift, in the form of promontories and islands. It seems quite possible that the passing away of the Ice Age left the ground which is now occupied by the shallow waters off the Dublin coast covered with a mantle of drift, the surface of which was above sea-level, and over which animals and plants might migrate freely. Post-glacial marine denudation, which could hardly be called on to cut the present Lambay channel out of the solid rocks which may at one time have occupied it, would, it may be granted, have sufficed to remove the same amount of drift, and to erode this softer material back to the Pre-glacial coast-line. That many species of plants and animals have, since its final isolation, reached Lambay by the agency of wind, and of sea, and directly or indirectly by the act of man, is of course evident.

THE FLORA OF INISHTURK.

BY R. LLOYD PRAEGER.

INISHTURK lies off the Mayo coast, half-way between Clare Island to the north-east and Inisbofin to the south-west. It is further from the mainland than either, being seven miles out from the nearest point, as against three and a quarter in the two other cases. It is also much smaller than either, having an area of $2\frac{1}{4}$ square miles, as against Bofin's $4\frac{1}{2}$ square miles (Inishark included), and Clare's $6\frac{1}{8}$ square miles. In elevation it is intermediate. Clare Island rises to 1,520 feet, with a colony of alpine plants. Bofin has no point over 300 feet. A large part of Inishturk is over the last-mentioned elevation, and its highest points are 629 and 588 feet. Geologically, the three islands are similar, being composed mainly (Bofin and Turk exclusively) of Ordovician and Silurian slates and schists. Bofin is the richest of the three in fresh water area and as regards sandy shores. These physical features should be borne in mind when the flora of the three islands is compared.

GENERAL FEATURES.

In shape, Inishturk is oblong—much the shape of Ireland itself, but with its longest diameter W.S.W. instead of S.S.W. The coast is very little indented by bays or creeks, and the single tiny harbour is not oversafe in a ground-swell. The shore is everywhere rocky, save for one spot south of the harbour, where a few square yards of sandy beach rise a couple of feet above storm water-mark. Salt marsh is entirely absent. On the northern and western sides there are high cliffs, which rise to 400 feet in one place, and the coast is exceedingly broken and picturesque. Elsewhere the ground rises from the shore in a bold slope. There are four main elevations on the island—in the N.E., N.W., S.E., and S.W. respectively, and rising to 428, 629, 588, and 240 feet; and between are rather deep valleys, which afford greater shelter than the general appearance of the island would lead one to expect. The slates are everywhere thrown into a series of

sharp east and west folds, and dip at high angles. This is accountable for the low rounded ridges of rock that everywhere traverse the island east and west, and in some places cause the surface to strikingly resemble a sheet of corrugated iron. A series of very strong vertical joint-planes and faults traverses the beds north-west and south-east, and much affects the modelling of the island. The main valleys are cut along these lines, and at the west end some magnificent vertical cliff walls have the same origin. Another result of geological conditions is the presence of innumerable caves, often of considerable length, cut both along the strike and along the joints referred to. In two cases these open by funnels on the top of the cliffs at quite a distance from the sea margin. Drift is almost completely absent, only a couple of small patches having been observed, but the disintegration of the slates has produced a light rich soil in places. There are several little streams, with quite a luxuriant vegetation along them, and several tiny boggy lakelets. Cultivation is confined to two areas in the south and east, in the two main valleys, but does not include more than perhaps one-twentieth part of the island. Here are grown excellent potatoes and oats, and some rye, barley, cabbages, turnips, and beet. The major part of the surface of the island consists of green, grassy, rocky heath, furnishing excellent pasturage. By farming and fishing a present population of 23 families is supported.

CHARACTER OF THE VEGETATION.

From the point of view of vegetation, the surface of the island is easily and naturally divided into three areas, namely—the *cultivated area* (which includes the most sheltered portions of the island and the deepest soil, and was originally, no doubt, largely occupied by arbuscular vegetation, which has still its headquarters there), the *heath area* (which spreads over the greater part of the island), and the *maritime area* (which, owing to the extreme exposure and the large area subject to soakings of salt spray, is more extensive than the bold elevation of the island would lead one to expect).

The Cultivated Area.—The tilled land, which covers two irregular areas about the “villages” of Garranty and Craggy

respectively, occupies a series of little sheltered grooves, separated by the ribs of rock before-mentioned, which latter furnish grazing land. Among the crops, *Brassica alba* is by far the commonest weed. Some fields are yellow with it, and its heavy fragrance fills the air. Other common and luxuriant weeds are *Brassica Sinapis*, *Spergula arvensis*, *Lamium intermedium*, *L. purpureum*, *Stachys palustris*, *Atriplices*, *Polygonums*, *Rumex crispus*, *Euphorbia Helioscopia*. The patches of meadow land are bright with quantities of *Spiræa Ulmaria*, *Lythrum Salicaria*, *Heracleum Sphondylium*, *Angelica sylvestris*, *Senecio aquaticus*, *Cnicus pratensis*, *Oriochis maculata*, all of which are abundant in many situations on the island. The fields are much broken up by rocky thickets formed mainly of *Rubi* and *Pteris*, with the following, among others, as abundant dependent species:—*Hypericum Androsæmum*, *Geranium dissectum* (both unusually abundant on Inishturk), *Epilobium montanum*, *Lastrea Filix-mas*, *Osmunda regalis*, *Athyrium Filix-femina*. The abundance and luxuriance of the Lady Fern on the island is remarkable. The cultivated area being also the most sheltered, it is there, on rocky places, that the only arboreal vegetation is found, mainly in the shape of bushes. These include *Corylus Avellana*, *Betula pubescens*, *Populus tremula* (indigenous), *Salix cinerea*, *S. repens*, *Prunus spinosa*, *Rubi*, *Rosa canina*, *Pyrus Malus* (var. *acerba*, indigenous), *Ilex Aquifolium*, *Sambucus nigra* (looking native). Of *Cratægus Oxyacantha* a single bush was seen in the chink of a rock. The little cliff which overhangs the harbour furnishes examples of almost the whole arbuscular flora of the island. Some of the bushes of Birch, Hazel, Crab, Holly, and Elder attain a diameter of six or eight feet, but three or four feet represent their greatest height. *Salix viminalis* is grown in small quantity by many cottages for basket making; while two Ash trees, two Fuchsias, and a Sycamore, planted in front of a cottage at Garranty, represent the only attempt at forestry on the island. In the bushy places *Arrhenatherum avenaceum* is remarkably abundant, and its silvery panicles, raised high above the dense growths, are everywhere waving in the wind.

The Heath Arca.—Outside the limited farmland area heath, in one form or another, occupies the ground, save on the

northern and western coasts, where the maritime flora prevails. The heath is generally rocky, dry, and very grassy, and often presents delightful natural gardens, brilliant with *Polygala depressa*, *Anthyllis Vulneraria*, *Trifolium pratense*, *Lotus corniculatus*, *Galium verum*, *Jasione montana*, *Euphrasia officinalis*, *Thymus Serpyllum*, and *Orchis maculata*. Other abundant plants are *Viola Riviniana*, *Lathyrus macrorrhizus*, *Hypochaeris radicata*, *Calluna vulgaris*, *Erica cinerea*, *Plantago maritima*, *P. Coronopus*. The most conspicuous grasses are *Festuca ovina*, *Agrostis vulgaris*, *Aira præcox*, *A. caryophyllea*, *Kæleria cristata*, *Triodia decumbens*, *Anthoxanthum odoratum*. Where rocks crop out, *Saxifraga umbrosa* and *Sedum anglicum* are abundant; and hardly a chink of a vertical rock-face anywhere on the island is without *Asplenium marinum*. Where the heath becomes wetter, *Ranunculus Flammula*, *Hypericum elodes*, *Anagallis tenella*, *Potamogeton polygonifolius*, and *Eleocharis multicaulis* are, perhaps, the most abundant plants; they are accompanied by quantities of *Viola palustris*, *Hydrocotyle vulgaris*, *Galium palustre*, *Leontodon autumnalis*, *Erica Tetralix*, *Myosotis repens*, *Juncus bufonius*, *J. supinus*, *J. lamprocarpus*, *J. acutiflorus*, *Carex glauca*, and *C. flava*. Needless to say, the whole heath vegetation is extremely stunted by exposure, and even such plants as the taller rushes named above were gathered in flower a few inches high. Around the lakelets there are small areas of very wet marsh, consisting of a floating felt, where *Menyanthes trifoliata*, &c., join the group enumerated above, and where a few species, such as *Carex paniculata* and *C. limosa*, have their only habitat. On the steep seaward slopes of the Signal Tower Hill a grassy, mossy, springy sward prevails, with many patches of rushes. This is much dug, to a depth of three or four feet, for peat, of which there is still a good supply available.

The Lakes.—Near the Signal Tower the little Lough Coolanick lies in a deep depression on the edge of the cliff. At the south-west end of the island half-a-dozen ponds and tiny lakes lie in the rock troughs already alluded to. None of the lakes attain a depth of more than about three feet. Most are extremely shallow, with a bottom of soft peat-mud. Herring Gulls in numbers frequent those in the west.

The flora of Lough Coolaknick is extremely poor, and consists mainly of *Chara fragilis*, which is present in all the lakes. The western group is distinctly more interesting. Here *Lobelia Dortmanna*, *Sparganium natans*, *Isoetes lacustris*, *Nitella opaca* (?) grow, the first two in several stations.

The Maritime Area.—This divides itself into two vegetations, inhabiting respectively cliff and sward. On the cliffs which fringe the northern and western shores, *Sedum Rhodiola* is the most abundant plant, growing in unusual profusion, and sometimes extending, like *Asplenium marinum*, to rocks in the interior of the island. With it are the usual sea-cliff plants—*Cochlearia officinalis*, *Beta maritima*, *Asplenium marinum*, and much *Angelica sylvestris*, *Matricaria inodora*, and *Rumex Acetosa*. Low rocks on the more sheltered east and south shores yield *Crithmum maritimum*, *Glaux maritima*, *Juncus Gerardi*, *J. maritimus*, *Carex extensa*, *C. distans*.

A band of varying width along the cliffy shores, and a large area at the west end of the island, is occupied by dense *Plantago* sward, as smooth as if shaved with a razor. This is often composed practically entirely of *P. maritima* and *P. Coronopus*; but has usually various other ingredients, of which some of the most frequent are *P. lanccolata*, *Radiola linoides*, *Cerastium tetrandrum*, *Sagina maritima*, *S. procumbens*, *Hydrocotyle vulgaris*, *Anagallis tenella*, *Carex flava*, *Festuca ovina*. The appearance of this formation, stretching like a close green carpet between the rocky knolls, even at a considerable distance from the sea, is very remarkable. There is no doubt that this a truly halophile flora, for a windy day even in summer sends flecks of foam flying all over the island, while in winter gales the whole of Inishturk is beaten by salt spray.

BOTANICAL EXPLORATION.

The botany of Inishturk has not previously been systematically explored. In 1872 Mr. William Macmillan, Inspector of National Schools, landing on the island in the course of his professional duties, picked up close to the landing-place a plant which looked "very like a stunted broad-leaved willow."¹ This he sent to S. A. Stewart, who told him of the

¹ W. Macmillan, *in litt.*, August, 1906.

value of his find, and communicated this new station for *Euphorbia hiberna* to A. G. More. The next visit to the island of which there is any botanical record was that of A. G. More himself, in company with R. M. Barrington. Attracted, no doubt, by Macmillan's discovery, these botanists landed on Inishturk on their way back to Westport from exploring Inishbofin in 1875, and spent a few hours there listing plants; but the only list published¹ was one of twenty species which they had not observed on Bofin. They obtained *Euphorbia hiberna*, and their list also includes *Trifolium arvense* (an unexpected plant), *Lychnis diurna*, *Sedum Rhodiola*, *Carex dioica*. During the thirty years that have since elapsed no botanist appears to have visited Inishturk. In the middle of July last my wife and I spent a week on the island, and devoted much of the time to a survey of the flora. By the kindness of Rev. W. S. Green and Mr. Townshend Gahan, a little Congested Districts Board shed of galvanised iron, built on a rock on the very edge of the ocean, opened its hospitable door to receive us; and here, in a room ten feet by eight, surrounded by bulwarks of Portland cement, dynamite, and fishing lines, we roasted sixpenny chickens, baked bread, fried mackerel (all in the one pan), ate, slept, wrote, and dried plants, with an enviable satisfaction.

FLORISTIC NOTES.

Total Flora.—The total flora of Inishturk (Phanerogams and Vascular Cryptogams), according to the standard used in "Irish Topographical Botany," numbers 323 species, or 329 species and sub-species. I shall, first of all, list these, using symbols to indicate comparative frequency:—c. = common; f. frequent; r. = rare; l. = local; v. = very; 1, 2, &c. = seen in 1, 2, &c., stations.

Ranunculus Flammula,	Caltha palustris, 1.	Cardamine hirsuta, r.
v. c.	Fumaria capreolata, l.	flexuosa, 1.
acris, f.	confusa, f.	Cochlearia officinalis, f.
repens, f.	Nasturtium officinale, f.	danica, r.
Picaria, f.	Cardamine pratensis, r.	grænlandica, r.

¹ More (A. G.): Report on the Flora of Inish-Bofin, Galway. *Proc. R.I.A.* (2), Science, ii., 578. 1876.

Brassica campestris, v. r.	Trifolium repens, c.	Hydrocotyle vulgaris, c.
Sinapis, f.	procumbens, 2.	
alba, v. c.	dubium, f.	Apium nodiflorum, v. 1.
Capsella Bursa-pastoris, 1.	Anthyllis c.	Conopodium denudatum, 1.
Senebiera coronopus, r.	Lotus corniculatus, c.	Anthriscus sylvestris, 1.
Helianthemum guttatum, 1.	Vicia Cracca, c.	Crithmum maritimum, r.
Viola palustris, c.	sepium, c.	Cenanthe crocata, 2.
Riviniana, c.	Lathyrus pratensis, c.	Angelica sylvestris, c.
canina, f.	macrorrhizus, c.	Heracleum Sphondylium, f.
Polygala vulgaris, 2.	Pruunus spinosa, r.	Daucus Carota, c.
serpyllacea, c.	Spiræa Ulmaria, f.	Hedera Helix, f.
Silene maritima, c.	Rubus argenteus, r.	Sambucus nigra, 1.
Lychnis diurna, 4.	dumnoniensis, r.	Lonicera Periclymenum, f.
Flos-cuculi, r.	pulcherrimus, c.	Galium verum, c.
Cerastium tetrandrum, c.	rusticanus, c.	saxatile, f.
glomeratum, r.	iricus, c.	palustre, c.
triviale, f.	Borreri, c.	Aparine, r.
Stellaria media, c.	Fragaria vesca, r.	Sherardia arvensis, 1.
graminea, 1.	Potentilla Tormentilla, f.	Valeriana sambucifolia, 1.
uliginosa, f.	Anserina, r.	Scabiosa Succisa, c.
Arenaria peploides, 1.	palustris, 1.	Solidago Virgaurea, c.
Sagina maritima, f.	Alchemilla arvensis, r.	Bellis perennis, f.
procumbens, c.	Rosa spinosissima, c.	Aster Tripolium, 1.
subulata, r.	canina, f.	Antennaria dioica, 1.
nodoša, 1.	Pyrus Malus, v. 1. and r.	Gnaphalium uliginosum, r.
Spergula arvensis, f.	Cratægus Oxyacantha, 1.	Achillæa Millefolium, r.
Spergularia rupestris, f.	Saxifraga umbrosa, 1.	Parnica, 1.
Montia fontana, r.	Chrysosplenium oppositifolium 1.	Chrysanthemum segetum, 1.
Hypericum Androsæmum, f.	Cotyledon Umbilicus, 1. and r.	Leucanthemum, r.
tetrapterum, 1.	Sedum Rhodiola, c.	Matricaria inodora, f.
humifusum, 3.	anglicum, v. c.	*discoidea, 1.
pulchrum, c.	Drosera rotundifolia, f.	Artemisia vulgaris, 2.
elodes, c.	intermedia, 1.	Tussilago Farfara, 1.
Radiola linoides, c.	Myriophyllum alterniflorum, 1.	Senecio vulgaris, f.
Linum catharticum, c.	Callitriche stagnalis, f.	Jacobæa, r.
Geranium molle, r.	Lythrum Salicaria, v. c.	aquaticus, c.
dissectum, f.	Epilobium parviflorum, f.	Carlina vulgaris, 1.
Robertianum, f.	montanum, f.	Arctium Lappa, f.
Oxalis Acetosella, 1.	obscurum, f.	Cnicus lanceolatus, f.
Ilex Aquifolium, 1.	palustre, f.	palustris, f.
Trifolium pratense, c.	arvense, 1.	pratensis, c.
medium, 2.		
arvense, 1.	Circæa lutetiana, 1.	

Cnicus arvensis, c.	Pinguicula vulgaris, c.	Listera ovata, 1.
Centaurea nigra, c.	lusitanica, 1. f.	Orchis mascula, 1.
Lapsana communis, r.	Mentha hirsuta, c.	incarnata, f.
Crepis virens, 1.	arvensis, 1.	maculata, c.
Hieracium Pilosella, f.	Thymus Serpyllum, c.	Habenaria chloroleuca,
Hypochæris radicata, c.	Prunella vulgaris, f.	v. r.
Leontodon hirtus, f.	Stachys palustris, f.	Iris Pseud-acorus, f.
autumnalis, c.	sylvatica, 1.	*Allium Babingtonii, 1.
Taraxacum officinale, r.	arvensis, f.	Narthecium ossitragum,
Sonchus oleraceus, r.	Galeopsis Tetrahit, f.	f.
asper, r.	Lamium intermedium, f.	Juncus bufonius, c.
arvensis, 1.	f.	squarrosus, r.
Lobelia Dortmanna, 2.	purpureum, f.	Gerardi, f.
Jasione montana, c.	hybridum, 1.	effusus, f.
Calluna vulgaris, c.	Teucrium Scorodonia,	Juncus maritimus, 1.
Erica Tetralix, f.	c.	supinus, c.
cinerea, f.	Plantago major, r.	lamprocarpus, c.
Armeria maritima, c.	lanceolata, c.	acutiflorus, f.
Primula vulgaris, c.	maritima, v. c.	Luzula maxima, 2.
Lysimachia nemorum, f.	Coronopus, v. c.	erecta, f.
Glaux maritima, f.	Littorella lacustris, f.	Sparganium affine, 1. r.
Anagallis arvensis, r.	Chenopodium album, f.	minimum, r.
tenella, v. c.	Beta maritima, 1. c.	Triglochin palustre, r.
Centunculus minimus,	Atriplex patula, f.	maritimum, 1.
1. f.	hastata, r.	Potamogeton natans, f.
Samolus Valerandi, 1.	Polygonum Convolvu-	polygonifolius, c.
Erythraea Centaureum,	lus, f.	Eleocharis palustris, r.
f.	aviculare, f.	multicaulis, c.
Gentiana campestris,	Hydropiper, f.	Scirpus fluitans, f.
1. f.	Persicaria, f.	Savii, f.
Menyanthes trifoliata, f.	Rumex obtusifolius, f.	setaceus, r.
Myosotis cæspitosa, f.	crispus, c.	lacustris, 1.
repens, c.	Acetosa, f.	Eriophorum angusti-
arvensis, f.	Acetosella, c.	folium, 1.
Calystegia sepium, 1. f.	Euphorbia Helioscopia,	Schæenus nigricans, f.
Veronica agrestis, f.	f.	Carex dioica, 1.
polita, f.	hiberna, 1. f.	pulicaris, f.
arvensis, r.	Peplus, 1.	paniculata, 1.
serpyllifolia, f.	Urtica dioica, f.	vulpina, f.
Chamædrys, r.	urens, 1.	echinata, c.
Beccabunga, 1.	Betula pubescens, 1. r.	ovalis, f.
Euphrasia officinalis,	Corylus Avellana, 1. r.	vulgaris, f.
v. c.	Salix cinerea, f.	glauca, c.
Bartsia Odontites, c.	aurita, f.	limosa, 1.
Pedicularis sylvatica, f.	repens, c.	pilulifera, r.
Rhinanthus Crista-galli,	Populus tremula, 1. f.	præcox, f.
f.	Empetrum nigrum, f.	panicea, r.
Utricularia minor, 1.	Juniperus nana, 1. r.	binervis, 1.

Carex distans, r.	Koeleria cristata, c.	Asplenium marinum, .
Hornschuchiana,	Molinia cærulea, c.	c.
1.	Dactylis glomerata, f.	Ruta-muraria, 1.
extensa, r.	Poa annua, c.	Athyrium Filix-femina,
flava, v.c.	pratensis, f.	c.
Anthoxanthum odora-	trivialis, f.	Scolopendrium vulgare,
tum, c.	Glyceria fluitans, f.	r.
Phleum pratense, 1.	maritima, r.	Lastrea Filix-mas, c.
Agrostis canina, r.	Festuca rottbœllioides,	dilatata, f.
alba, c.	r.	æmula, f.
vulgaris, c.	sciuroides, r.	Polypodium vulgare, f.
Aira caryophyllea, c.	ovina, c.	Osmunda regalis, c.
præcox, c.	rubra, r.	Ophioglossum vulga-
Deschampsia cæspitosa,	Bromus mollis, f.	tum, 1.
1.	Brachypodium sylvati-	Botrychium Lunaria, r.
flexuosa, f.	cum, f.	Equisetum arvense, r.
Holcus mollis, 1.	Lolium perenne, r.	palustre, 1.
lanatus, f.	†temulentum, 1.	limosum, 1.
Arrhenatherum avena-	Agropyron repens, r.	Lycopodium Selago, 1. r.
ceum, c.	Nardus stricta, f.	Selaginella selagi-
Triodia decumbens, c.	Pteris Aquilina, c.	noides, f.
Phragmites communis,	Blechnum Spicant, c.	Isoetes lacustris, 1.
f.	Asplenium Adiantum-	Chara fragilis, f.
Cynosurus cristatus, c.	nigrum, f.	Nitella opaca (?), 1.

NOTES ON RARER PLANTS, &c.

Fumaria capreolata, L.—Fine plants in one station. **F. confusa** frequent, in the typical form and as var. **hibernica**.

Cochlearia græniandica, L.—Not infrequent in clinks of rocks on the northern coast, and comes inland along the reef of rocks that runs south-east towards Garranty. Identical in characters and habitat with the Achill plant.

Helianthemum guttatum, Mill.—We were much pleased to find this on Inishturk—one small colony, consisting of very fine plants. The station is a grassy rib of rock which crosses the main valley of the island, just below the straggling cottages, four in number, which constitute the village of Craggy. This plant has its Irish head-quarters in the neighbouring island of Inishbofin, in W. Galway, where it was discovered by Mr. W. MacMillan in 1872; and elsewhere in Ireland is known only from Three Castle Head, Co. Cork. Its rarity on Turk contrasts curiously with its abundance on Bofin.

Sagina subulata, Presl.—Sprangly distributed along the north and west coasts, generally on dry ledges of rock. The finding of this plant in W. Mayo fills up a gap in its known range, which is now almost continuous for the maritime divisions from Cork round the west coast to Antrim.

Spergula arvensis, L.—Both var. *vulgaris* and var. *sativa* seen.

Montia fontana, L.—Var. *minor* occasional; var. *ricularis* once seen.

- Epilobium montanum** × **obscurum**.—West of the harbour. Rev. E. S. Marshall confirms my naming.
- Callitriche stagnalis**, Scop., var. **serpyllifolia**, Lönneroth.—The only Water Starwort seen.
- Trifolium arvense**, L.—Found by A. G. More on Inishturk in 1875, which has since remained its only Mayo-Galway station. We found it in abundance on the rocky bluff which overlooks Portdoon, which is probably More's locality. He marked it with a †. I fancy it is indigenous there, but if not, is certainly thoroughly established.
- Rubus**.—*Rubi* are abundant in the sheltered parts of the island, on the borders of lanes and fields, but no great variety occurs. Five forms were easily distinguishable in the field, and Mr. Rogers, who has kindly examined my gatherings, names six from the materials collected. The most striking and handsome Bramble on the island is *R. Borreri*, which is abundant, mostly not quite typical, and varying towards var. *dentatifolius*, Briggs. One form of *R. Borreri* collected is so hairy that Mr. Rogers suggests *Borreri* × *iricus* as its parentage. The other presumed parent of this plant, *R. iricus*, is also abundant—a characteristic western form. Two plants very widely distributed in Ireland, *R. pulcherrimus* and *R. rusticanus*, and two more local, *R. argenteus* and *R. dunmoniensis*, complete the list.
- Saxifraga umbrosa**, L.—We noticed that when a cottage falls into ruin, this and *Sedum anglicum* are the first plants to establish themselves on the ruined walls, while *Athyrium Filix-femina* takes possession of the deserted floor.
- Drosera intermedia**, Hayne.—Found only on a sloping piece of wet heath, south of Lough Coolaknick. Though the wet floating marsh which fringes several of the lakelets would appear to furnish an ideal habitat, neither *D. anglica* nor *D. intermedia* was to be seen.
- ***Matricaria discoidea**, DC.—Has completely taken possession of the village of Garranty, where it occupies the "roads" almost to the exclusion of other weeds.
- Arctium Lappa**, L.—Burdocks are frequent, but were quite immature at the time of our visit, so have been placed under the Linnæan aggregate.
- Lobelia Dortmanna**, L.—Abundant in Lough Namucka and Lough Aleen.
- Centunculus minimus**, L.—Often abundant on damp roadsides and in fields that have gone out of cultivation.
- Pinguicula lusitanica**, L.—Frequent at the west end of the island; not seen elsewhere.
- Euphorbia hiberna**, L.—Inishturk has been chiefly known to botanists as furnishing one of the few west coast stations for this interesting plant. Here it was first found by W. Macmillan, the discoverer of *Helianthemum guttatum* on Inishbofin, in 1872, and was subsequently seen by More and Barrington on their brief visit in 1875. The plant is confined to the harbour and the sheltered bushy slopes west of it, where it grows in abundance.

Populus tremula, L.—Somewhat widely spread in rocky and bushy places over the south and west of the island, seldom rising three feet in height.

Juniperus nana, Willd.—Here and there on the western heaths, rare, and very stunted and prostrate.

‡**Allium Babingtonii**, Borrer.—Twice seen on borders of fields near the harbour.

Juncus effusus, L.—The form with spreading stems was several times observed.

Sparganium affine, Schinzl.—Frequent in the western lakelets and pools. *S. minimum* is more widely distributed, but rarer.

Carex limosa, L.—Plentiful in the wet marsh around Lough Coolacknick, growing with very stunted *C. paniculata*.

Deschampsia caespitosa, Beauv., var. **brevifolia** (Parnell).—A curious grass, of which a few specimens were seen in a wet marsh at the west end of the island. It grew in small tufts 6-7 inches high, with a comparatively small panicle of a golden-brown colour, rising about 30 inches. In naming it as above, Mr. Bennett remarks:—"But a query comes in here. There is an *Aira caespitosa* var. *brevifolia*, Hartm., *Hanb. Sk. Fl.*, ed. 2, p. 25, 1832 = *A. Hartmanniana*, Nyman, *Consp. Fl. Europ.*, p. 807, 1882. This is a plant found in Norway, Sweden, and the Faroes, and by the description in Anderson's *Scan. Gram.* cannot be our *brevifolia* (although Ascherson and Graebner, in their *Flor. Syn. M. Europ.*, put it so). That being so, there seems to be no name for our plant. The nearest seemingly is var. *latifolia*, Bischoff, in Koch's *Syn.*, Ed. 2. It might be called var. *levis*—I cannot find this under *caespitosa*. I think our plant may be *A. caespitosa* δ . *rigida*, Opiz, *Seznam*, 37, 1852; but there is no description to this, so it is a *nomen nudum*."

Festuca ovina, L.—The viviparous mountain form occurs at sea-level.

Asplenium Ruta-muraria, L.—On the walls of the ruined watch-tower. The presence on Inishturk of certain plants of special habitat is interesting. Here, more than 600 feet over the Atlantic, in a desperately exposed position, this fern has found its way to the only suitable mortar-built wall on the island. Again, there are not ten square yards of sand above spring-tide level on the whole island, yet *Arenaria peploides* has discovered that single spot. It looks as if the arrangements for seed-dispersal in these and some other plants were singularly efficient.

Ophioglossum vulgatum, L.—Seen only in a very dwarf state at the cairn on the hill west of the harbour (588 feet). *Botrychium Lunaria* is common, and was seen four times.

Isoetes lacustris, L.—Plentiful and fine in Lough Namucka.

Nitella opaca, Ag. (?).—Sparingly in Lough Namucka. "This or *N. flexilis*—probably *N. opaca*."—H. & J. Groves.

Types of distribution.—Inishturk corresponds closely with Clare Island, Achill Island, and the Mullet as regards the representation in its flora of the various types of distribution ; and in view of the remarks on this subject made in my papers dealing with the flora of those areas¹, no analysis of the Inishturk flora appears necessary. The flora, too, like that of the adjoining areas referred to, is strongly calcifuge. Only one of the “calcicole A” group of “Cybele Hibernica” occurs—namely, *Carlina vulgaris*; four of the “calcicole B” group—*Anthyllis Vulneraria*, *Tussilago Farfara*, *Leontodon hirtus*, *Carex glauca*; and one “calcicole C” plant, *Antennaria dioica*; in all, six species out of 56.

Comparison with neighbouring areas.—Full lists of the phanerogamic flora of all the larger western islands having now been published—Inishbofin, Inishturk, Clare Island, Achill Island (to these may be added the peninsula of the Mullet)—it becomes possible to make comparisons between their respective floras. Certain details of such comparisons are both interesting and curious, but the exigencies of space preclude my doing more than draw attention to the relation between area, elevation, and total flora, and, following that, to list the Inishturk plants which do not grow on the neighbouring and larger islands of Inishbofin and Clare.

	Area (sq. m.)	Elevation (feet).	Flora.
Inishbofin,	4½	292	303
Inishturk,	2¼	629	327
Clare Island,	6½	1,520	365
Achill Island,	57	2,204	416
Mullet,	45	434	348

¹ *I.N.*, xii., 277; xiii., 265; xiv., 229.

² Characeæ omitted in all cases, since the Inishbofin Characeæ have not been worked.

This table shows a remarkable relative richness in the vegetation of Inishturk. With only one-half the area of Inishbofin, which is besides better supplied with lakes and sandy shores, Inishturk yields a flora actually larger by 24 species than the flora of Bofin. It falls short by only 38 species of the flora of Clare Island, which is nearly three times the size of Turk, and comes within 21 species of the flora of the Mullet, which has an area over twenty times as great.

It is also interesting to find that Inishturk possesses 25 species not found on either Bofin or Clare. Its flora (Characeæ omitted) includes altogether 86 species not found on Bofin, and 40 not found on Clare. The Inishturk plants, which are absent from both these neighbouring islands, are listed below:—

<i>Caltha palustris.</i>	<i>Sherardia arvensis.</i>
<i>Cochlearia grænlandica.</i>	<i>Carlina vulgaris.</i>
<i>Lychnis diurna.</i>	<i>Mentha arvensis.</i>
<i>Trifolium medium.</i>	<i>Stachys sylvatica.</i>
<i>arvense.</i>	<i>Euphorbia hiberna.</i>
<i>procumbens.</i>	<i>Listera ovata.</i>
<i>Rubus argenteus.</i>	<i>Carex vulpina.</i>
<i>dumnoniensis.</i>	<i>Phleum pratense.</i>
<i>Borreri.</i>	<i>Agrostis canina.</i>
<i>Pyrus Malus.</i>	<i>Holcus mollis.</i>
<i>Cratægus Oxyacantha.</i>	<i>Glyceria maritima.</i>
<i>Drosera intermedia.</i>	<i>Isoetes lacustris.</i>
<i>Anthriscus sylvestris.</i>	

Four of the plants of Inishturk are additions to the flora of Division 27, West Mayo, namely—

<i>Helianthemum guttatum.</i>	<i>Rubus argenteus.</i>
<i>Sagina subulata.</i>	<i>R. Borreri.</i>

Three more, recorded some time since from the island, are still unknown elsewhere in the division—*Lychnis diurna*, *Trifolium arvense*, and *Euphorbia hiberna*.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 29.—The Annual Meeting was held in the Royal Dublin Society's Lecture Theatre. The Report of the Council, adopted at this meeting, states that there were 195,034 admissions to the Gardens during 1906, being an increase of 6,612 as compared with the previous year, while the receipts, £2,597, show an increase of £107. The financial condition of the Society is on the whole satisfactory. During the year over £1,500 has been expended on buildings and on permanent improvements and additions to the houses for animals. All expenses in connection with these improvements have been paid. The purchase of animals cost £672 and their food £793. On the other hand £386 was realised by the sale of animals. A sum of £100 was bequeathed to the Society by Sir William Findlater, who had been for many years an active member of Council. His legacy will enable the Council to carry out some urgently needed improvements. A balance of £777 remains to the credit of the Society.

The question of providing better accommodation for Anthropoid Apes had been discussed for many years, and at last the plans which were in contemplation at the time of the last General Meeting have been carried out. The Council feel sure that the new house, which was finished at Whitsuntide, will be successful in keeping the delicate Apes in better health and in greater comfort than before. The whole of the annexe to the Monkey House has been converted into a single large cage. This cage can be divided at will into four separate compartments, the roof and south wall being fitted with glass in such a manner as to allow every available ray of sunlight to enter. The south side of this new structure is in such a position that a two-fold purpose is served thereby—namely that of enabling visitors to see the Apes without entering the Monkey House, and of giving the Apes a cheerful outlook into the Gardens. In warm weather the sashes in the roof can readily be opened, and the south half of the cage is then practically a sunny open-air shelter. A room for the keeper has also been provided. A completely new building erected in the year is the Small Carnivore House. It is of an octagonal shape, and contains novel devices, not hitherto carried out in similar structures. To it were transferred in the summer many of the small hardy Carnivores, which for lack of suitable accommodation were formerly placed in the Monkey House. This new house is entirely unheated, and quite open to the outer air on one side. It affords, therefore, further opportunities for the trials which have been conducted in the Gardens of keeping animals in the open air as much as possible during night and day. The Rhesus Monkeys alluded to in last year's Report, are now passing their second winter in the large open-air cage, formerly used as an aviary. The results of these experiments encourage the Society to add further buildings of a similar kind for large Carnivores as soon as funds are available.

Special attention deserves to be drawn to the addition to the Haughton House. Members of the Society are now provided with a special room for their own use, where letters can be written, and books and periodicals on natural history consulted, and where they may bring their friends.

The large aviary which had been begun in 1905 was completed last year, and it is probably one of the largest structures of the kind in Europe. One Committee of the Council had charge of the internal fittings of that aviary, another superintended its being stocked with suitable birds. A fine view of it accompanies the Report.

As the Giraffe is rapidly growing, it was found desirable to effect some structural alterations in the Giraffe House so as to allow it to enter its sleeping quarters in comfort. New walks were constructed on the far side of the lake, and numerous minor repairs have been carried out during the year to the houses and general fencing, while the construction of new walks and plantations has added to the beauty of the Gardens.

The Ladies' Committee (to whom the Council entrusted the management of the Refreshment Room when the latter was taken over from the contractor some two years ago), after putting the department in excellent working order, retired in the spring, as they felt that their help was no longer needed and that in future this branch of the Society's work could be successfully carried on by a competent lady directly responsible to the Council.

On the occasion of the arrival of the Earl of Aberdeen as Lord Lieutenant, a suitable address of welcome was prepared by the Council and accepted by the Viceroy.

The Council have had an illustrated guide to the Gardens prepared during the year. So as to place it within the reach of all the visitors to the Gardens, it is on sale at the gate and in the refreshment room at the moderate charge of one penny. The Council are particularly indebted to Mr. D. H. Leonard, who organised a Christmas party this year for the staff of the Gardens and their families. Their thanks are also due to Messrs. Palgrave, Murphy, and Co., and the City of Dublin Steamship Company for the generous arrangements they have made in connection with the transit of animals.

The Society's "Lion Industry" continued to flourish in 1906, the number of cubs born during the year being nine. Two of these were born in the out-door cage, where they were successfully reared, the male being still in the Gardens, whilst the female was sent to India. This being the first record of the birth of Lions in an unheated house, open day and night, deserves to be placed on record. The male cub was remarkable in being very darkly spotted all over. Numerous applications were received from many parts of the world for Irish Lion cubs. The Irish Lion has thus been sent to almost all quarters of the globe—to India, Burmah, France, Germany, Scotland, and England. It is interesting to note that some Prairie Marmots, which are natives of North America, gave birth to a number of young in the Rodent Enclosure.

The number of adult Lions at present in the collection is six males and seven females, while seven cubs are also to be seen.

The purchases made in 1906 by the Council are more numerous than those for some two or three years past. Animals were only bought when they could be obtained at exceptionally low prices.

A young male Gorilla was procured towards the end of December, and was then the only specimen living in the British Islands. It was felt that with the new Anthropoid House it might perhaps be possible to keep this remarkable ape alive. Unfortunately, it succumbed to a gastric attack, no doubt contracted before its arrival in the Gardens.

Other valuable additions were the two young Chimpanzees, a male and a female, who thoroughly enjoy themselves together, and cause great amusement by their gymnastic feats. The new Anthropoid House enables them to display their powers in a manner which would have been quite impossible in the older cages.

A female Kangaroo, a companion for the boxing Kangaroo, was also procured, as well as a male Anoa. Quite new to the collection were a pair of Tasmanian Devils. Several Pumas and a great number of foreign birds were bought by Mr. Goodbody in South America. Some of the latter are now in the new aviary, on the far side of the lake. Other purchases include a male Llama, a Puma, many Monkeys, including two Drills and a Moustache Monkey, two Marmosets, small carnivores, and birds. By exchange, a goodly number of animals were secured, among them two dwarf Shetland Ponies, Shetland Sheep, several monkeys, and birds.

The Officers and Council for 1907 were elected as follows:—President, The Right Hon. Jonathan Hogg; Honorary Vice-President W. E. Peebles; Vice-Presidents, Sir John Ross of Bladensburg, Sir Frederick Shaw, R. M. Barrington, Prof. A. E. Mettam, and Dr. E. M'Dowel Cosgrave; Secretary, R. F. Scharff; Treasurer, A. F. Dixon; Council, Sir Charles B. Ball, Sir John Barton, The Hon. Mr. Justice Boyd, Sir Ernest Cochrane, Dr. S. T. Gordon, Lt.-Col. F. Heuston, L. O. Hutton, J. Malachy Kelly, J. Nugent Lentaigne, C. J. MacCarthy, F. W. Moore, H. B. Rathborne, Sir Andrew Reed, Prof. J. A. Scott, Dr. George Scriven, and G. A. Stevenson.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 4.—J. T. NOBLE ANDERSON, B.A., M. Inst. C.E., read a paper on "Present Works and Progress in Australia and New Zealand." The lecture was illustrated by 100 lime-light slides, many supplied by H. M. Government, New Zealand.

JANUARY 8.—A lecture was given by JAMES TAYLOR, subject "Representative Modern Painters," illustrated by 200 lantern slides.

FEBRUARY 12.—SEATON F. MILLIGAN, J.P., M.R.I.A., lectured on "The Norsemen in Ireland," illustrated by lantern slides and Viking ornaments found in Ireland, from the lecturer's collection.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 14.—The Club met at Leinster House, Dr. G. H. PETHYBRIDGE (Vice-President) in the chair. Prof. H. H. DIXON showed transverse sections of the stem of an unnamed Liana sent by Dr. R. Kerr from Chiengmai, Siam. The sections showed several discontinuous concentric bands of cambium. Sections of the stem of *Tecoma radicans* were also exhibited for comparison. An accessory cambium-layer on the inner side of the protoxylem was well seen in these latter.

D. M'ARDLE exhibited male plants of *Splachnum ampullaceum*, L., which were collected by him last year in the Correl Glen near Church Hill, Co. Fermanagh, where they grew in dense patches on old cow dung, male plants only. The species rarely assumes this dioecious character, being generally found with both sexes growing together. The male flowers are terminal on the succulent transparent stems, numerous, fusiform, mixed with sub-clavate paraphyses, and surrounded by squarrose bracts delicate and loosely reticulated, ending in a tapering point irregularly denticulate with a delicate nerve, which ceases near the apex. This minute plant forms a beautiful microscopic object. The species of this genus are remarkable for the soft, flabellate, succulent habit, and tender, loosely reticulated leaves; and the substances on which they flourish, which is not always the dung of animals. Dr. Taylor records (*Mycologia Britannica*, p. 36) an instance of having found one of the species *S. angustatum* growing on an old stocking in Yorkshire. The same species, he writes, was seen upon the hat of an unfortunate traveller who had perished on Mount St. Bernard; and Captain Parry discovered during his second Arctic voyage *Splachnum mnioides*, L. growing in the nasal cavity of the skull of a Musk Ox. This species, with *S. ampullaceum* L. and *S. sphaericum*, Hedwig, are found in Ireland.

Dr. G. H. PETHYBRIDGE exhibited a leaf-rust of the Tomato caused by *Cladosporium fulvum* Cke. The fungus has been known to prove destructive to tomatoes (especially when cultivated under glass) on the Continent, in Great Britain, and in the United States. During the past summer it has also appeared in Ireland—viz., in Co. Cork. The disease can be checked in its early stages by spraying with potassium sulphide, 1 oz. to 2½ gallons of water.

DECEMBER 12.—The Club met at Leinster House. Prof. G. H. CARPENTER (President) showed the larva of a leaf beetle, *Psylliodes chrysocephala*, Linn., and its dissected head under the microscope. These larvae had been noticed in the spring of 1906, by Brother A. Ryan, as injurious to cabbage crops near Limerick, the habit of the larva being to burrow into the plant and then to mine along the centre of the root and stem-base. The larva has been described and figured by exhibitor (*Journ. Econ. Biol.* i., 1906, pp. 152-6, pl. xi.).

F. W. MOORE exhibited a flower and an inflorescence of *Bulbophyllum miniatum*, a very rare miniature Orchid from the Congo district. This

species flowered for the first time in cultivation at Glasnevin. It belongs to the section in which the labellum has a well-marked marginal fringe of hairs. In the species under consideration the hairs are long, white, and very fine. The labellum is so delicately balanced that the slightest movement of the air which catches the long hair, causes it to vibrate rapidly.

Dr. FRANCIS A. WINDER showed the larval form of a scarlet earth mite (*Trombidium* sp.) that is known as the "Harvest-bug," or "Orange tawny," *Leptus autumnalis*. In this stage the mite has only six of the eight legs that characterise the adult, and its habit of burrowing into the skin of persons who have been among the vegetation whereon the mites breed is well known, as its presence on the human body sets up an intolerable irritation. These larvæ are found also on various domestic animals, and on wild mammals. Only in the larval stage are these mites parasitic; the adults feed by suction from plant tissues.

Dr. G. H. PETHYBRIDGE exhibited sections of a leaf of a plum tree suffering from the disease known as "Silver-leaf." The silveriness of the leaf is due to the death of the upper epidermis and its separation from the underlying cells, the spaces thus produced becoming filled with air. In some cases the epidermis had entirely disappeared, and the cells of the uppermost layer of palisade parenchyma were also dead. Not the slightest traces of any fungus can be found in these silvery leaves. The cause of the disease has long been a mystery, but Percival seems to have proved that it is due to the roots and stems being attacked by *Stereum purpureum*. A specimen of this fungus was exhibited growing on the branches of a plum tree, but not from the same tree as that from which the silvery leaves exhibited were derived. The fungus was sent by a horticulturist in Co. Down as being the cause of the death of the plum tree, but unfortunately too late in the season to admit of any leaves of this tree being examined, since they had all fallen. Writing from memory the sender says "the general appearance of the leaves was delicate and pale as if attacked with mildew, but on close examination there was no mildew." Probably these were "silver-leaves" (although the sender himself does not think so), and this case would tend to support Percival's explanation of the cause of the disease.

W. F. GUNN showed the leaves of culinary Peas suffering from a mildew, *Erysiphe Martii*, Lév. which was very prevalent in some parts of the country last summer. The microscope showed the leaves crowded with minute black perithecia embedded in the mycelium of the fungus. The disease, though not very deadly, spoils the appearance of the plants, and diminishes the crop.

JANUARY 9.—The Club met at Leinster House.

Dr. G. H. PETHYBRIDGE (Vice-President) in the chair, exhibited the fungus causing the American gooseberry mildew (*Spharotheca mors-uvæ*) in its winter or resting condition. On the gooseberry twigs amongst the brownish surface mycelium, the black perithecia, just visible to the naked eye, are to be found in large numbers. On applying gentle

pressure to the cover-glass of a microscope-preparation, the perithecia burst, and the single, eight-spored ascus, characteristic of this species, protrudes.

Professor G. A. J. COLE showed a thin section of the calcareous Liassic shale, altered by dolerite, from Portrush, in which the fossil molluscan remains have become infilled, and in part actually replaced, by granular pyroxene. In the most altered layers, streaks formed of pyroxenic grains are the only representatives of the fossil fragments, and would be unrecognisable as such if the whole gradation were not traceable in the field. Dr. Oldham, about 1838, observed in the same rock a belemnite, the hollow of which was occupied by pyroxene.

A. R. NICHOLS exhibited spicules of a marine sponge (*Cellius angulatus*, var.) obtained at low-water at Lambay Island, Easter, 1906. The comparative measurements of the spicules of Bowerbank's type specimen and of the Lambay specimen are given on p. 87 of this volume.

Dr. M'ARDLE exhibited the reproductive organs of *Lejeunea Mackaii*, Hook., also portion of the plant showing the flat roundish under leaves. It is larger than and unlike any other British *Lejeunea*, and is separated at once from the genus *Radula* by the presence of under leaves, or stipules. The inflorescence is monœcious, the andrœcia are on lateral branches, consisting of several pairs of altered leaves, which contain one or two globose antheridia each. Perianth large obcordate, capsule very delicate with projecting cilia, spores large, elaters bispiral. The specimens were collected on the walls of the "Pigeon Hole" cave, near Cong, Co. Mayo, in July last. The only other locality for the plant in that district is on rocks by a small lake near Letterfrack.

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 20.—The President (W. H. PHILLIPS) gave his inaugural address on "Some Beautiful Varieties of Ferns." The lecture was illustrated by a very large number of slides from photographs specially taken by the lecturer. The paper was criticised by N. H. Foster, W. Gray, R. Patterson, W. J. C. Tomlinson, and J. Hamilton.

NOVEMBER 28.—The first Wednesday "Club Night" was presided over by W. J. Fennell, M.R.I.A., and the evening was occupied by a lantern display. Slides were shown and described by the following: W. J. Fennell, N. H. Foster, Robert Patterson, T. Anderson, Miss Walkington, Arthur Deane, Mrs. Hobson, Miss Y. Courvoisier, Miss Andrews, J. C. Tomlinson, R. Welch, W. A. Green, W. H. Gallway, and A. R. Hogg.

DECEMBER 12.—The President in the chair. ARTHUR DEANE, the Curator of the Municipal Art Gallery and Museum, gave a short paper on "Leaves and their Functions," illustrated on the black-board. R. Welch, H. L. Orr, A. Milligan, W. J. Fennell, W. J. C. Tomlinson, N. H. Foster, Rev. J. Sheils, and the President took part in the ensuing discussion.

DECEMBER 18.—The President (W. H. Phillips) in the chair. The Rev. W. A. ADAMS, B.A., of Antrim, gave a lecture on "The Stone Age in South Africa." It was illustrated by a large number of specimens collected by the speaker, and the paper was criticised by Mrs. Hobson, R. Welch, J. Dickson, R. May, J. Carson, A. Milligan, and W. H. Patterson.

JANUARY 9.—Robert Welch, M.R.I.A., in the chair. J. STRACHAN lectured on "The Geogony of some Secondary Minerals," illustrated by numerous specimens and black-board drawings. R. Welch, W. Duncau, R. Bell, R. May, W. J. C. Tomlinson, S. A. Wear, and W. H. Gallway, criticised the paper.

JANUARY 15.—W. J. Fennell, M.R.I.A., in the chair. T. E. BARRINGTON read a paper on "Clouds and their Evolution," which was illustrated by a large number of photographs, taken by the lecturer. The paper was criticised by W. H. Patterson, W. Gray, R. Welch, and R. May.

ROBERT PATTERSON drew the attention of the members to the forthcoming issue of the special Lambay Survey number of the *Irish Naturalist*, and invited subscriptions to defray the extra cost of the number.

BOTANICAL SECTION, JANUARY 19.—A meeting was held in the Club Room. Rev. C. H. Waddell, B.D. (Chairman of the Section), presiding, when a paper was read by W. J. C. TOMLINSON on "The Homes of our Rarer Wild Flowers, a Study in Plant Geography."

OMAGH NATURALISTS' FIELD CLUB.

Several successful and well-attended lectures have been given in Omagh during the winter, including—NOVEMBER 27, F. MARTIN DUNCAN, F.R.P.S., of London, on "Denizens of the Deep." DECEMBER 11.—"The Story of the Rocks," by W. J. ROBINSON, Jun., of Derry. JANUARY 8—"The Vegetable World," by Dean OVENDEN, of Enniskillen. FEBRUARY 14.—N. H. FOSTER, of the Belfast Field Club, on "The Feathered World." Also, "Nature Rambles in Ulster Byeways," by SAMUEL HENRY. All lectures were illustrated by lantern views. The attendance has been far in excess of anticipations.

NOTES.

BOTANY

Lathræa squamaria in Co. Cavan.

During a visit to the Agricultural College at Ballyhaise, in April, 1906, Mr. J. W. Steen called my attention to a few specimens of the Toothwort growing on the roots of trees in an avenue close to the house. The discovery of the plant in this locality is due to Mr. T. Irving, and I find that so far it has not been recorded for Co. Cavan.

Dublin.

GEO. H. CARPENTER.

THE PROBLEMS OF AN ISLAND FAUNA.

BY C. B. MOFFAT, B.A.

[Presidential Address to the Dublin Naturalists' Field Club,
8 January, 1907].

IF any one were at the present moment to attempt a retrospect of the past year's work in Irish natural history it would be a very incomplete one; and it is, I think, a gratifying sign of the progress of scientific research amongst us that we are promised within a few weeks' time so full an account of the zoology, botany, and geology of Lambay—the result of recent researches carried out chiefly, I believe, by individual members of this Club—that two ordinary numbers of the *Irish Naturalist* would need to be fully devoted to it, and consequently the editors have thought it advisable to merge two numbers into one, which is to appear some time in February. I believe that the investigation of the fauna and flora of the very smallest island is a matter of great interest, and I hope that some of the results from a small island on our east coast may prove, when we see them set forth, not less interesting in their way than those more sensational discoveries relating to the zoology of a remote past with which Dr. Scharff and Mr. Ussher have of late been so largely contributing to our storehouses of knowledge by their patient exploration of the caves in the west and south.

It would be difficult to exaggerate the importance of the work that has been done towards the solution of Irish faunal problems during quite recent years. Dr. Scharff, by his very remarkable work on "The Origin of the European Fauna,"¹ has given us a clearer conception of the way in which many of these problems may be solved than Irish naturalists ever possessed before. I do not propose this evening to attempt to discuss the different elements of our fauna, which have been so ably analysed in that book, or to consider what or where are likely to have been the bridges over which, at different times, they crossed from their original homes to populate Ireland, or how long it probably is since those

¹London: Walter Scott. 1899.

bridges last existed. But it seems to me that we have something else to consider besides the presence of particular groups of species and the absence of particular groups of species; and that is the general poverty of our fauna as a whole. For recent investigation seems to me to have gradually bored away the old explanations that used to be offered on that subject, and to have made it more difficult, instead of more easy than before, to understand why Ireland has not as rich a fauna and flora as England, and why England has not as rich a fauna and flora as the little kingdom of Belgium on the near continental shore.

No doubt, if we restrict ourselves to the simple and time-honoured process of taking the animals one by one, we get at results that can be summed up conveniently in a few words. A great many of the animals and plants which now inhabit Western Europe had not—it is supposed—arrived at that part of their present range by the time that England—or rather the whole “*Britannic*” area—was finally broken off from the Continent; so that those animals and plants, by the time they reached the Straits of Dover, found themselves too late to catch the last bridge into Britain. But some of those that did catch the last bridge into Britain, and have been able in consequence to constitute themselves parts of the fauna and flora of England, Wales, and Scotland, were, nevertheless, prevented from reaching Ireland, because Ireland had become a separate island at a yet earlier date than that which saw the final insulation of Great Britain. At first sight it might seem that on this principle the poverty of our present fauna is completely explained by our very early severance from the Continent of Europe.

But what was Europe like—what were the western parts of the Continent like—when that early severance took place? Was the fauna of the whole West of Europe then as poor in point of number of species as the Irish fauna is at the present day? And, if so, how can that poverty be explained? Dr. Scharff has given us strong reasons for believing that what he calls the Siberian members of the British fauna were at that time still unknown in Western Europe, or, at least, were only beginning to find their way to those regions across the great Central Plain that had lately been left dry. I quite believe in

the reality of this Siberian invasion of the region left bare of life by the drying of the Mid-European Sea—the sea that in Glacial times seems to have covered most of Russia, Germany, Denmark, South Sweden, and the Netherlands. On the retreat of that sea, of course, the new plain would also be invaded by the old European fauna that had lived on its western shore ; but it would not at once be so fully occupied by these creatures as to form part, as it were, of their old ancestral domain ; and thus there would be for a time a real new highway across Europe without pre-supposing any inferiority on the part of the old West-Eurasian animals to oblige those creatures to give place to—or to die out before—the Eastern invaders. There would be in Germany a grand commingling of East and West, a fresh scramble, from which almost anything might emerge. Still, if many of the new Siberians ultimately survived, it must, one would think, have been at the cost of some of their Western competitors. This brings us back to the question—Do the Irish fauna and flora of to-day, with their extreme deficiency in number of species, represent to our eyes what the fauna and flora of Western Europe were like before the breaking out of this conflict with the Army of the East, and up to the time when Ireland saw herself finally cut adrift ? If so, how can we account for such extreme poverty in a continental area ? And if not, how can we explain the losses that our own fauna and flora must have suffered since the days when we became an island ?

A little time ago, we all possessed a very satisfactory answer—or what seemed to be so—to questions of that kind. There was that terrible phenomenon the Great Ice Age. That, surely, was sufficient—if we could believe half the accounts that men of science gave us of its dismal character—to explain any conceivable amount of extermination. If Ireland was cut off before the Britannic area had had full time to recover from the effects of the Ice Age, that would amply explain why her fauna continued poor ; and, of course, if we were insulated at a yet earlier date, before the maximum severity of the Glacial Age had been reached, the explanation would then be so perfect that the difficulty would present itself in an opposite form—How did any of our plants and animals survive ? But our leading zoologists have of late given so much attention to the

Ice Age that it seems to have been from their point of view nearly asphyxiated. Dr. Scharff thinks all our fauna and all our flora lived through it. And even those authorities who shrink from accepting Dr. Scharff's opinion in its entirety, take for all practical purposes the same view as he does of the insignificance of the Ice Age. For they all seem to agree that a part of our Irish fauna and flora existed through the Ice Age: and of course if any part did, that must have been what is now the oldest part, the so-called Lusitanian element, the southernmost, and, one might say, the most delicate, from the point of view of their present European distribution, of the animals and plants now found in the British Isles. For example, there is the *Arbutus*, which most of us, I suppose, have at some time seen growing in its native home at Killarney. Who would select the *Arbutus* as a plant capable of resisting a very high degree of cold? Yet the *Arbutus* is one of that small group of West of Ireland species which must, if any of our flora lived through the Glacial Age, have been among the hardy survivors. I do not, therefore, see that we save anything in *a priori* probability in suggesting that *only some* of our plants lived through that terrible time. If any did, the *Arbutus* was among the number, and we may dismiss the Glacial Age from our minds as nothing worse than a slight chill.

At the same time, Mr. Ussher's and Dr. Scharff's explorations of late years in the caves of our southern and western counties clearly show that at some period, either after or not very long before the "Great Ice Age," we had in Ireland a good many interesting animals that have since become extinct. They were not all animals that cold would be likely to extinguish, though some of them possibly were. Some, like the Arctic Fox, whose remains Dr. Scharff has unearthed in Co. Clare, point to former land connections with the very far North. Some, like the celebrated African Wild Cat, identified from the caves of the same county, and the *Hyæna* of whose former abundance in Co. Cork we see such indisputable evidence given by Mr. Ussher¹, belong obviously to a time when we were more intimately connected with the South.

¹ *Irish Naturalist*, November, 1906.

And some, like the Banded Lemming (*Cuniculus torquatus*) and the still more recently identified Scandinavian Lemming (*Myodes lemmus*), both of which have been added to our list of former Irish animals by Dr. Scharff's and Mr. Ussher's researches since the publication of "The History of the European Fauna," were supposed by the author of that work, when he wrote it, to have entered Europe as part of the great Siberian irruption. If that were so, the Siberian irruption must have reached Ireland in greater force than Dr. Scharff was at first inclined to believe, and I do not know whether he now holds the same view as he held in 1899 as to the place of origin of the Lemmings. At any rate, northern and southern forms alike, and possibly eastern forms too, have died out in Ireland in considerable numbers since a time of which the floors of our caves still tell. It seems, too, that birds like the Hawfinch (now a rare winter visitor) and the Great Spotted Woodpecker (a mere straggler at present to the Irish coast) turned up in the cave-deposits, suggesting, though not exactly proving, that we had a richer bird-fauna in those times than we have now. In short, if the Ice Age was not an exterminating factor, it seems to me that we must find a substitute for it. The dying out of old forms on a continental area can often be explained by the view that newer forms crushed them out in the struggle for existence. But this does not explain how an island fauna comes to be deficient in both sets of species, as we see it in Ireland, where so many of the new forms are absent, through having failed, it is thought, to reach us, and yet the old forms, except a few, have failed to survive to our day.

I venture to propound for consideration the question—Do island faunas tend to decrease? I think they do; but this, even if admitted to be probable, must not be accepted as proved without very close examination. I do not think that the point has been sufficiently examined. If the rule is for island faunas to tend to decrease, we can never accept the absence of any species from an island as proof that it never reached that island. But I am led to believe that such a rule, or such a tendency, does exist, in the first place, by what seems to be the admitted fact that island faunas are nearly all poor in species compared with the faunas of continental areas of the same dimensions. If we look across Europe and Asia from Great

Britain to Japan, we see an island dominion in some respects remarkably like our own, in others strikingly different, but which for my present purpose yields a resemblance, in the fact that the number of land mammals found in Japan is almost exactly the same as the number found in the British Islands. So, if our seas proved a barrier to a general rush from Siberia westward, it may be asked, did Japan's sea prove a barrier to a similar rush, at an earlier period, from Europe eastward? At any rate, both groups of islands, at opposite ends of a great continental area, agree in the common poverty of their faunas compared with the faunas of the neighbouring shores.

To go through all the island faunas of the world would be a large survey; but I would remind you what great stress Darwin laid—as also his great co-thinker Alfred Russel Wallace—on the absence from what he called oceanic islands of terrestrial mammals and batrachians, while birds and winged insects and bats, and some other creatures rather harder to account for, such as lizards and terrestrial mollusca, were frequently found to occur. As these islands were supposed by Darwin never to have been connected with any continental land, the point of interest with him was to find out how they came to possess any fauna at all, and particularly how such creatures as lizards and land-snails, belonging to many different species, had reached and colonised islands far out in the ocean that had never, since they arose from its waters, been connected with any continental shore. In his chapter on that subject in the “*Origin of Species*” Darwin builds a most fascinating argument, and suggests many agencies which, he thinks, might, from time to time, help a little in the successful dispersal of lizards and snails across large expanses of sea. But I think the criticisms advanced by Dr. Scharff and by other recent writers against what is called the “*flotsam and jetsam*” theory are very destructive of its force. “*Occasional means of transport*” may—indeed they must—sometimes be successful; but it seems to be almost certain that something else is needed to account for the practically universal presence of land mollusca on oceanic islands, and the very general dispersion of small reptiles in similar spots. Modern thought seems, therefore, to tend towards the view that there are no

“oceanic islands,” or, at least, very few, in the old Darwinian sense of the word—that is to say which have never been connected by land with any continent. The old oceanic island has, in short, gone the way of the Ice Age, and been swept into the dust-heap of once venerable things no longer worth thinking about. We are told that wherever we see a fauna—unless, perhaps, it consists entirely of seals or sea-haunting birds—we must presume that the land on which that fauna is found was once—however long ago—continental.

This revolutionises the difficulty altogether. We no longer have to ask ourselves, how did lizards come, but how did frogs disappear? What has become of all the mammalian life, all the batrachian life, and a very great proportion of the reptile, insect, and plant life that undoubtedly must have inhabited these oceanic islands in former times, if they were parts of great continental areas now submerged? “I have not found,” says Darwin, “a single instance, free from doubt, of a terrestrial mammal (excluding domesticated animals kept by the natives) inhabiting an island situated above 300 miles from a continent or great continental island.” The absence of frogs, toads, and newts from such islands he found, after careful inquiry, to be almost equally universal. These facts, together with the general fewness of the species that do occur, undoubtedly need to be explained by some law that Darwin was not called on to suggest, if we are now to believe with Dr. Scharff (who gives strong grounds for his opinion) that “accidental introduction cannot play an important part in the making of the fauna of any country,” and that consequently every island which has a fauna at all, no matter how limited, inherits that fauna from an age when it formed part of a continent.

Such a conclusion may be too sweeping; but I think there can be no doubt that the mere conversion of a piece of land into an island does increase, to every species inhabiting that land, the chance of becoming extinct. We have only to reflect that any local devastation which sweeps over an area may for a time enormously diminish the numbers of a species anywhere; if very severe, it may for a time exterminate it. But the extermination which would be temporary when the locality was part of a large continuous area would be permanent if it

happened upon an island. For example, in parts of Africa and of South America—to judge from what has been told us by Livingstone, Darwin, and other writers—almost the whole mammalian fauna has sometimes been exterminated by drought; and that extermination, however wholesale, is still only temporary, because, when the drought is over, animals from the neighbouring parts of the continent, chiefly of the same kinds, come in to take the places of those that have died. On an island, there can be no such renewal; a species once exterminated, unless it has means of transportal by sea, is exterminated for ever. “Some sixty years ago,” says Mr. Distant¹, “the Sousliks (*Spermophilus* sp.) suddenly disappeared in the neighbourhood of Sarepta, in south-eastern Russia, in consequence of some epidemic; and for years no Sousliks were seen in that neighbourhood.” The Sousliks, it seems, are now as numerous about Sarepta as they formerly were; but that is probably due to the fact that the epidemic which destroyed them did not prevail over the whole of south-eastern Russia. A similar visitation on an island would have killed them beyond recall—unless the island was large enough, or varied enough in its features, to possess within itself an area which the epidemic did not affect.

This may explain the absence of some British animals from Ireland; because Ireland is not only smaller, but has also a more uniform character, than the island of Great Britain. The Squirrel is believed by Mr. Harvie-Brown to have become extinct in the north of Scotland towards the close of the eighteenth century; but it returned during the latter part of the nineteenth, as an immigrant from more southern parts. The same thing might have occurred in Ireland, but here the uniformity of conditions would lessen the chance of the animal's being able to return. I think, however, that the poverty of island faunas where the islands are at all large requires some further explanation than this; and from a considerable number of isolated facts, none of them very strong in themselves, but perhaps worth some closer investigation, I have come to suspect that species are sometimes limited in their range by diminished fertility towards its outermost

¹ *Zoologist*, September, 1905.

parts; and if that were so, it would lead to wholesale extermination of such species, whenever areas within the outermost parts of their ranges were converted into islands.

I will mention a few of the class of facts to which I refer. I have examined the contents of a good many nests of the Dipper on Irish streams, and have never found one where the number of eggs was more than four, though English ornithological writers speak of the normal number as five or six. Mr. Ussher has obtained clutches of five, but he agrees with me that four in Ireland is the usual number, and he has told me in conversation on the subject that a good many kinds of birds produce, on the average, smaller clutches in Ireland than in England. Then we know that the Crossbill, which twenty years ago made a vigorous effort to establish itself as a resident breeding species in Ireland, suffered in some seasons from wholesale infertility, laying only addled eggs, and it still remains to be seen whether the establishment, reduced as it already is to a very small garrison, will become permanent. The Cuckoo must also, I think, lay fewer eggs in Ireland than in England; for very few Cuckoos' eggs seem to be found by the most sedulous collectors in this country, and even the young birds, though they are not by any means silent creatures, are not, I think, very often observed.

Turning next to mammals, we find an extraordinary contrast between what British—or rather “Britannic”—and Continental writers say about the rate of productiveness in Bats. According to Continental writers the usual number of young at a birth is two; but English and Irish zoologists—there is no difference in this case between the larger and the smaller island—have made most careful inquiries into this subject, and the researches of Dr. Daniell in the south of England, of Thompson's correspondent Hyndman in Ireland, and quite lately of Mr. Arthur Whitaker in the north of England¹, all point to the unanimous verdict—as regards, at any rate, the Pipistrelle and the Noctule—that the number produced is only one. I confess that this seems to me almost too great a difference to be credible; but some higher degree of fertility must exist among Continental Bats to explain the differences in what has been observed.

¹ *The Naturalist*, November, 1905.

Among insects we see the same tendency illustrated in several ways. There is the undoubted fact that a considerable number of butterflies which are double-brooded in the continental parts of their range become single-brooded in parts—especially in the outlying parts—of their Britannic range. The Small Heath butterfly (*Cænonympha pamphilus*) was alluded to in the *Irish Naturalist*¹ some years ago as a common insect which is regularly double-brooded in England, but single-brooded in at least the northern half of Ireland. In more southerly Irish counties it certainly produces two broods; but I think the autumnal brood (at any rate in Co. Wexford) is generally a poor one. The Dingy Skipper (*Thanaos tages*), a very local Irish insect which I find fairly common in Killohgrin Forest, Co. Wexford, in May and early June, does not seem to me to produce any second brood during August in its Irish haunts, as it does in England; and I notice that the Rev. W. W. Flemyng has recorded² a precisely similar observation regarding the Holly Blue (*Polyommatus argiolus*) in Co. Waterford. Whether this form of decreased fertility would make extinction more easy I do not say; but it is not the only form which the tendency takes even among the Lepidoptera. The Clouded Yellow butterfly (*Colias edusa*), though generally rare in Ireland, sometimes occurs in our fields in swarms, and under rather peculiar, and, I think, interesting circumstances. I remember it in Co. Wexford in 1876. I had never seen it before. The first arrivals that year were in early June: I shall never forget the tantalising sight of a bright golden insect rushing madly by as if speeding for its life, and in a very few seconds lost again to view. Just one at a time to-day, another a few days later, not one that would linger or give me a chance to take it—not one that would even swerve from its direct line of flight. Now obviously these were immigrants from across sea, and they seemed not to have yet exhausted their migratory impetus when I saw them. Then a lull: I had thought I should see no more of the winged gems, when August came. In every clover-field, in every stubble-field, quantities of Clouded Yellow butterflies, so easily netted that on cloudy

¹ vol. iii., pp. 44 and 223.

² *Irish Naturalist*, vol. xi., p. 172, 1902.

days one did not need a net—one could pick them up with the finger and thumb while they sat at rest on the yellow heads of Hawkbit, Cat's-ear, and other composite plants. These were no immigrants—they were all fresh, fine, perfect specimens, that evidently had had no trouble in life, and were bent on taking things easy. They were, of course, the offspring of those I had seen in June, but they did not emulate their parents in the cultivation of the strenuous life. They stayed with us all the autumn, and I fully expected to see their offspring in the following year. When that year came, I think I saw some four or five at the utmost; in 1878 I saw two, in 1879 one, and then none for a long series of years. The progeny of the immigrants, which had been so enormous in the first generation, had failed to leave any successors behind them; but the great quantity of those insects which appeared in August, 1876, from eggs laid by parents that had flown across the sea the previous June, shows that there was nothing to prevent similar broods from appearing in later years, if the eggs laid by the Irish-bred butterflies had been equally good.

I should, however, state that among the great swarms of butterflies that formed that "Edusa" outburst of 1876 only a minority were females; and that is a feature often observed in these insect outbursts, and may represent one of the ways by which Nature stops the increase of insects in the outlying and less favourable parts of their range. It is said that in the south of England, where that splendid butterfly the Purple Emperor (*Apatura iris*) reaches his outlying zone, collectors take on the average ten males to one female; and I think from my own observation that five or six males to one female is about the proportion of the sexes in the Brown Hairstreak butterfly (*Thecla betulæ*) in its woodland haunts in Wexford. It is quite possible that the same proportions obtain for these butterflies elsewhere; but I cannot help thinking the great inequality may mean that the insects have reached—as they clearly have in the localities referred to—the limits of their respective ranges.

If these facts are rightly explained by my supposition that fertility often decreases towards the outskirts of a range, we can see at once as a consequence that island faunas will generally be poor. Take the case of a species with a large con-

tinuous continental range, whose productiveness in the central parts of its area of dispersion is much in excess of what it needs to maintain its numbers; in the less central parts of its range it produces fewer, and, perhaps, still further out, only about the bare number that are necessary, with all allowance for loss, to keep it from decreasing: then at last we come to a zone where it may produce even fewer than the necessary number, a rate of fertility not sufficient to keep up its numbers at all. Even there, it will not die out, but may continue to hold its own, so long as the range of the creature is continuous; for the innermost parts of the range continue to supply fresh individuals that will fill up the gaps outside. But suppose that any part of this outlying range is converted into an island; then the species is left to its own resources, it can no longer be reinforced as before, and it will become extinct. That may be one of the reasons why in Ireland we want some of the species that maintain themselves in the southern and eastern parts of Great Britain, just as Great Britain also wants some of the species whose continental range extends to within sight of her shores.

A fortunate chance has preserved to us the Natterjack Toad on the shores of Dingle Bay; but the *prima facie* odds against its survival in Ireland must have been large, since we meet it nowhere else in the country. I am disposed to compare with this case of the Natterjack Toad in Kerry the case of that very local little reptile, the Sand Lizard (*Lacerta agilis*), which we do not find in Ireland, but which is known to occur on the northern shores of the Isle of Man¹. The Isle of Man has a fauna so very remarkably Irish, that when Professor Carpenter first suggested the use among naturalists of the word "Britannic" for the area comprising both Great Britain and Ireland, and the limitation of the now ambiguous word

¹ See *Zoologist*, February, 1893 ("Contributions to a Vertebrate Fauna of the Isle of Man," by P. C. Kermodé); also, Mr. P. G. Ralfe's "Birds of the Isle of Man" (1905), where a list of the mammals, reptiles, &c., of the island will be found on page xxxiii. Dr. Scharff has, however, kindly pointed out to me that the records of *Lacerta agilis* are still in need of confirmation, and the language used by me above is therefore too confident.

“British” to the smaller area of Great Britain without Ireland, I felt at once that such a proposal would raise a great difficulty as to what to do with the Isle of Man. Does it belong to the British, or to the Irish part of the Britannic area? I feel that difficulty still; but I do not think the case of the Sand Lizard, which is almost the only Mammal animal not found in Ireland, should suffice to exclude the Isle of Man from what seems to me to be, on the whole, its natural place in the Irish area. For this little reptile is very possibly just another such case as the Natterjack Toad, which must have been once more generally diffused, but which now survives in only one spot in its ancient Irish range—the sole difference being that, in the case of the Lizard, the place of survival within the area happens to be not in Kerry, but in the Isle of Man. At any rate, if we insist on regarding the very large number of British species which are absentees from the Irish list, as a great invading army which the sea prevented from reaching our own shore, it cannot but strike us as a strange circumstance that the only member—or very nearly the only member—of that army to win for itself a footing in the Isle of Man should have been this very unadventurous little lizard, which, even in England, is restricted to quite a few localities, and shows not the smallest disposition to become anywhere a dominant or advancing species.

Both Great Britain and Ireland certainly have lost, within times that were at least subsequent to the beginning of the Glacial Age, a considerable number of species, which are shown by the explorers of our caves to have flourished here while we had still a continental connection. How they came to die out—whether from change of climate, from partial submergence, from increased competition with new forms, or through the operation of some cause quite different from any of these—we cannot say. But I do think it is a mistake to assume that the insulation of the British and Irish areas has affected our fauna and flora in no other way than by preventing the advent of new species. We have to explain how we have lost, as well as how we have failed to gain.

NOTES ON A BOTANICAL EXPEDITION IN IRELAND
IN SEPTEMBER, 1906.BY G. CLARIDGE DRUCE, M.A., F.L.S.,
Fielding Curator in the University of Oxford.

THE beautiful autumn of last year tempted me to make a botanical journey to Ireland, where I thought, despite the lateness of the season, which had been unusually sunny in England, and where, therefore, many plants were quite gone over, I might be able to see some Irish plants *in situ*. Among these I wanted to observe *Polygonum sagittatum* and *Sisyrinchium californicum* in order to assist me in making up my mind on their status, and more especially to find the eleven Irish species which I had not seen growing in their native place, these being *Spiranthes Romanzoffiana*, *Potamogeton Kirkii*, *Arabis ciliata*, *Erica Mackaii*, *E. mediterranea*, *Arenaria ciliata*, *Inula salicina*, *Saxifraga Sternbergii*, *Chara canescens*, and *Sisyrinchium angustifolium*. Of these I saw all but the *Sisyrinchium* and the *Spiranthes*. I was favoured with delightful weather, and the beauty of some parts of the scenery it would be difficult to overpraise. The two species additional to the Irish flora which I noticed are *Rubus thyrsoides* and *Rhinanthus monticola*, while the most interesting plant was the new variety of *Agrostis canina*, L. (var. *levis*). The grasses were over for the most part, so far as critical study was concerned, and the remark holds good with regard to many species, the Carices being hopelessly late, while the Rubi, too, were almost entirely out of condition. My route was from Waterford to Cork, thence to Bantry; by boat to Berehaven and Glengariff; drive to Kenmare, thence by Parknasilla to Sneem, Derrynane, Castle Cove, and back to Kenmare; rail to Tralee and Dingle; climb Brandon Mountain and Connor Hill; rail to Limerick and Killaloe; by the steamer to Portumna; boat on Lough Derg; drive from Portumna to Woodford and Loughrea; rail to Galway and Maam Cross; drive to Roundstone, and thence to Clifden, Leenane, and Westport; rail to Sligo; drive to Ben Bulbin and Glencar; rail to Dublin and Wexford.

- Ranunculus Baudotii**, Godr.—In a pond between Wexford and Raven Point.
- R. Flammula**, L.—At 2,000 feet on the Brandon range. A form of this, much gone over, was seen in a peaty pool between Maam and the Cross Roads, Co. Galway, which had leaves very like those of *R. scoticus*, and I think it will be found to be that species, but specimens gathered earlier in the year are necessary before one can speak positively.
- R. Lingua**, L.—Rossmore near Lough Derg.
- R. Steveni**, Andrj.—Berehaven.
- R. Boræanus**, Jord.—Roundstone.
- R. repens**, L.—In the "Alien List" Mr. Dunn included *R. repens* as an introduced plant to the British Isles. I saw it on the cliffs of Brandon up to 2,700 feet, and I have seen it in Filby Fen growing with absolutely native plants, as also on the Langton Lees, a piece of lowland moorland in Scotland. I have no doubt that it is a native species.
- Aquilegia vulgaris**, L.—By Lough Derg near Rossmore.
- Fumaria capreolata**, L., and **F. pallidiflora**, Jord.—Killarney.
- F. confusa**, Jord., and **F. Boræi**, Jord.—Also near Killarney.
- Radicula Nasturtium-aquaticum** (L.), Druce (*Nasturtium officinale*), var. **microphylla** (Reichb.), Druce.—Berehaven.
- Alyssum maritimum**, Lam.—A lax form of this at Killarney, in the station yard.
- Barbarea verna**, Aschers. (*vulgaris*, Brown), var. **divaricata** (Dyer).—Near Maam.
- Arabis hirsuta**, R. Br.—On the Ben Bulbin range, at 1,700 feet, in Sligo.
- A. ciliata**, R. Br.—This seems a very good sub-species. A belated flower of the glabrous plant was found in mid-September near Roundstone.
- Cardamine flexuosa**, With.—At 2,000 feet on Brandon.
- Senebiera didyma**, Sm.—Westport, 1876.
- Lepidium Smithii**, Hook.—Dingle, &c. The true *L. hirtum* is not an Irish species.
- Cerastium vulgatum**, L., var. **hirsutum** (Fries.).—On a wall at Glengariff, the stem clothed with long patent hairs, not glandular.
- Stellaria palustris**, Retz.—By the Shannon near Killaloe landing stage.
- Sagina procumbens**, L.—A form of this, with fleshy leaves (the var. *maritima*, Gren. & Godr.), at Berehaven.
- S. nodosa**, Fenzl.—The highest elevation for this species, given in "Cybele," is 1,000 feet in Dublin. I saw it at 1,800 feet on the Ben Bulbin range in Sligo, as the glabrous plant.
- Hypericum Androsæmum**, L.—On the cliffs of the Ben Bulbin range at 1,000 feet.
- Geranium Robertianum**, L.—At 1,700 feet on Brandon.
- Impatiens glanduligera**, Royle.—At Enniscorthy.

- Erodium cicutarium**, L'Hér.—A white-flowered form at Rosslare of the non-glandular plant, probably *E. pallidiflorum*, Jord.
- Ulex Gallii**, Planch., var. **humilis**, Planch.—Very characteristic on rocks at Derrynane and at Roundstone. The type was in most magnificent bloom on Urrisbeg.
- Vicia Orobus**, DC.—New to district VI. On Church Island, Lough Derg, in small quantity.
- Rubus Lindleianus**, Lees.—Plentiful near Killaloe.
- R. rhamnifolius**, W. & N.—Near Roundstone.
- R. Selmeri**, Lindeb.—Near Westport.
- R. macrophyllus**, W. & N. agg.—Near Portumna; near Westport; Sligo.
- R. thyrsoides**, Wimm.—The Rev. W. Moyle Rogers writes:—"Though I have nothing in a large collection of *R. thyrsoides* quite matching these pieces, there can hardly be any doubt, I think, that in an aggregate sense they must go to the above. Usually, however, the stem is stouter and glabrous or glabrescent, the terminal leaflet with a much longer petiole, and the panicle prickles weaker and curved. But it is an exceedingly variable species, and your stem is probably very young. So I suggest provisionally *R. thyrsoides*, Wimm., sp. coll., the first Irish specimen that I have seen." This was gathered at Derrynane.
- R. pulcherrimus**, Newm.—Berehaven; new to Cork. Roundstone, not infrequent.
- ?**Rubus lasiocladus**, Focke.—Berehaven "Much like *lasiocladus*, but with too immature barren stem for certainty"—*teste* Rev. W. Moyle Rogers.
- Potentilla procumbens**, Sibth.—Roundstone; Rosslare.
- P. reptans**, L., var. **microphylla**, Tratt.—Near Raven Point, Wexford.
- Alchemilla vulgaris**, L.—Ascends to 1,800 feet in Sligo. Var. **glabra**, DC. **alpestris**, Schmidt.—Ben Bulbin range.
- Agri-monla odorata**, Mill.—Derrynane, Co. Kerry; Rossmore, Co. Galway; Rosslare, Co. Wexford.
- Rosa agrestis**, Savi (*R. sepium*, Thuill).—On Church Island, Lough Derg.
- Cratægus Oxyacantha**, L.—Only *monogyna* seen.
- Saxifraga hypnoides**, L.—Ascends to 1,800 feet on Ben Bulbin. Two forms occur on that range; one, I am inclined to think, may be *Sternbergii*; it was over flower.
- Escallonia rubra**, Pers., or **E. macrantha**, Hook & Arn.?—Naturalised near Derrynane, &c.
- Epilobium montanum**, L.—A form somewhat simulating *roseum* grew on walls at Killaloe.
- Fuchsia Riccartoni**, Hort.—Quite naturalised in many places by Kenmare River, as at Castle Cove, Derrynane, &c., in Kerry, and at Roundstone and Leenane in Galway. In great luxuriance and beautiful flower. Seedling specimens were noticed.

- Apium nodiflorum**, Reichb. f.—A rampant form occurred near Rosslare, climbing into the hedges, and showing no trace of rootlets at the nodes. Var. **ocreatum**, Bab.—At Westport.
- Fœniculum vulgare**, Mill.—Near Lady's Island Lake, Co. Wexford.
- Sherardia arvensis**, L.—Among grass at Roundstone, and to all appearance native.
- Aster Tripolium**, L., var. **discoldea**.—Rosslare.
- Diotis maritima**, Hook.—In great abundance, and flowering freely, in the locality in which Mr. C. Hurst gathered it a few years back. A sight worth going to Ireland to see.
- Anthemis nobilis**, L., var. **discoidea**.—Berehaven.
- Chrysanthemum Leucanthemum**, L.—In flower in September. A curious small form occurs in the turf by Dog's Bay, Roundstone, with a stem 2-4 inches high, and a monocephalous anthode, with dark phyllaries. A similar form occurs on the Lizard Downs. It seems to deserve a varietal name.
- Senecio vulgaris**, L., var. **radiatus**, Koch.—Near the pier at Bantry.
- Senecio Jacobæa**, L., var. **discoideus**, L.—Dog's Bay, Roundstone; Rosslare, Co. Wexford.
- Arctium Newbouldii** (Williams), (= *nemosum*, Lej.).—Rosslare.
- A. intermedium**, Lange.—Ascends to 700 feet on Ben Bulben. Berehaven; Derrynane; between Leenane and Westport.
- Cnicus arvensis**, Hoffm.—Ascends to 1,600 feet on the Ben Bulben range.
- Silybum Marianum**, Gaertn.—Near Lady's Island Lake.
- Erica Mackayi**, Hook.—In full flower in September, not choosing the wettest part, but rather the drier portions, of the bog. I found it by the road, about half a mile south of Craigg More, as well as on and about that hill.
- E. mediterranea**, L., var. **hibernica**, Hook.—This, on the contrary, appeared to prefer the wetter parts of the heath on Urrisbeg, especially on the N.E. side. To me it appears varietally distinct from the Portuguese plant.
- Dabœcla polifolia**, D. Don. [= *D. cantabrica* (Huds.)].—In magnificent flower at Roundstone, &c. I saw it about four miles from Westport, on the road to Leenane.
- Statice linearifolia**, Laterr.—Berehaven, Derrynane, Roundstone, near Ben Bulben, Wexford, and Waterford.
- Anagallis arvensis**, L.—In grassy places by the sea at Roundstone, and seemingly quite indigenous.
- Erythræa Centaurium**, Pers. (= *Centaurium umbellatum*, Gilib.), var. **capitatum** (Koch).—Roundstone. This is doubtless the *E. latifolia* of the "Cybele."
- E. pulchella**, Fries (= *Centaurium pulchellum* (Druce)).—A few specimens near Raven Point, Co. Wexford.
- Symphytum asperum**, Lepechin.—Near Killinick, Co. Wexford. The fodder plant.

- Calystegia sepium**, R. Br., var. **colorata**.—Derrynane; Maam.
- Euphrasia gracilis**, Fries.—Roundstone; Ben Bulbin.
- E. brevipila**, Burn. & Gremli.—Dingle; Derrynane; Connor Hill.
- E. Salsburgensis**, Funk.—A form of this, with slightly broader leaves, at Roundstone, and also in the Ben Bulbin district.
- E. curta**, Fries, var. **glabrescens**, Wettst.—Berehaven; Roundstone; Ben Bulbin; Connor Hill; Dingle; Derrynane.
- E. nemorosa**, H. Mart.—Portumna, Co. Galway; Rosslare.
- Bartsia Odontites**, Huds., var. **verna** (Reichb.)—At 1,800 feet on Connor Hill. Var. **serotina** (Reichb.)—Rosslare.
- Rhinanthus Crista-galli**, L. (*minor*, Ehrh.)—Common.
- R. stenophyllus**, Schur.—Near Dingle.
- R. monticola**, Druce.—Connor Hill, very rare. New to Ireland.
- Utricularia intermedia**, Hayne.—Flowering near Roundstone in September.
- Pinguicula lusitanica**, L.—Ascends to 1,300 feet on Connor Hill.
- Mentha piperita**, L.—About a mile above Dingle, on the road to Connor Hill. Base of King's Mountain, Co. Sligo.
- M. verticillata**, L., var. **paludosa** (Sole).—Dingle; Roundstone.
- M. Requieni**, Benth.—Scarcely naturalised at Bantry.
- Origanum vulgare**, L.—Killarney.
- Calamintha montana**, Lam. (= *C. officinalis*).—Near Castle Cove, Co. Kerry. Roadside between Killinick and Wexford.
- Marrubium vulgare**, L.—Near Rosslare.
- Stachys ambigua**, Sm.—Westmeath.
- Thymus Chamædrys**, Fries.—Ben Bulbin. An intermediate form at Derrynane, habit of *Serpyllum*, but with small flowers and pubescence not covering the stem all round.
- Plantago major**, L., var. **intermedia** (Gilib.)—Berehaven; Rosslare.
- Chenopodium rubrum**, L., var. **pseudo-botryodes**, H. C. Wats.—Lady's Island Lake border, very characteristic; as also on the north side of Wexford Harbour.
- Atriplex littoralis**, L.—Coast near Ardavan, Co. Wexford.
- A. deltoidea**, Bab.—Wexford.
- Salicornia stricta**, Dum.—Wexford.
- Suaeda maritima**, Dum., var. **procumbens**, Syme.—Ardavan, Co. Wexford.
- Polygonum tomentosum**, Schrank (*maculatum*).—Sneem.
- P. sagittatum**, L. (not *sagittifolium*, as given in the "Cybele").—Abundant in the locality given in the "Cybele," and in good flower in September. By a piece of good luck I am able to throw some light on its method of introduction to the Irish flora. On my return from Derrynane, I gave a lift on my car to a man who, seeing my vasculum full of this plant, said, "You have Dada's Weed." I asked him what he meant by using that name. He replied by telling me that about fifty years ago a boat with a load of Indian corn was wrecked on the coast near Castle Cove. The corn was

obtained by the man's father-in-law, who had a mill about a mile or so up the small stream. The corn was duly ground into meal, but the next year the *Polygonum* began to appear, and spread rapidly, so that in time it was called by the children "Dada's Weed." I may say that it is not easy to see any trace of the mill, which has been long ago demolished. Doubtless the prickly stems led to its being conveyed by animals into the neighbouring bog, while the stream itself carried the plant, or the seed of it, downwards to its outfall into the sea. Had the course been longer, a greater extent of the country would have been occupied by this invader. But the introduction of this species throws a sidelight on the occurrence of *Sisyrinchium californicum* at Rosslare, of which more anon.

P. cuspidatum, S. & Z.—Between Sligo and Glencar, not near houses, but of course an alien.

Euphorbia Helioscopia, L.—Very large plants at Berehaven.

Urtica dioica, L.—To 1,300 feet in Kerry.

Quercus fœmina, Mill (*sessiliflora*).—Berehaven; Derrynane.

Salix triandra, L.—In several localities between Killinick and Wexford.

S. alba, L., var. **vitellina**.—Near Killinick.

S. smithiana, Sm.—Rossmore; several localities near Sligo; Killinick, Co. Wexford.

S. purpurea, L.—Near Woodford; between Sligo and Ben Bulbin.

Hydrocharis morsus-ranæ, L.—Near Rossmore, Co. Galway.

Spiranthes spiralis, C. Koch (*autumnalis*).—The flowers have a delicious odour resembling white lilac. Near Raven Point, Co. Wexford.

Helleborine palustris, Schrank (*Epipactis*).—Most abundant in the hollows of the sand-hills near Raven Point, Co. Wexford. *Liparis* should be found here, since it grows in similar places in Wales; we were much too late to be successful in our search for it.

Habenaria conopsea, Benth.—Derrynane.

Sisyrinchium californicum, Dryand.—In the locality where the Rev. E. S. Marshall discovered it at Rosslare, in the greatest abundance over many acres.

It must be remembered that a few miles south of the station for this Western American species is Carnsore Point, on which, as my driver said, there had been more wrecks than almost any point in Ireland. It is easy, therefore, to imagine a wreck of Indian corn, as in the case of the *Polygonum sagittatum*, drifting on the coast at or near Rosslare, and in this manner bringing the seeds of the Californian species. The plant seeds very freely, and one could not walk about amongst it without scattering the seeds. Moreover, I examined several pads of earth which had been scattered from the feet of horses, and in each case saw seeds adhering, so that the animals grazing in the meadows would assist to distribute it when once established. Moreover, the locality is subject to floods, and these would also assist in its dispersal. The fact remains that

the plant is completely established, but I have no doubt in my own mind that to some wreckage containing Californian produce we must attribute the occurrence of this Western American species in Ireland. Notwithstanding the wider spread of its ally, *S. angustifolium*, I am a little sceptical as to that plant being aboriginal in Ireland, although its curious appearance in outlying spots is at present without a completely satisfactory explanation.

Scilla verna, Huds.—Raven Point, Co. Wexford.

Juncus bufonius, L.—Ascends to 1,900 feet in Kerry. Var. **fascicularis**, Koch.—Raven Point, Co. Wexford.

J. acutus, L.—Abundant in the sand-dunes of Raven Point, Co. Wexford. Var. **effusus**, Buchenau.—A lax-flowered plant which occurs in some quantity with the type in the above locality, must I think be referred to this variety, which has not hitherto been recorded for the British Isles.

J. silvaticus, Reich. (*acutiflorus*).—Ascends to 2,100 feet in Kerry.

Lemna trisulca, L.—Rossmore, Co. Galway.

Potamogeton Kirkii, Syme.—Still in good quantity at Maam. A beautiful plant, with elegantly graceful submerged leaves. It has been suggested that *P. natans* may be one of its parents, but I failed to see traces of that species in it.

P. pectinatus, L., var. **scoparius**.—Lady's Island Lake.

Ruppia rostellata, Koch.—Lady's Island Lake.

Eleocharis acicularis, R. Br.—Rossmore, Co. Galway.

Agrostis canina, L., var. **lævis**, Hackel in litt.—“Differt a typo foliis omnibus planis latiusculis (circ. 2 mm. latis) prorsus lævibus, paniculæ ramis spicularumque pedicellis lævibus, spiculis majusculis.”

This grew near the summit of Brandon, and at once attracted my attention, reminding me somewhat of the variety *scotica*, which I gathered on Ben Fay, in Scotland, but I found differed from it in several particulars. Professor Hackel therefore names it as a new variety. The large spikelets and broader leaves at once mark it from the type. In the var. *grandifolia*, which I first discovered in Ross-shire, the leaves are narrow, and the panicle branches are not smooth.

A. tenuis, Sibth. (*vulgaris*, With.), forma **grandiflora**, Hackel.—Brandon.

Holcus lanatus, L.—Ascends to 1,900 feet in Kerry on Connor Hill.

Sleglingia decumbens, Bernh.—Ascends to 2,100 feet on Brandon.

Sesleria cærulea, Ard.—Ascends to 1,500 feet on the Ben Bulben range.

Cynosurus cristatus, L.—Ascends to 1,900 feet on Connor Hill.

Koeleria gracilis, Pers.—Derryuane; Roundstone. A very stout-spiked form on Ben Bulben requires further study; it ascends on that range to 1,800 feet, and Professor Babington erroneously thought it might be *K. valesiana*. It belongs to the *cristata* group.

Festuca rubra, L.—Ascends to 2,900 feet on Brandon, and to 1,800 feet on the Ben Bulben range.

***Agropyron Hackelli**, mihi, (*junceum* × *repens*).—Raven Point, Co. Wexford.

Asplenium Adiantum-nigrum, L.—Ascends to 1,800 feet in Kerry.

Osmunda regalis, L.—Ascends to 1,200 feet in Kerry.

Chara connivens, Braun, and **C. canescens**, Loisel.—Both occurred in the station given by the Rev. E. S. Marshall in Wexford; the former also at Lady's Island Lake.

C. aspera, Willd.—Lady's Island Lake.

Oxford.

IRISH SOCIETIES.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 8.—EXCURSION TO THE BOTANIC GARDENS, GLASNEVIN.—Under the guidance of Mr. F. W. Moore, A.L.S., a party of members and visitors inspected the Gardens. Special attention was directed to the exotic plants in the houses.

DECEMBER 11.—The second business meeting of the session 1906-7 was held in the Royal Irish Academy. The President (C. B. Moffat) in the chair. Prof. G. A. J. COLE, F.G.S., the Club's delegate to the Corresponding Societies Committee of the British Association, presented his report on work of the Committee at the York Meeting in 1906. He drew special attention to the proposal for a photographic survey of the United Kingdom, and suggested that the visit of the British Association to Dublin in 1908 should be marked by the exhibition of a local collection. The following members took part in a discussion that followed:—Prof. Carpenter, R. Lloyd Praeger, F. W. Gunn, A. Roycroft, and I. Swain. The proposal for a local survey was referred to the Committee. I. SWAIN then read a paper on "Irish Carboniferous Fenestellidæ," which was illustrated by lantern slides and specimens. The paper was discussed by Prof. Carpenter and Prof. Cole.

JANUARY 5.—VISIT TO THE COLLECTION OF IRISH GEOLOGICAL SURVEY, NATIONAL MUSEUM.—A party of members and visitors assembled at 1 p.m. in the Geological Survey Gallery to hear H. J. SEYMOUR, B.A., F.G.S., give an account of the method of arrangement of the fossils. Mr. Seymour pointed out the improvements that had been introduced into the collection during recent years.

JANUARY 8.—The Annual General Meeting was held in the Royal Irish Academy. The President in the chair. The Report and Statement of Accounts for 1906 were submitted and adopted. Votes of thanks to the Royal Irish Academy and the Dublin press were passed. The President then announced that the Committee had appointed the following members to inquire into the subject of a photographic survey of the Dublin District: Professor Cole, Mr. Seymour, and Dr. Pethybridge. J. B. BUTLER suggested that a section for the study of Marine Biology be instituted. The President announced the following as constituting the

Officers and Committee for 1907 :—President, C. B. Moffat, B.A. ; Vice-President, Geo. H. Pethybridge, Ph.D., D.Sc. ; Hon. Treasurer, H. K. Gore Cuthbert ; Hon. Secretaries ; J. de W. Hinch, F. O. B. Ellison, M.D. ; Committee : W. B. Bruce, J. B. Butler, B.A. ; Prof. G. H. Carpenter, B.Sc. ; Miss Garner, W. F. Gunn, J. N. Halbert, Miss M. C. Knowles, Miss M'Intosh, B.A. ; R. Ll. Praeger, B.A., B.E. ; A. Roycroft, J. F. C. Skeffington, M.A. ; R. Southern, I. Swain, B.A. The President then read his inaugural address dealing with "Problems of an Island Fauna" which appears in our present issue (pp. 133-145).

FEBRUARY 9.—EXCURSION TO SUTTON AND HOWTH.—A party of members and visitors to the number of sixteen took part in this excursion. A start was made from Sutton Cross at 1.30 for the dolomite beds north of Bottle Quay. Here the conductor (Isaac Swain, B.A.) gave a general account of the geology of the district, and then the party moved along the shore line in direction of the Bailey. Good examples of the rocks of the district (dolomite, grits and slates, quartzites, etc.) were examined in the coast sections. The striation of the quartzite exposures were followed with keen attention during the afternoon. At the Needles the party turned inland towards the Summit, and after tea returned to town.

FEBRUARY 12.—The third business meeting was held in the Royal Irish Academy, the President in the chair. The evening was occupied with a series of papers dealing with the geology, botany, and zoology of Lambay. These papers were abstracts of the work done by the speakers, who, with others, for the past two years have been examining this island, and the full report of which has been published in the last issue of the *Irish Naturalist*. The papers, which were illustrated by a large number of lantern slides, were by the following members :—General Introduction, R. Ll. Praeger, B.A. ; Geology, H. J. Seymour, B.A. ; Marine Mollusca, N. Colgan, M.R.I.A. ; Echinodermata, A. J. Nichols, M.A. ; Earthworms, R. Southern ; Entomology, J. N. Halbert ; Problems of Distribution, Prof. G. H. Carpenter ; Botany, Birds, and Mammals, R. Ll. Praeger, B.A.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 13.—The Club met at Leinster House.

Prof. G. H. CARPENTER (President), in the chair, showed a new species of bristletail (Thysanuran), *Præmachilis hibernica*, from Lambay. Details of this insect have been described and figured in the *Irish Naturalist* (vol. xvi., 1907, pp. 55-6, pl. 16).

F. W. MOORE exhibited a section of part of the labellum of *Angræcum pellucidum* from W. Tropical Africa. In this species the lip is delicately fringed, and extremely thin, in parts reduced to one cell. In the cells close to the edge there are numerous clusters of crystals (raphides).

J. N. HALBERT exhibited a scarce oribatid mite, *Scutovertex maculatus*, Michael, from Lambay. The species has been recorded in the *Irish Naturalist*, vol. xvi., 1907, p. 66.

R. SOUTHERN exhibited specimens of the tape-worm, *Anoplocephala hyracis* (Rudolphi), from the intestine bile-ducts, &c., of a Hyrax, which died recently in the Dublin Zoological Gardens. *A. hyracis* belongs to that division of the family Tæniidæ with an unarmed scolex, and one set of genital organs in each segment. The segments are much longer than broad. The worms were found in the duodenum, and at intervals along the intestine. The principal bile-duct was also greatly distended with proglottids. A description of the species has been given by R. Moniez, in *Revue Zool. du Nord de France*, vol. iv., 1891-92, p. 28.

BELFAST NATURALISTS' FIELD CLUB.

BOTANICAL SECTION. FEBRUARY 16.—A meeting was held in the Museum, when a lecture was delivered on "How to know our Common Mosses," by Rev. C. H. WADDELL, B.D. There was a good attendance of members.

IRISH FIELD CLUB UNION.

ACCOUNTS, 1906.

RECEIPTS.			EXPENSES.		
	£	s. d.		£	s. d.
To Balance, 1904,	5	10 6	G. H. Pethybridge, Lec- ture in Belfast,	1	11 9
Affiliation Fees—					
D.N.F.C., 1905,	1	1 0			
B.N.F.C., 1905-6,	2	2 0			
O.N.F.C., 1906,	0	5 0			
L.F.C., 1906,	1	0 4	By Balance,	8	7 1
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	£9	18 10		£9	18 10
Audited and found correct.			J. DE W. HINCH, Hon. Sec. D.N.F.C.		

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

REVIEW.

OUR NATIVE WATER BIRDS.

The Aquatic Birds of Great Britain and Ireland. By Professor C. J. PATTEN, M.A., M.D., Sc.D. Pp. 620, with 56 plates and 68 text illustrations. Demy 8vo. 25s. net. London: R. H. Porter, 1906.

It has been our unpleasant duty on several recent occasions to criticise adversely certain books on British birds, firstly, because there did not seem to be any particular reason why they should have been written at all; secondly, because the Irish information, if not completely misleading, was vague to an irritating degree. The writers or compilers had apparently never heard of Ussher and Warren's standard work, and were also not aware of the existence of this Journal. It is, therefore, with no ordinary feelings of pleasure that we say at once how very different is the splendid volume by which Professor Patten has enriched the literature of the British avifauna in general and of the Irish avifauna in particular. Not only is there every reason why this book should have been written, but it would have been a positive calamity to ornithology had it never appeared. There are so many features of the book we have been pleased with that we hardly know which to mention first, but perhaps the keynote to the charm of the whole volume will be found in the freshness and breeziness that pervades every page. There is no suggestion of the "midnight oil" or of scissors and paste; on the contrary, we feel the sea-breezes fanning our cheeks, or the water oozing over our boot-tops as we accompany Dr. Patten over slob-land and mud flat, or by marsh and lake. Best of all, Dr. Patten not only has a nodding acquaintance with nearly all the rarer birds he writes of, but he is on intimate terms with the remainder of the aquatic birds of this country, and speaks from personal and first-hand knowledge. Herein lies, to us, the great charm of the book, and the natural consequence of this intimacy is that several facts in bird-life are noted for the first time. Dr. Patten is a close and careful observer, and he has here given us the gist of field-notes extending over a large number of years, and kept with painstaking accuracy. And he is as skilful with skinning-knife and camera as he is with pencil and field-glass, and the result is seen in numerous excellent photographs of birds with the information, "From specimens collected and mounted by the author." The illustrations of Turnstones on plate xvii. are simply delightful, and nothing better could be desired. There are many plates of equal excellence, but this one is particularly pleasing and successful.

Many practical hints on the best method of observing bird-life are given in the introduction. For example, "I have often baffled birds by doubling myself into such curious attitudes that they probably mistook me for some inanimate object, such as an old hamper or a piece of sack, lying washed ashore, and by this means I have found myself surrounded

by great numbers busily pattering about in search of food." And the frontispiece depicts the author crouched on the ooze, doubled up into what appears to be a very uncomfortable attitude. Again, "By lying flat on my back with my eyelids apparently closed, yet sufficiently open to allow of vision, I have allured Great Black-backed Gulls to approach on the wing within a ridiculously close range, and the late Mr. E. Williams informed me that by adopting this form of strategy he frequently brought Ravens and Hooded Crows within thirty yards of his head." Dr. Patten speaks with no uncertain voice in favour of observation compared with shooting. "Regarding the question of collecting specimens, unnecessary destruction of bird-life must be protested against. Far more is to be learned by patient and persevering observation, carried on in adverse no less than in genial weather, in remote and difficult places no less than on the silvery beach, over which one can travel for miles without growing tired, than by yielding to an impetuous desire to shoot every specimen which happens to come within range of the fowling piece. The destruction of sea-birds, especially of Terns and Gulls for millinery and other useless purposes, is in a marked degree brutal, and in those pages dealing with the species generally victimised, I have not refrained from expressing an opinion on the subject. Happily in many districts sea-birds and their eggs are now protected by law, and it is to be hoped that this protection will be extended to other districts. The Societies for the Protection of Wild Birds in both Great Britain and Ireland, are doing such excellent and energetic work in this direction that it is needless to say more." These sentiments we heartily endorse. Before leaving the Introduction we notice a curious slip on p. x., where the terms scapulars, secondaries, primaries, and *axillaries* are referred to, and "the positions of these groups of feathers are seen in Plate II." This plate depicts a Snow Bunting in an attitude that does *not* show the axillaries at all. The addition of the words "the first three" would have made matters right. Turning to the body of the book, each species is dealt with in a systematic manner which much facilitates reference. First, we have reference to the coloured figure in Gould, Dresser, and Lilford, then a condensed account of its habits, and distribution in the British Isles, followed by detailed descriptions of "Flight," "Food," "Voice," and "Nest," then a short note on Geographical Distribution ending with full "Descriptive characters," and "Average measurements." From this it will be seen how thoroughly Dr. Patten has covered the ground. Little more information could be given without making the book unwieldy, and, speaking generally, no more information is necessary. The only addition that suggests itself would be a description of the down found lining the nests of the various ducks. This is so important an aid to identification that we should naturally expect to find full information about it in this excellent volume.

Throughout the book there are constant references to the works of Ussler and Warren, and Barrington, and the volumes of the *Irish Naturalist* have evidently been carefully scanned and noted. Residing in Dublin

for so long, the author gives very full and valuable information on the birds of Dublin Bay, for which we are grateful, and in this connection a warm tribute is paid to the assistance he received from the late Mr. E. Williams. Regarding more northern information, there is internal evidence that Dr. Patten has overlooked the account of the birds of Antrim and Down, as given in the Guide published by the Belfast Naturalists' Field Club for the 1902 meeting of the British Association. For instance, no mention is made of the Shoveller breeding in Co. Down (p. 98); the statement at foot of p. 272, giving 1899 as the date of the most recent capture of a Great Suipe is not correct (*vide* B. N. F. C. Guide, p. 163), and there is no record of the Dotterel in Co. Antrim, as stated on p. 211. These small errors only show how extremely difficult it is for an author of such a large book as that under notice to avoid *all* pit-falls, and they do not detract from the value of this magnificent piece of work. Dr. Patten has laid British ornithologists under a debt of gratitude, while we in Ireland are especially grateful for the many new facts brought to light as to the habits of our water-birds. The book must of necessity be on the shelves of everyone calling himself an ornithologist, and we wish it the wide circulation it so richly deserves.

ROBERT PATTERSON.

NOTES.

BOTANY.

Central Committee for the Survey and Study of British Vegetation.

The Committee met in Manchester on November 24 and 25, sitting for seven hours on the first day and five hours on the second. The Chairman of the Committee, A. G. Tansley, M.A. (London University), presided; also present—W. B. Crump, O. V. Darbishire, Ph.D. (Manchester University), F. J. Lewis, F.L.S. (Liverpool University), C. E. Moss, M.Sc. (Manchester University), Prof. F. W. Oliver, D.Sc., F.R.S. (London University), R. Ll. Praeger, B.E., W. G. Smith, B.Sc., Ph.D. (Leeds University), J. W. Woodhead (Halifax Technical College). The general business transacted included the following:—Minutes; Report on Derbyshire excursion held in August; the question of the publication by Government of vegetation maps; report of the colour scheme sub-committee, and adoption of a standard colour-scheme for vegetation maps; application for advice regarding subdivision of cultivated land in Gloucester; the collection of botanical photographs which is being formed in conjunction with the British Association Botanical Photographs Committee. In the consideration of the last item the Committee was aided by the presence of Prof. F. E. Weiss, D.Sc. (Manchester University), secretary of the said B. A. Committee. Subsequently the following communications, most of which were illustrated by maps and lantern slides, were

brought before the meeting:—W. B. Crump—Notes on some Peat Deposits in the Pennines; F. J. Lewis—Recent Observations on Scottish Peat Deposits; W. G. Smith—Vegetation Survey of North-east Yorks; R. Ll. Praeger—Vegetation of Lambay, Co. Dublin; Prof. Oliver—The Bouche d'Erquy in 1906; A. G. Tansley—Mapping Problems and Difficulties; C. E. Moss—Botanical Survey of Somerset. A vote of thanks to Prof. Weiss for permission to use the Botanical Department of the University for the meeting, and to Messrs. Moss and Darbishire for making the local arrangements, brought the business to a close.

Vitality of Seeds.

In cut-away bogs it is frequently the case that a growth of birch springs up, although no birch trees are found in the neighbourhood. Is it possible that the seed of the birch may have been preserved in the bog from a former age, and springs up when opportunity permits? No birch wood is found in bogs, I believe, but the bark is preserved.

S. HENRY.

Omagh.

Ranunculus scoticus on Lough Corrib.

This Scottish Crowfoot was found by Sraheens Lough, in Achill Island, by its describer, Rev. E. S. Marshall, in 1899. Subsequently I showed it to be abundant by most of the numerous lakes in Achill, and also by the upland lakes of the Fermanagh highlands. Last July it was found in profusion on both sides of Lough Corrib at Kilbeg Ferry. The station is interesting, not only because it is lowland (the lake lies 28 feet above Ordnance datum), but because this is the first time that the plant has been found on the limestone. Mr. Marshall remarks of my specimens, "*Very good R. scoticus.*"

R. LLOYD PRAEGER.

Dublin.

Additions to "Irish Topographical Botany" in 1906.

Since, owing to the publication of the double Lambay number, there will be some pressure on the space in this Journal for the next few months, I propose to forego my annual summary of botanical additions, and to publish a two-years' instalment at the beginning of next year. This is rendered the more convenient by the fact that the great majority of the additions of last year are already accessible in these pages, in three papers published in the volume for 1906—namely, that of Mr. Phillips on "Some Irish Brambles" (May), and those by myself "On the Botany of Lough Carra" (Sept.), and "Notes of a Western Ramble" (Dec.).

R. LLOYD PRAEGER,

Dublin.

ZOOLOGY.

Some further additions to the Marine Mollusca of Co. Dublin.

In continuation of a systematic survey of the marine molluscan fauna of the Dublin coast which has occupied me for the past two years, I made some dredgings in and around the classic and much-worked area of Dalkey Sound in September and October last. The highly productive labours of Walpole in 1852-53, and of Kinahan in 1860, have by no means exhausted this ground, as three half days spent in dredging outside the northern end of the Sound towards Bullock Harbour, and about a mile eastward of the Sound on the seaward side of the isolated rock known as the Muglins, yielded me no less than four species new to the coast of Co. Dublin. One fortunate haul made outside the Muglins in 13 fathoms low-water gave me the richest shell sand I have ever obtained on the Dublin coast whether by dredging or shore collecting, the material brought up having produced 89 species of mollusca. Many of these are, or have hitherto been considered to be, rare for Dublin, and perhaps in some future issue of this Journal the editors may be able to spare me a page for a complete list of the species, as an example of the happy chances which occasionally befall the earnest dredger. One of the 89, *Utriculus mammulatus* (Phillipi), of which three specimens were found, has not previously been recorded for Dublin or for East Ireland.

Two other dredgings, made off Bullock Harbour, each in 10 fathoms low-water, yielded me three Nudibranchs new to Dublin, and to East Ireland. The first of these, made on the 20th September last, gave me one specimen of *Antiopa cristata* (Della Chiaje). It was a damaged or immature specimen which, although destitute of most of its body papillæ, I was able to identify positively with the valuable assistance of Mr. A. R. Nichols and Alder and Hancock's *Monograph*. The second dredging, made on the 6th October last, yielded three specimens of *Antiopa hyalina*, Ald. and Hanc. The only previous Irish records for these species are for South-west Ireland. The first species has been taken in Cork Harbour, Baltimore Harbour, and Valencia Harbour, and the second in Valencia Harbour. Along with *A. hyalina* in this last haul of the 6th October a fine specimen $1\frac{3}{4}$ inches long of *Lomanotus marmoratus* (Ald. and Hanc.) was taken. This was previously known as Irish from but two stations, Valencia Harbour in Kerry, and Ballinakill Harbour in Galway, and is perhaps the most interesting result of my two years work on the Dublin marine mollusca. From the rarity of its forms, the genus *Lomanotus* is not well understood, and the species stand in need of revision. Such a revision I have ventured to undertake after a study of the scattered and not easily accessible literature of the genus, and hope before long to publish the results, with a detailed description of the Bullock specimen, and reasons for the adoption for it of Alder and Hancock's specific name here used.

N. COLGAN.

Sandy Cove.

Lepidoptera in the North of Ireland during 1906.

I saw my first butterfly of the year on April 2nd, *Vanessa urticae*, and a week later observed *Pieris rapae* on the wing. In the same month I took *Anticlea badiata* and *Larentia caesiata* in my own grounds. *Pararge egeria* put in an appearance on May 2nd, and *Euchloe cardamines* on the 10th. On June 16th I captured a very battered Painted Lady (*V. cardui*) in one of my fields, and a few days afterwards while out driving saw another specimen, but this was very perfect. At Newcastle, Co. Down, on July 27th, Graylings (*Satyrus semele*) were abundant, also the Common Blue (*Polygonatus icarus*). I got several larvæ of *V. cardui* on thistles, which I brought home and endeavoured to rear, but failed in every case, as the larvæ had been attacked by a Braconid, which Mr. Claude Morley says is probably *Apanteles vanessa*, Reich. It was curious that all should have been affected, for Mr L. Bonaparte-Wyse tells me that of those he bred in Waterford none were affected by the parasite. I was glad to get a couple of specimens of *Argynnis aglaia*, as I had not seen this Fritillary since I caught it many years ago at Castlerock. I saw but could not capture a Humming-bird Moth (*Macroglossa stellatarum*), and curiously enough I saw another on that day two months, Sept. 27th, while driving from Carlingford to O'Meath. *Zygæna lonicera* and *Z. filipendule* were pretty abundant. Besides these I captured *Agrotis valligera*, *Anaitis plagiata*, *Cidaria fulvata*, *Acidalia aversata*, and *Gnophos obscurata*. I was very favourably impressed with the locality for Lepidoptera, and no doubt an entomologist staying in Newcastle for three or four weeks would reap a rich harvest of insects.

Sugar was a dreadful failure, and finally I gave it up in despair. I was not, however, without some compensation, for I took at sugar a pair of *Aporophyla nigra*, a moth which Barrett ("British Lepidoptera," vol. iv., p. 280), records as very rare in Ireland and usually on the coast, and gives as localities the neighbourhood of Dublin, Kerry, Galway, Donegal, and Antrim. Besides these I took *Noctua glareosa*, *Helotropia fibrosa*, *Miana literosa*, *Triphena fimbria*, *Calymnia trapezina*, and very dark specimens of *Xylophasia monoglypha*, *Apamea oculatea*, and *Cidaria russata*. I also took sitting on the trunk of a pine tree near the sugar a specimen of *Depressaria arenella*.

W. F. JOHNSON.

Poyntzpass.

Late departure of a House-martin.

On Sunday, November 18th last, a House-martin (*Chelidon urbica*) was seen at 2 p.m. flying close to Beechwood House. It circled round a few times, and then turning to the south gradually disappeared from view. Both the House-martin and Swallow leave us, as a rule, in October, and it is only rarely a straggler is seen so late in November.

J. TRUMBULL.

Malahide.

Fieldfares roosting.

On the 22nd of November I was shooting on the Bog of Allan, near Naas. About three o'clock a large flock of Fieldfares crossed the canal and settled on the bare bog. As evening drew on, small flocks kept coming circling round and pitching on the same spot. As I remained about the place till near dark flock after flock continued to arrive, all making for the same spot. Suddenly the whole party would rise in the air, as Starlings will at roosting time, and settle again. I was much interested, as I had seen the Fieldfares feeding on the hawthorn trees by the roadside while driving to the place in the morning, but this was the first time I had observed them going to roost. Although there are plenty of woods in the vicinity, this spot seemed to be the roosting-place for the flocks in the district. I would have liked to have gone to the exact spot, but feared being unable to find my way out of the bog in the dark.

W. J. WILLIAMS.

Dublin.

Rough-legged Buzzard in Co. Wicklow.

Two large hawks were seen frequenting the moors near Sallygap in the month of December. One fell a victim to poison laid in a rabbit, and was thrown away by the keeper. The owner of the shooting told me he had seen the bird, and thought it was a Peregrine Falcon, but by the description given to me I knew it could not be a bird of that species. Wishing to identify the bird I asked him to kindly have it sent here if possible. On arrival it proved to be a male Rough-legged Buzzard, but owing to exposure to the weather for some days, the plumage was not in good condition.

W. J. WILLIAMS.

Dublin.

Rough-legged Buzzard in Co. Cork.

On the 18th November, 1906, a male Rough-legged Buzzard in fine plumage was trapped on the ground at Mitchelstown Castle, and sent to me by Mr. W. D. Webber for determination. He has permitted me to present it, in his name, to the Dublin Museum, where it is to be mounted for the Irish collection. I am not aware that this species have been previously recorded from the South of Ireland, though it has been repeatedly taken in Ulster.

R. J. USSHER.

Cappagh, Co. Waterford.

Pomatorhine Skuas, Great Shearwaters, Fulmars, and Scoters off the West Coast.

Mr. George P. Farran, of the Fisheries Branch, Department of Agriculture, writes as follows:—

“22nd December, 1906.

“I am sending you a few notes on the birds seen by Mr. Kemp and myself when out on the SS. *Helga* last October–November.

“October 16.—Pomatorhine Skua flying round the ship whilst trawling 20 miles off Drogheda.

“October 17.—Several small flocks of Common Scoters seen off Drogheda Bar, 1 to 2 miles out.

“November 1.—At 70 miles S.W. of Fastnet Rock, Co. Cork, a few Kittiwakes were seen, but no Shearwaters; 15 miles to the westward Kittiwakes were more numerous, and a few Great Shearwaters were seen; and 15 miles to the north (= 75m. W.S.W. (mag.) of Fastnet), many Great Shearwaters and a few Fulmars were noticed, and a Rook came on board, a fairly young bird with feathered cere.

“The wind was about N.W., moderate, during the day. The previous day (October 31st) it had been N.E. to N., light to moderate, but on October 30th there was a strong N. gale, which may have blown the bird off.

“November 6.—30 miles off Tearaght, Co. Kerry, several Great Shearwaters and Kittiwakes, and a few Fulmars were flying round the ship, and at 40 miles off the same birds were seen together, with a few Lesser Black-backed Gulls, three Gannets, and four Pomatorhine Skuas, one of which was completely black. It was in company with the others, and agreed with them in size and shape, but had a short tail.

“November 11.—About 7 miles off Blackwater Lightship a Chaffinch came on board late in the evening, and while steaming for Kingstown during the night the calls of birds, which I did not recognise, could be heard, as if accompanying the ship, and next morning a dead Fieldfare was found on board.

“The Great Shearwaters are usually in company with Fulmars, with which they agree in size; the Manx Shearwaters, which are seen close inshore, being noticeably smaller, and, it appears to me, differing somewhat in flight, moving their wings more rapidly.

“The Great Shearwaters differ from the Pomatorhine Skuas (*i.e.*, the immature birds without the elongate tail-feathers and black gorget) in their shape and flight. They never hover, as the Skuas attempt to do, but spend their time close to the water, gliding or rapidly moving their wings and continually altering their course. Their colour agrees with that of the Pomatorhine Skuas in being dark above and light below, but the light sides of the neck give them the appearance of having an imperfect white collar.”

Commenting on the above, Mr. Howard Saunders writes:—

“I am interested in Mr. Farran's letters, and have not the slightest doubt that the writer saw *Puffinus major*. Here is a copy of my note

after seeing many in the Atlantic, N. and S., on four voyages:— In flight the neck is outstretched to full extent, and this produces the appearance of a whitish collar, while the head-cap looks dark and detached."

It may be remarked that the Great Shearwater has been observed in the vicinity of our islands during the summer and autumn months, including November, one occurrence in December being recorded by Mr. Dresser. The Sooty Shearwater, which Mr. Farran did not meet with, has been most frequently seen off Ireland in September, sometimes then in company with Great Shearwaters (see *Irish Naturalist*, 1901, p. 42, and 1905, p. 43).

R. J. USSHER.

Cappagh, Co. Waterford.

Irish Notes of Birds and Mammals.

The December issue of the *Zoologist* contains "Disappearance of many of our home-bred Birds in autumn," by Robert Warren. The following number contains a note on "An apparent hereditary transmission of a mutilation in the Domestic Cat," by W. F. de V. Kane, and "Is the Weasel a native of Ireland?" by R. Warren. In the February number is a note on the "Hawfinch at Ballinasloe," by Rev. W. W. Flemyng, another on "Sabine's Snipe in Ireland," by W. J. Williams, "Some rare visitors to Bartragh Island, Killala Bay," by R. Warren, and "Iceland Gulls in Donegal," by J. Steele-Elliott.

Superfœtation in Sheep.

On Jan. 25, 1907, one of my ewes gave birth to a fine strong lamb. It was the first this year at Fassaroe. On Feb. 21st she had twins, fully developed, healthy lambs, but rather weakly. It was interesting to watch the ewe trying to attend to both families, so unequal in age and size. One of the twins died when two days old, the others are alive and well. The twins had the black points of a Shropshire sire. The first born lamb resembled the mother, a Roscommon ewe.

The usual period of gestation in sheep is about five months; the interval between the two families in this instance was 27 days. The technical problems of this interesting case I leave to veterinary journals. Though I have been personally interested in the births of many thousands of lambs, this phenomenon never occurred before to my knowledge. I believe superfœtation is not unknown in sheep, but its occurrence is most exceptional.

RICHD. M. BARRINGTON.

Fassaroe, Bray.

ON THE RELATIONSHIP OF THE IRISH ELK.

BY R. F. SCHARFF, PH.D.

WE are so accustomed to look upon our common Fallow Deer as the nearest living relation of the extinct Giant Deer (*Cervus giganteus*) or "Irish Elk" as it is commonly called in this country, that it comes to us as quite a surprise to find that a well-known Swedish authority now disputes the correctness of that view. Prof. Lönnberg¹ indeed goes so far as to say that the likeness between the Fallow Deer and the Irish Elk is only superficial, and that there seems to be greater real affinity between the latter and the Reindeer.

I may mention that when Sir Victor Brooke² wrote his well-known essay on the classification of the Deer tribe he founded his divisions, as their names imply, upon the position in the fore-limbs of two splint-like bones, the rudiments of the second and fifth metacarpals. He called the two divisions Plesiometacarpi and Telemetarpi. In the Deer belonging to the first division the lateral splint-bones (metacarpals) are only present in the near or upper part of the limb, while the second division includes all the Deer which possess splint-bones in the remote or lower portion of the fore-limb. Thus the genera *Cervus* and *Dama*, to which our Red-deer and Fallow Deer respectively belong, are included in the division of the Plesiometacarpi, while all the true American Deer, including the Reindeer, are members of the other group.

It was only an afterthought, as it were, on Sir Victor Brooke's part and a suggestion of Prof. Garrod's to include in his definition of the two great divisions of the Deer tribe other osteological characters besides the position of the splint-bones. But those other characters are evidently not of the same importance as the original ones on which the two divisions were founded. Prof. Lönnberg makes no reference to this fact in his suggestive and interesting paper.

¹ LÖNNBERG (EINAR): Which is the taxonomic position of the Irish Giant Deer and allied races? *Arkiv f. Zool.*, vol. iii., 1905.

² BROOKE (SIR VICTOR): On the Classification of the Cervidae, with a synopsis of the existing species. *Proc. Zool. Soc. London*, 1878.

The Irish Giant Deer (*Cervus (Megaceros) giganteus*) possessed undoubtedly the upper or proximal splint-bones only, and must, therefore, be placed with most of the other Old World Deer among the Plesiometacarpi, and not with the Reindeer among the Telemetarpi. The other characters alluded to by Sir Victor Brooke which might be utilized in distinguishing the two divisions of Deer from one another are those that Prof. Lönnberg principally relied upon in his endeavour to remove the Irish Giant Deer from the genus *Cervus*.

The first of these characters is that, in what we might call by the term Old World Deer (Plesiometacarpi), the posterior portion of the nasal cavity is not divided by the vomer into two distinct chambers, while in the New World Deer including Reindeer (Telemetarpi) it is so divided. The vomer, I may mention, is usually a thin, flat bone forming a complete or incomplete septum between the hinder part of the nostrils. Prof. Lönnberg makes the statement that the vomer in *Megaceros*, that is to say, in our Irish Giant Deer, divides the posterior nostrils into two completely separate passages.

I have examined several skulls of the Irish Elk, and though the vomer, like all the bones in the skull, is much thickened, it is not really attached to the palatine bone, but free from it as in the Red-deer and Fallow Deer. A thin blade of a knife can be passed in all cases between the palatine and vomer up to a distance varying from $1\frac{3}{4}$ to $2\frac{1}{4}$ inches, corresponding to the length of the former bone, which is much thickened in the Giant Deer. In the Reindeer, on the other hand, the vomer is firmly attached to the palatine bone and to the posterior edge of it.

Prof. Lönnberg lays particular stress on the smallness of the antorbital vacuity in the Giant Deer as compared with that of the Fallow Deer, in which respect it approaches the condition noticed in the Reindeer. All typical Deer possess such a vacuity. In the young Giant Deer and in female skulls it is prominent, but in old males this vacuity tends to disappear, and in some cases has been almost entirely covered in by the growth of the surrounding bony tissue. This condition of the adult Giant Deer is, therefore, not of any importance in classification.

The shape of the nasal bones and the shallowness of the preorbital pits appear to me trivial characters as compared with those previously alluded to. As regards the antlers, Prof. Lönnberg draws attention to the presence in the Giant Deer and Reindeer of a flattened and palmated brow-tine. But as he acknowledges, it is somewhat differently developed in these two types. Among the numerous antlers of the Giant Deer in the Dublin Museum, there are scarcely two alike, and even the brow-tine presents a good deal of variation, being sometimes altogether absent. It appears to have originated from a dichotomy of a single straight tine with a subsequent filling up with bony tissue of the angle between the branches.

I think I have alluded to the most important points raised by Prof. Lönnberg in his discussion as to the alleged affinity between the Giant Deer and the Reindeer. In my opinion the former is much more closely related to the Fallow Deer than to the Reindeer, and Mr. Lydekker and other recent authorities appear to me justified in retaining it as a member of the genus *Cervus*.

Dublin Museum,

IRISH PARASITIC FUNGI.

BY J. ADAMS, M.A.

THE following species of Fungi do not seem to have been previously chronicled as natives of Ireland. Two of them are hitherto undescribed species. The month during which reproductive organs were found and the locality are given in each case.

PHYCOMYCETES.

- Cystopus lepigoni**, de By.—Conidial stage, May. On *Spergularia rupestris*. Bray Head, Co. Wicklow.
- Peronospora affinis**, Rossmann.—Conidial and oospore stages, July. On *Fumaria officinalis*. Rush, Co. Dublin.
- P. calotheca**, de By.—Conidial stage, June. On *Galium Aparine*. Royal Canal bank, Co. Dublin.
- P. Schachtii**, Fuck.—Conidial stage, June. On *Beta maritima*. Sutton, Co. Dublin.

ASCOMYCETES.

Claviceps Junci, n. sp.

The species of this genus are usually found parasitic in the ovary of Grasses, sometimes on Sedges. Neither in Saccardo's "Sylloge Fungorum" nor in Engler and Prantl's "Pflanzenfamilien" is there any mention of a member of the genus occurring on Rushes. The Sphacelia stage only was found, occurring in the ovary of *Juncus glaucus*, and filling up its interior with an immense number of colourless spores. The spores are oblong to elliptical in shape, one-celled, $7\cdot0-10\cdot3 \mu \times 2\cdot8-3\cdot5 \mu$ (Fig. 1). Obtained on 17th Sept. on Royal Canal bank, Co. Dublin.

Rhytisma Andromedæ (Pers.)—Ascus stage, July. On *Andromeda folifolia*. Bog near Newbridge, Co. Kildare.

UREDINEÆ.

Coleosporium Campanulæ (Pers.)—Uredospore stage, August.

On *Campanula rotundifolia*. On north shore of L. Neagh, south of Randalstown, Co. Antrim.

Uromyces Betæ (Pers.)—Uredospore stage, May. On *Beta maritima*. Portrane, Co. Dublin.



Fig. 1.—Spores of *Claviceps Junci*. Fig. 2.—Leaf of Whin covered with pycnidia of *Cicinnobolus Ulicis*. Fig. 3.—Pycnidia of same, more enlarged. Fig. 4.—Spores of same.

FUNGI IMPERFECTI.

SPHÆROPSIDÆ (Section SPHÆRIOIDÆ).

Cicinnobolus Ulicis, n. sp.

The species of this genus are usually found as parasites on the Erysiphaceæ, which are themselves parasites. Pycnidia pedicellate, brownish black, $33\cdot6-61\cdot6 \mu \times 26\cdot6-42 \mu$. Spores oval to oblong, one-celled, hyaline, $4\cdot2-8\cdot4 \mu \times 2\cdot1-2\cdot8 \mu$,

Parasitic on one of the Erysiphaceæ on stems and leaves of *Ulex europæus*, which it covers with a felt of hyphæ bearing pycnidia. (Figs. 2, 3, and 4), July. On Great Sugar Loaf, Co. Wicklow.

For his kind assistance in the identification of the species of *Claviceps* and *Cicinnobolus*, I am deeply indebted to Mr. A. D. Cotton, of the Royal Botanic Gardens, Kew.

Royal College of Science, Dublin.

OBITUARY.

GREENWOOD PIM, M.A., F.L.S.

The announcement of the death of Mr. Greenwood Pim, M.A., of Easton Lodge, Monkstown, caused sincere regret to his many friends. Mr. Pim's name was familiar to all students of science, and especially to those interested in botany, as for many years he had taken an active part in promoting natural science teaching, and in encouraging and helping all lovers of plant life. Mr. Pim had a distinguished career in Trinity College. He took first honors in classics, and at his final examination he secured first place among the senior moderators in natural science, and was awarded a large gold medal. On leaving college he devoted himself to the study of Fungi, and soon became an acknowledged authority on these difficult and intricate forms of vegetation. To him specimens came from all parts of Ireland for identification, and his courtesy in answering his numerous correspondents was generally acknowledged. When a comprehensive Guide to the Co. Dublin was prepared, on the occasion of the visit of the British Association to Dublin in 1878, Mr. Pim undertook the list of Fungi, which list, as the author points out, was the first published for Ireland since Wade tabulated some fifty species in 1804. This new list amounted to nearly 500 species, and the author subsequently added many more species to it. Mr. Pim was also known as a science lecturer at the Royal Dublin Society and other places. He was a prominent supporter of all local natural history societies, such as Dublin Microscopical Club, Dublin Naturalists' Field Club, &c., and in most of these at various times he occupied high official position—President, Secretary, Treasurer, &c. He was an enthusiastic gardener, and devoted much time and attention to the many rare plants he had collected together in his garden at Monkstown. His success in the cultivation of many groups of plants reputed difficult to grow, such as the *Oncocyclus Iris*, was remarkable and his collection of the newer varieties of water-lily was frequently alluded to in gardening periodicals.

W MOORE.

REVIEWS.

INTERNATIONAL BOTANICAL NOMENCLATURE.

List of British Seed-Plants and Ferns exhibited in the Department of Botany, British Museum (Natural History). 8vo. Pp. 4 + 44. London, 1907 4s.

The interest of this pamphlet lies not in the fact that it is a list or catalogue of the British herbarium in the British Museum, but that it is a revision of the nomenclature of British plants, in accordance with the rules adopted by the International Botanical Congress at Vienna, 1905. Dr. Rendle and Mr. Britten, who are responsible for the list, deserve our thanks for having produced a very useful little work, which will be welcomed by students of British plants, even though it introduces still further changes in our already much altered plant names. The giving of a full reference to the original description of each species is valuable in a handy list of the kind, as also the correlation of the names used in the three leading handbooks of the British flora: viz., Bentham's "Handbook," Hooker's "Student's Flora," and Babington's "Manual."

BUTTERFLIES AT HOME AND ABROAD.

A Natural History of the British Butterflies: their world-wide Variation and Geographical Distribution. A Text-book for Students and Collectors. By J. W. TUTT, F.E.S. Vol. i. London: Elliot Stock, 1905-6. Pp. iv. + 480. Plates xix. Price, 1s.

This book may be regarded—so Mr. Tutt tells us in his preface—as vol. viii. of the "Natural History of the British Lepidoptera," vol. iv. of which has been already noticed in the *Irish Naturalist* (vol. xiii., pp. 160-1). Its publication at the present time has resulted from the accumulation in the author's hands of a large amount of material on the Butterflies, and from the need for a "really good scientific work" on that popular group of insects. The first instalment of this vast amount of material, here offered to the student of insects, will be found an invaluable mine of information. How rich the material is may be gathered from the fact that the systematic part of the volume, including 400 pages, contains the account of only ten species. On this scale of treatment Mr. Tutt will require six or seven volumes in which to deal with all the British butterflies!

In the first 80 pages of the volume will be found fourteen chapters, four of which deal with eggs, and nine with larval structure and habits. A single chapter, entitled "General Observations on Butterflies," and restricted to less than two pages, contains all the general information

on imaginal structure to be found in the present volume. We presume that this highly important branch of the subject will be discussed in some of the subsequent volumes, but we cannot help feeling that its absence from the introduction to the whole work is a mistake in arrangement. The four chapters on eggs are admirable, and contain abundance of new information; one on the photography of these beautiful objects by Mr. E. A. Tonge, will incite many naturalists to turn their cameras to similar use, especially after studying the plates in which Mr. Tonge's work is reproduced by excellent half-tone blocks. Mr. Tutt lays much stress on the form of the egg, as indicating relationships among the Lepidoptera. He points out that the eggs of all butterflies are of the "upright" type—*i.e.*, the egg "has its micropylar axis perpendicular to the surface on which it is laid, whilst its transverse section almost always forms a circle, and its base is almost always flattened at the point of attachment."

The chapters on larvæ, containing much interesting matter gleaned from varied sources, are fascinating reading for the entomologist. The facts relating to the association of caterpillars of certain lycænid butterflies with ants will be new to many naturalists, the ants being attracted by a sweet fluid secreted by a gland on the eighth abdominal segment of the larva. Most of the observations on these relations between ants and caterpillars, and all those on the carnivorous habits of certain butterfly larvæ, have been made on exotic, not on British species, so that their inclusion in this work may perhaps be open to some objection. The chapters on the silk-spinning and resting habits of the caterpillars, and their "protective" or "warning" coloration, are concerned chiefly with British insects, exotic species being occasionally mentioned by way of illustration. The facts brought together in this section, partly from Mr. Tutt's own industrious field work, and partly from his marvellously wide reading, are perhaps the most generally interesting in the whole book. Although most butterfly larvæ spin before pupation only a pad of silk to support the tail-end of the pupa, the "Skippers" and the *Parnasii* spin silken cocoons, and "there are many intermediate stages between the coarse but slight silken cocoon of the *Parnasiids*, in which the pupa lies loosely, and the merely suspended butterfly pupa." During larval life, however, the power of spinning is extensively used by many caterpillars of the butterflies, the protective webs spun by the gregarious caterpillars of our common vanessids being well known. The interesting notes on protective coloration are illustrated by three especially good photographs.

By far the larger part of the volume (400 pages) is devoted to the systematic account of ten species—the "Skippers" and the "Coppers." The families and genera are arranged in ascending sequence, and Mr. Tutt has adopted a scheme which will be approved by most serious students of the Lepidoptera. The "Skippers," as the lowest group, are treated first, and some 200 pages are devoted to them. Mr. Tutt revives the Linnean *Urbicola* as a generic name (with *comma* as its type), and thinks it necessary, therefore, to replace the super-family-name *Hesperides* by

Urbicolides. Similarly the Linnean *Ruralis* (with *betulæ* as type) is revived for the typical "hairstreaks," and the family name Lycænidae, in general use for more than seventy years is put aside in favour of Ruralidae. We cannot help regretting that Mr. Tutt has made so extensive a pilgrimage in the perilous paths of priority. The object—at least the professed object—of zoological nomenclature is to facilitate the study of animals. Much of the modern work on nomenclature can, however, have little result beyond hopelessly confusing the student of the future. The interpreters of old zoological writings agree fairly as to the rules which guide their labours, but they often differ utterly in the application of these rules. Many of them will doubtless argue that the terms *Urbicolæ* and *Rurales*, used as they were by Linné as plural adjectives, cannot stand as generic names at all, and that we may therefore continue to speak of Hesperidae and Lycænidae with a clear conscience. The generic splitting adopted by Mr. Tutt will probably be, for the most part at least, adopted by all students of butterflies in the near future, and the changes of names thus necessitated cannot but be accepted. It may cause inconvenience, however, that diagnoses of new Palæartic genera not occurring in Britain, should be published in a work on British Butterflies.

Two families (the Urbicolidae and the Hesperidae) are recognised by Mr. Tutt among the British "Skippers," the former being divided into two sub-families, the Thymelicinae and the Urbicolinae. The Thymelicinae include *Adopæa lineola*, *A. flava*, and *Thymelicus actæon*, which differ from the other five British "Skippers," and indeed from butterflies generally in having eggs that approach the flat form characteristic of many moth families. Mr. Tutt gives short generic diagnoses, usually drawn from some eminent systematist—Watson in the case of the "Skippers"—but the treatment of imaginal structure is somewhat meagre, and the absence of structural figures is to be regretted. On the other hand, when we turn to the specific description, we find that the range of variation and the habits of the butterfly are treated at great length, while the larval stages are described in much detail. Many gaps previously existing in the life-histories of certain species—the "Iulworth Skipper," *Thymelicus actæon*, for example—are filled in the present volume, and it is gratifying to know that in this important part of his labours, Mr. Tutt has received invaluable and generous help from friends who have placed at his disposal specimens or notes of observations of larvae which they have been so fortunate as to secure. The only Thymelicine of which there is an Irish record is *Adopæa flava*, and nobody has seen the insect in this country since Birchall's time. The British localities—Mr. Tutt uses "British" in the wide sense so as to include Ireland—are grouped under counties, the counties of England, Wales, Scotland, and Ireland being lumped all together in alphabetical order, so that Cork may be sandwiched between Cheshire and Cornwall. It is hard to understand how any naturalist who takes an interest in geographical problems can tolerate so bad an arrangement. Of the three British Urbicolinae only *Augiades sylvanus* is recorded as Irish. Both the British Hesperinae,

Hesperia malva and *Nisoniades tages*, occur in Ireland, but while the former's Irish nationality rests on a single Kerry record, the latter is the only "Skipper" at all widely spread in Ireland, Mr. Tutt's alphabetical arrangement of counties does not make it easy for the student to trace its Irish range, especially as Erniscorthy appears under Kerry. It should be mentioned that in the account of each species, several pages are devoted to "Time of Appearance," a long list of localities, both British and Continental, with dates and authorities, being given. It may be doubted whether these lists are at all worth the space which they occupy, enormous though the labour of compiling them must have been. Possibly by expending much further labour the student may be able to arrive at some general conclusions from all this material. In its present state it must be compared to a pile of loose bricks rather than to a finished building.

Besides the admirably full details of larval stages and habits, Mr. Tutt is to be especially congratulated on the section devoted to the variation of each species. It may be doubted whether the naming of forms differing in some slight detail of pattern may not have been carried too far; there are eighteen named "varieties" and eight named "aberrations" of *Urbicola comma*. But this precise nomenclature, if not regarded as an end in itself, should be an aid to the precise study of variation, and the scientific student will feel deeply grateful to Mr. Tutt for having described the world-wide variation of these species that inhabit our islands. For such knowledge is most needful if the study of variation within our own fauna is to be fruitful of result.

The family Ruralidæ of Mr. Tutt (= Lycænidæ of authors) is placed by him in a 'superfamily' Ruralides, along with the Lemoniidæ (Frycinidæ), and this arrangement will meet with general acceptance. Only two species, the "Small Copper" and "Large Copper," are treated in the present volume, but they are most fully described, nearly 90 pages being devoted to the former insect, which Mr. Tutt calls *Rumicia phlaas*, agreeing with Scudder that it should be generically separated from *Chrysophanus*, of which the "Large Copper," *C. dispar*, is the type, but considering Scudder's use of the name *Heodes* for the *phlaas* group inadmissible. Scudder's generic diagnoses are given at length. *R. phlaas* is a common Irish butterfly, and, with Mr. Tutt's pages before him, the Irish student will be able to compare whatever forms of the species he may collect with varieties from all parts of the world. The North American forms, usually known as *hypophlaas* and *americanus*, are regarded by Mr. Tutt as races of *phlaas*, so that the species has an enormous range in both hemispheres. These American forms are most closely matched in the European fauna by specimens from Lapland. The dark, brilliantly-coloured South European form (*eleus*) may be closely approached by specimens captured in south-eastern England, or may be imitated by subjecting pupæ, the offspring of British *phlaas*, to a warm temperature during the critical stage of their development.

Few entomologists of the present generation will fail to be interested by Mr. Tutt's full historical account of the famous "Large Copper"

(*Chrysophanus dispar*), how too eager collectors exterminated it before the middle of last century in its Fenland haunts, and how equally eager collectors of to-day hunt for specimens—at five to ten guineas apiece—in London auction rooms. The early stages of this grand insect are described from specimens furnished by its Continental variety, *rutilus*.

So we must conclude our survey of this volume. What we consider to be defects and omissions we have pointed out, but the general impression left on the mind of the reader is admiration for Mr. Tutt's knowledge and industry, and gratitude for so rich a result from his labours. The earnest entomologist will not fail to procure and study the work for himself, and he will look forward eagerly to the volumes yet to come.

G. H. C.

THE SCIENCE YEAR BOOK.

The Science Year Book, with Astronomical, Physical, and Chemical Tables, Summary of Progress in Science, Directory, Biographies, and Diary for 1907. Edited by MAJOR B. F. S. BADEN-POWELL, F.R.A.S. London: King, Sell, and Odling. Pp. 364, &c. Price 5s. net.

The present issue is the third of this very useful annual, which can be cordially recommended to all scientific workers as a handy book of reference, and an excellent means of noting engagements and duties. In the account of progress in science during 1906, five pages are devoted to "Zoology," "Natural History," and "Botany." "Zoology" seems curiously restricted to works on the Mammalia. The biographical directory of scientific men is interesting, but there are still some very notable omissions—for example, A. Sedgwick and A. E. Shipley, of Cambridge, and E. P. Culverwell, of Dublin. The directory of scientific institutions also needs revision; the staff of the Geological Survey of Ireland appears as it was more than ten years ago.

AIDS TO NATURE STUDY.

Blackie's Nature Knowledge Diary. Compiled with Notes on Nature Study, by W. PERCIVAL WESTELL, F.R.H.S. Dublin and London: Blackie and Son, Ltd. Pp. 64.

This will prove a valuable help to teachers and scholars in observing nature out of doors. There is a weather chart, on which the barometric variations may be traced from day to day, a diary for notes on meteorology, ornithology, entomology, botany, the farm and the garden, and space at the end for a detailed index of entries to be arranged under the various subjects. To encourage index-making, even in the youngest book-writers, is praiseworthy. Mr. Westell's introductory notes are brief and good.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a St. Kilda Ram from Mr. M. Horan, two Green Monkeys and a Patas Monkey from Capt. R. N. Pike, four Guinea Pigs from Miss V. Davoren, a pair of Rabbits from Mr. A. Horne, a Fieldfare from Mr. W. J. Williams, four Muscovy Ducks from Mrs. Wright, a young Ostrich from Dr. W. H. Langley, three Canary Finches from Mr. J. Beers, and two Herring Gulls from Dr. H. E. Evans.

Among animals lately purchased for the Gardens are a Chimpanzee, a Mandrill, a Yellow Baboon, a White-nosed Monkey, a Squirrel Monkey, two Capuchins, a Geoffroy Marmoset, a Ruffed Lemur, three Ring-tailed Lemurs, two Brown Lemurs, a Black Lemur, a Tiger-cat, six Canadian Tree Porcupines, an Opossum, a Sea Eagle, a Brahminy Kite, a Kolbe's Vulture, an Angolan Vulture, four Cockateels, and ten Grass Parrakeets.

DUBLIN MICROSCOPICAL CLUB.

MARCH 13.—The Club met at Leinster House. Prof. G. H. CARPENTER (President), in the chair, exhibited the pupa of a species of fungus-midge (*Sciara*) whose larvæ feed commonly in rotten potatoes. He also exhibited the parasitic mite, *Chorioptes communis*, from cattle in Co. Dublin.

Dr. G. H. PETHYBRIDGE exhibited the parasitic fungus, *Pionnotes Beta*, which Mr. F. W. Moore found causing the destruction of growing swedes at the Albert Agricultural College, Glasnevin, last autumn, and which Mr. Masee, of Kew, identified. The fungus is recorded from France and Britain, growing on beet and mangel. Its occurrence in Ireland, and on swedes, is interesting. An account of the fungus is given in the *Kew Bulletin*, no. 3, 1906, p. 49.

F. W. MOORE showed sections through the seed of *Welwitschia mirabilis*, a rare plant growing in the arid upland plains of Damaraland, S. W. Africa. The seed has a peculiar calyptriform integument, and the suspensor is spirally coiled. The seed is winged.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 23.—Professor Gregg Wilson, M.R.I.A., in the chair. ANDREW DUNCAN, B.Sc., read a paper on the "Geological aspects of water supply." The paper was spoken on by Miss Ryan, Rev. J. Shiels, Prof. Wilson, R. Welch, W. J. C. Tomlinson, W. Gray, C. M. Cunningham, R. Bell, and W. H. Gallway.

FEBRUARY 13.—Robert Patterson, M.R.I.A., in the chair. HAMILTON M'CLEERY read a paper on "Bees; their structure and habits," illustrated by lantern slides. The Chairman, G. Donaldson, W. J. C. Tomlinson, and W. H. Gallway, criticised the papers.

FEBRUARY 19.—Nevin H. Foster, M.B.O.U., in the chair. CHARLES M. CUNNINGHAM read a paper on "Results of an investigation of the drift of the Irish Sea," illustrated by lantern slides. There was a second paper by E. T. MCKEAN, B.A., B.L., on "Who were the fairies?" The Chairman, Professor Wilson, Robert Patterson, Robert Welch, and Robert May spoke on the papers.

FEBRUARY 27.—H. L. Orr in the chair. WILLIAM GRAY, M.R.I.A., gave a practical demonstration on "Mounting microscopic objects."

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 9.—EXCURSION TO THE SCALP.—A small party of members and visitors left Harcourt-street station by the 1.30 train for Carrickmines. From Carrickmines the party, under the conductorship of Dr. G. H. Pethybridge, visited the Dingle, a glacial "dry gap," the topography of which was closely studied by those interested in geology. Ballycorus was the next point visited, and here fine specimens of galena were obtained in the old shaft of the lead works. From this the party struck across the fields to the Scalp, which was studied after the members had had tea. Return was made to Dublin by the 5.57. During the whole of the afternoon a steady drizzle fell, which was largely responsible for the smallness of the number of the party.

MARCH 12.—The fourth business meeting of the Session was held in the Royal Irish Academy House. The President (C. B. Moffat, M.A.) in the chair. R. M. BARRINGTON, LL.B., lectured on "Irish Birds," and gave an account of the methods by which he had been able to check the arrival of migrants by means of lighthouses and lightships around the coasts of Ireland. The lecturer then discussed the habits, etc., of a number of Irish birds, and showed a large series of lantern slides illustrating his remarks. The lecture was discussed by the Chairman and Rev. Allan Ellison, of Walton, Hertford, a former member of the Club.

Mr. H. W. D. Dunlop, B.A., C.E., was nominated for membership.

NOTES.

BOTANY.

Leaf-pitting in *Arum maculatum*.

Some four years ago attention was drawn in this Journal (*Ir. Nat.* xii., p. 78) to a curious form of leaf-pitting in the Common Arum observed at two stations in Co. Dublin, Kilbogget, near Ballybrack, and Newcastle, near Saggard. In the discussion which ensued no satisfactory hypothesis was suggested in explanation of this pitting or pseudo-blistering of the Arum leaf, but the negative result was arrived at that the pitting was not morbid, that is to say, was not due to insect or fungus infection. Dr. Pethybridge, in a very interesting contribution (*Ir. Nat.* xii., p. 145), pointed out that the spotting of the Arum leaf, observed with greater or less frequency in many parts of the British Isles, had been shown by the researches of Stahl in the Jena Botanical Garden to be permanent or hereditary, at least in this sense, that it was repeated in the same plant from year to year. Having grown in my garden for three years some plants of the Newcastle Arum referred to above, I find that the pitting no less than the spotting of the leaves is hereditary in the same sense. The plants when gathered at Newcastle in 1904 had leaves plentifully spotted and pitted, the pittings being on the upper surface of the leaves, with answering prominences on the back or lower surface. Next year's leaves of these plants were well above ground in the garden and partially unrolled by the 4th February, 1905. They were spotted and pitted precisely as in the previous year, the pits being recognizable quite as early as the spots. With the growth of the plants, both spots and pits became more pronounced, until finally the leaves assumed an appearance indistinguishable from that of the plants in their original hedgerow habitat. A similar development took place in the garden plants in the spring of 1906, and again for a third time in the spring of the present year, the pittings of 1907, like those of 1904, being accurately coincident with and strictly confined to the parts of the leaves marked by brown spots and blotches. So far none of the plants have flowered with me in cultivation, so that I have had no means of deciding whether the pitting is transmissible by seed.

N. COLGAN.

Sandycove.

I may add that for three years I have grown in my garden a spotted but unpitted plant, obtained by Dr. Pethybridge near Greenhills, Co. Dublin. It also has retained its character constantly.

R. LL. PRAEGER.

Dublin.

Polystichum aculeatum in Co. Dublin.

On the 25th March last I started on a walk with the object of making a search for *Polystichum aculeatum* in the part of the Co. Dublin lying west and south-west of Balbriggan. I had a remembrance of having seen, some 15 or 20 years ago, a number of plants of this fern growing by a road-side somewhere in the district between Balbriggan, Naul, and Skerries; but, although my memory was clear as to the identity of the species, I had only a very general and indefinite recollection of the locality of the place where I had seen it. I had failed in a previous search (in last September), but on this second excursion I was fortunate enough to find the plant. It grows, for a distance of about a quarter of a mile, or more, along both sides of the road south of Walshestown House, and in District I. of the Flora of Co. Dublin. I also found some plants on the road leading to Nevitt from The Five Roads, and I think it is probable that it occurs in other places on the hedge-banks of the fields and roads in the neighbourhood.

W. O'BRIEN.

Mr. O'Brien has kindly sent me a fine living specimen of this fern from the Walshestown locality, and has also shown me the MS. of the above note, which is of great interest, as being the first altogether satisfactory Dublin record for this rather critical species. Its title to a place in the Co. Dublin flora is now established beyond all doubt.

N. COLGAN.

ZOOLOGY.**The problems of an Island Fauna.**

As Mr. Moffat in his extremely interesting address on the above subject (*Irish Naturalist*, April, 1907), alludes to my work on kindred problems in such flattering terms, I may be permitted perhaps to offer a few remarks. In drawing attention to the former occurrence in Ireland of the Lemmings, which I considered to be of Asiatic origin, and to have entered Europe with the great Siberian invasion, Mr. Moffat justly criticises the arguments advanced by me in respect of the absence of the Eastern fauna from this island. I have rectified this error in a new work on European animals, which is now in the press. The Lemmings in Europe must have come from the North with the Arctic Fox and Hare, and have formed part of the Arctic invasion. They survived the entry of the Eastern group, and their remains are frequently intermingled on the Continent.

Mr. Moffat asks the pertinent question—Do island faunas tend to decrease? With the data available I think we are scarcely justified in assuming such a tendency. As regards Japan, its fauna as a whole is

greatly more varied than that of the British Islands, because it was connected with the Asiatic continent in recent geological times. That continent differed in Tertiary times from our own, in so far as it probably covered a larger area than it does now, while Europe was an archipelago of islands. An enormous and rapid development of the fauna took place in Asia. In Europe the weak island faunas after their junction were largely swept away by the incoming rush of the more highly specialized Asiatic types. There was practically no exodus from Europe to Asia. All our indigenous fauna could do was to struggle against the newcomers.

Mr. Moffat urges that the mere conversion of a piece of land into an island does increase, to every species inhabiting that land, the chance of becoming extinct. That seems to me a very sound argument, because, as he remarks, any local devastation may totally exterminate a species in an island, while on a continent the same species may re-enter the devastated ground from other parts. Yet, as a matter of fact, palæontology clearly indicates that species may perish on a continent just as much as on an island. I need only refer to the Irish Elk, the Mammoth, and such like forms which had a wide range within recent geological times and which have died out everywhere. Prof. Ray Lankester suggests, in his remarkable work on the "Kingdom of Man," that germ-carrying flies may have been the cause of the extinction of some of the larger mammalia, which have vanished from wide areas with such extraordinary rapidity. Various causes, no doubt, acted together in bringing about these changes in our fauna.

Mr. Moffat's keen power of observation is well exemplified by the facts he advances in favour of his supposition, that species may be limited in their range by diminished fertility towards its outermost parts. If this is a general law it ought to apply to Invertebrates as well as Vertebrates. It is certainly worth testing in different countries, for it might explain many anomalous features in the distribution of living organisms. And yet how are we to harmonize this view with the apparent fact that on an island the number of individuals in a given area is greater than on a continent? It has always struck me very forcibly when collecting Invertebrates abroad that, while I secured a great many species during a day's search, the number of individuals I noticed was small as compared with that on an island.

The perusal of Mr. Moffat's address has given me great pleasure. He has raised so many interesting points founded upon personal observation, he has opened such a wide field for further studies, that I trust the members of Naturalists' Field Clubs whom he specially appeals to, will aid him in the accumulation of additional knowledge. The acquisition of new knowledge will be an enjoyment to many, and a special help to those who regard the *Irish Naturalist* as one of the best means in spreading and advancing the study of Natural Science in Ireland.

R. F. SCHARFF.

Phascolion Strombi in Dublin Bay.

While examining the material of a dredging made in 10 fathoms off Bullock Harbour, Dublin Bay, in October last, I came across a dead and much-worn shell of *Strombus pes-pelecani*, the familiar Pelican's foot or Shoulder-of-Mutton shell, now generally known to conchologists as *Aporrhais pes-pelecani*, and was about to cast it aside as worthless when something peculiar in the aspect of the mouth arrested me. On closer scrutiny the mouth was found to be neatly sealed by a species of sandy concrete, smooth and hard, in the middle of which appeared a well-formed circular orifice, evidently a work of art. A hand-glass showed that the chamber into which this orifice led was not empty. Glimpses of a pale flesh-coloured body appeared within, so the shell was thrown into a bowl of sea-water to await developments, while I went on with the sifting of the dredging. On visiting the bowl a couple of hours later I found that the tenant of the shell was in a lively condition. A cylindrical flesh-coloured body, about $\frac{1}{8}$ -inch in diameter, filled up the circular orifice, and as this body was closely watched a smooth slender worm-like proboscis was seen to issue from its centre, pass out from the orifice, and rapidly lengthening go deftly twining and feeling round the body of the shell in a manner oddly expressive of intelligent seeking after information. The advance of this worm-like trunk was effected by a rapid process of eversion, and its retreat, when the animal was startled, by an inverse process of introversion, precisely similar in appearance to the operation by which a glove finger is turned inside out and then restored to its original position.

The animal lived with me for four days, and although I was at no time so fortunate as to witness an eversion of the trunk so complete as to exhibit the row of tentacles crowning its extremity, the identity of the creature with *Sipunculus bernhardus* of Forbes's History of the British Starfishes, *S. Strombi* of Montagu, was placed beyond doubt. On the morning of the fourth day of its captivity, the animal being apparently dead, I removed the shell from the water, wrapped it up in a strip of blotting-paper, and carried it in my pocket all day as I wished to show it to a friend interested in marine zoology. In the evening as an experiment I restored it to the bowl of sea-water, and was surprised to find the animal still living. It made a feeble attempt to evert its trunk, and when a portion of the hard concrete sealing of the mouth of the shell was removed so as to lay bare the broader basal part of the animal, this began to swell. Within a couple of hours it had assumed the shape and size of a small *Thyone papillosa* (a species of Sea-Cucumber), and its walls became so distended and translucent that the convolutions of the trunk coiled inside became clearly visible.

Irish records for this species are apparently very few. It was dredged by Dr. J. R. Kinahan in 1860, somewhere between Kingstown and Bray (*Report of Brit. Assoc.*, 1861), and by Mr. W. I. Beaumont on two occasions between 1895 and 1898, in Valencia Harbour, in from 3 to 7 fathoms, and outside of the harbour in Dingle Bay, in 45 fathoms (*Proc. R.I.A.*, 3rd

ser., v., p. 785). These are the only Irish records I can discover. Provisionally placed by Forbes amongst the Echinodermata, the animal has since been removed to the Annelida, where it now stands in the group Gephyrea, under the name *Phascolion Strombi* (Montagu).

N. COLGAN.

Sandycove.

Corophium grossipes in East Ireland.

A curious crustacean which I found on the Murrough of Wicklow, near Newcastle, in September last, has been identified for me by Mr. A. R. Nichols as belonging to this burrowing species. Specimens from two stations in West Ireland, Galway and Ballyshannon, are in the Dublin Natural History Museum, but there seems to be only one record for East Ireland, that given for Co. Dublin in Dr. J. R. Kinahan's Report of the Dublin Bay Dredging Committee of the British Association published in 1867. The precise locality is doubtful, but as the list includes some species collected at Baldoye, this crustacean was probably found there, where mud flats offer a congenial habitat. At Newcastle the species was abundant in very shallow salt pools with soft muddy bottom situated on the inner or landward side of the railway. The pools were not in permanent communication with the sea, though scarcely two feet above the level of ordinary high water, and were probably replenished only at spring tide. The enormously developed lower antennæ of the animal gave it an almost ludicrous top-heavy aspect as it issued from the soft mud and swam briskly to and fro close to its surface. In A. O. Walker's Revision of the Amphipoda of the Liverpool Marine District (*Trans. Liv. Biol. Soc.*, 1895), this species is recorded as occurring in immense numbers in mud banks of the Dee estuary, left bare by the tide, where hundreds of acres are closely perforated by its burrows.

N. COLGAN.

Sandycove.

Some Coleoptera from the North.

During the past two summers I collected a number of beetles at various places in the northern counties and now give a list of the more interesting species. I found the sandhills at Portrush and Buncrana very productive, but those at Portstewart did not repay the time spent on them, as I took very few species of any note.

At Portrush, Co. Antrim—**Dyschirius thoracicus*, **Harpalus tardus*, *Amara bifrons*, *A. tibialis*, **Helophorus nubilus*, *Aleochara obscurella*, **Homalota sordida*, *Xantholinus ochraceus*, **Othius lœvisculus*, *Oxytelus sculpturatus*, *Anisotoma dubia*, *Choleva grandicollis*, **Saprinus œneus*, *S. quadristriatus*, **Byrrhus fasciatus*, *Aphodius fœtens*, *A. scybalarius*, **Gastroidea polygoni*, *Sphæroderma cardui*, *Psyllodes affinis*, *Otiorrhynchus blandus*, *Philopodon geminatus*.

At Portstewart, Co. Derry.—*Amara tibialis*, **Phaedon armoracia*.

At Magilligan, Co. Derry.—*Elaphrus riparius*, **Mysia oblongoguttata*, *Rhopalomesites Tardyi*.

At Kilderry, Co. Donegal.—*Bradycellus distinctus*, **Bolitobius pygmaeus*, **Otiorrhynchus auropunctatus*, *Caliodes rubicundus*.

At Buncrana, Co. Donegal.—*Calathus melanocephalus*, *Tachypus flavipes*, *Deronectes xii.-pustulatus*, *Helophorus rugosus*, *Silpha atrata* var. *subrotundata*, *Aphodius merdarius*, **Tenebrio molitor*, *Philopedon geminatus*, *Sitones cambricus* var. *cinerascens*, *S. puncticollis*.

In addition to these, amongst some given to me by Mr. D. C. Campbell, were *Philonthus proximus*, *Elater pomorum*, and **Nacerdes melanura*. Mr. Campbell could not trace the place of capture of the first two, but the *Nacerdes* was taken in his office in Londonderry.

Those marked with an asterisk are new to their respective counties. I am indebted to Rev. W. F. Johnson and Mr. J. N. Halbert for kindly identifying a large number of my captures.

Saprinus quadristriatus has only been found as yet in county Antrim. Eight specimens were taken by me on the sandhills at Portrush. The other stations are Whitepark Bay and the mouth of the Bush River. *Tenebrio molitor* was taken on a piece of rotten drift wood on the beach at Buncrana. It is usually found in flour stores and mills, and has hitherto only occurred at Belfast and Dublin.

The very interesting weevil *Otiorrhynchus auropunctatus* was found whilst beating in the woods at Kilderry. The only other northern station is Culmore, where it was found by the late Mr. Buckle. I took a number of specimens of the large white form of *Philopedon geminatus* at Portrush and Buncrana. Some of them were exceptionally large and very white.

C. R. ALGEO.

Belfast.

A Gigantic Woodcock.

While shooting the covers at Clondeboye, Co. Down, on the 30th January last, a member of the party missed a long shot at a bird that the keeper did not recognise. On our walk homewards in the evening, the latter described it as being an enormous Woodcock, very black in colour. In the "Fur, Feather and Fin" series of monographs on game birds and beasts, Mr. L. H. de Vismes Shaw gives an account of various large Woodcock recorded, and proceeds to say that he is of opinion that a giant variety of this bird once existed, which was known to the rustics in the eastern counties of England as the "Double Woodcock" or "Muff-cock." Among other records he quotes Yarrell, who mentions a 'cock shot in 1801 weighing 27 ounces, the ordinary bird averaging about 11 or 12 ounces. ("Snipe and Woodcock." 1903, p. 128.)

On reading this, I wrote to my friend Mr. Arthur O. Fisher, then staying at Clondeboye, asking him to have another look for the bird, and he writes me as follows:—

“As you suggested, I looked for the giant Woodcock, and the second day after you were there one of the dogs put him out of a bush in the swamp. The under-keeper and I saw him in the open go right across the water. He was quite double the size of an ordinary Woodcock, and much darker in colour. In the distance he looked almost black. We marked him down in the thick cover on the opposite side. I lost no time, but had to go round, as we could not get across the swamp. We walked the cover carefully with three dogs, without any result. I felt sure we had walked over him, and so we went back, and up he got in front of the head-keeper, who was carrying a gun for this special occasion. In the thick cover, however, he said he couldn't get a shot, though he saw the bird for an instant. I saw him get up a long way to my right, and I foolishly fired a long shot, and after that we never saw him, though I hunted all Clandeboye for four days afterwards. I have seen him now three times, the head-keeper and the under-keeper twice each. They say he is a “Double Woodcock.” That he is a Woodcock I have no doubt at all, and he is abnormal both as to size and in the dark shades of his feathers.”

Mr. Fisher also described the bird to me as being “as big as a Brown Owl.” The keeper told me that when rising out of the cover the bird makes quite a different whirr to the common 'cock, and that the first time he heard it he thought it was a Pheasant.

Mr. J. Burke Murphy, Lady Dufferin's agent at Clandeboye, tells me he once heard of a huge 'cock being seen in the woods at Ards, near Dunfanaghy, Co. Donegal.

I have noted everything that I could find out about this mysterious giant, and hope that your readers may be able to add to the meagre total.

ALHC. WILSON.

Belvoir Park, Belfast.

[We never heard of a large race of Woodcock in these islands, and all the authorities we have consulted are silent on the subject. We therefore publish Mr. Wilson's communication without accepting responsibility, in the hope that other readers may be able to throw some light on what is now a mysterious occurrence.—EDS.]

Dotterels at Athlone.

Three specimens of the Dotterel were shot at Athlone on the 10th November; all were females, two showing the white band on the breast. Although a regular visitor to the south of England, this species is exceedingly rare in Ireland.

W. J. WILLIAMS.

Dame-street, Dublin,

Tufted Duck breeding on Lough Mask.

On September 16th last year, Mr. W. H. Good, of Westport, Co. Mayo, sent to the Dublin Museum for identification a young Tufted Duck (*Fuligula cristata*) that he had shot a few days before on Lough Mask, where 10 or 12 broods had been observed by him during the summer; he also sent an egg that he had taken there the previous July.

Mr. Ussher, in "Birds of Ireland" (1900), mentions the establishment and spread of the Tufted Duck as a breeding species in Ireland, as one of the most interesting of recent facts of Irish ornithology, and states that it was not then known to breed in the province of Connaught, west of the Shannon and Lough Arrow. In "Birds met with on Connaught Lakes" (*Irish Naturalist*, 1905) he remarks that the Tufted Duck had become so numerous on the Co. Sligo lakes in the breeding time that its presence at that season further west might be looked for; in the same year it was found breeding on Lough Conn (Warren in *I. N.*, 1905), and is now recorded as breeding in the following year on Lough Mask. Mr. J. A. Harvie-Brown, in "Fauna of the Tay Basin and Strathmore," just published, draws attention to the recent spread of the Tufted Duck in Scotland, and gives a map of the nesting-dispersal of this duck in that country.

A. R. NICHOLS.

Dublin Museum.

Birds seen off the S.W. Coast.

In the letter of Mr. Howard Saunders, from which I quoted in the April number of the *Irish Naturalist* (p. 163), there is an omission which I regret, as it does not give the systematic name now in use for the Great Shearwater. Mr. Howard Saunders wrote: "I have not the slightest doubt that the writer saw *P. major*, now *P. gravis*." The last three words were omitted in the printed copy by some misadventure.

I have since received or found further letters of Mr. Farran, containing a series of observations made on four cruises, usually 50 miles and upwards, off the Bull Rock or isles of Kerry. He noticed the following:—

Great Skuas.—May, 1906; August, 1906; February, 1907.

Pomatorhine Skuas.—May and November, 1906.

Buffon's Skuas.—August, 1906.

Great Shearwaters.—August, 1906 (numerous); November, 1906 (many).

Fulmars.—May, August, and November, 1906; February, 1907.

What a view this gives us of the little known bird population off the south-west extremity of Ireland!

R. J. USSHER.

Cappagh, Co. Waterford.

THE FLORA OF THE BARONY OF SHANID.

BY M. C. KNOWLES AND C. G. O'BRIEN.

THE barony of Shanid occupies the north-western angle of Co. Limerick, and is so called from Shanid Castle, a famous old stronghold standing on a hill behind Shanagolden, which dominates the scenery from one end of the barony to the other. This district, extending inland almost as far as Newcastle, and covering an area of $145\frac{1}{2}$ square miles, has the Shannon for its northern, and Co. Kerry for its western boundary. A line drawn from Morgans, opposite the Beeves lighthouse, touching the River Deal near Newbridge, through Lisnacailiagh, back over the hills near Glenastar, and including Rooskagh, a mountain of over 1,100 feet, and the highest point in the barony, describes the eastern boundary fairly accurately. The rocks are various beds of the Carboniferous series, and the features of the landscape, and of the vegetation follow very visibly the geological structure. The surface is divided between the undulating limestone tract in the east, with its close-growing flora (a fine grassy country, but ill-suited for timber), and the shales, grits, and Coal-measures rising into hills in the south and west, where the soil, often poor and boggy, and of less agricultural value, grows trees of noble form and stature. Except the Shannon, which is practically sea, there are no rivers of importance. The White River, which rises in Knockfinish, drains the northern tract of the barony before joining the Shannon at Loghill, and the River Galey, a tributary of the Feale, flowing west through the southern portion, are the only two that are more than streams. There are no lakes or ponds, and consequently the freshwater aquatic flora is poorly represented.

North-west Limerick has, perhaps, received more attention from botanists than any other part of the county, but, with the exception of Mr. Stewart, who was the first competent botanist to explore this region, they seem to have confined their investigations chiefly to the limestone crag-lands east of Foynes.

The botanical importance of the Shannon estuary, and the necessity for having its flora thoroughly investigated, are frequently referred to by Mr. A. G. More in letters to Mr. Stewart, and, it was by his advice that Mr. Stewart went there in 1886. In 1883 the former writes—"If you prefer to leave your own ground . . . I should say take either Belmullet and Erris . . . or the North of Limerick bordering on the Shannon and its coasts, together with the North bit of Kerry down to Tralee. Of this we know scarcely anything—I think I saw *Artemisia maritima* and *Althæa officinalis* near Foynes, from the railway carriage; and if you want a change to southern botany, Foynes is the place to start from." In 1884—"There are also the shores of the Shannon estuary below Limerick; and southern Clare (the Fergus River) requires to be overhauled." Later on in the same year "I hope you will arrange to go to Clare, and we left both sides of Shannon estuary open to you. It ought to be a good place." And just before Mr. Stewart set out:—"The Creek near Askeaton should be a good locality, I suppose, I do not think any qualified botanist has explored the south side of the Shannon estuary, and that ought to be the best ground for you to search. Don't forget the chance there is of *Cochlearia anglica*, *Statice Limonium*, and *Scirpus parvulus*."

The results of Mr. Stewart's explorations are to be found in a paper in the Proceedings of the Royal Irish Academy, 3rd series, Vol. 1, No. 3 (1890), in which he gives a list of 459 species of phanerogams. Only a small number of these are definitely mentioned as having been found in our district, but as he was able to give only a fortnight to the whole Shannon estuary from Loop Head round by the city of Limerick and along the south shore to Ballybunion, and, as the greater part of that time was given to Clare, this is not surprising. He verified Mr. More's locality for *Artemisia maritima*, but apparently did not find the *Althæa*. This plant does, however, occur in several places in the barony. Of the other plants mentioned by Mr. More as likely to be found, *Cochlearia anglica* grows plentifully along the Shannon, from one end of the barony to the other, though it is not mentioned in Mr. Stewart's list, and the var. *Hortii* is especially abundant along the muddy limestone shore.

There are only three of the plants recorded by Mr. Stewart from our district that we were not able to re-find. Two of these—*Castalia speciosa* and *Psamma arenaria*, are given from "several places between Askeaton and Foynes." We made a pretty exhaustive search for these without success. The *Castalia* may have occurred in some pond that is now filled up or drained, but there is no likely ground for the *Psamma*, which is essentially a grass of the sandy sea-coast. We have not met with it anywhere in the barony. The third is *Polystichum aculeatum*, "roadside, Foynes." We have not seen this fern anywhere, but *P. angulare*, not noted by Mr. Stewart, is common, especially off the limestone.

In 1899, Mr. Arthur Somerville spent some days at Foynes making a list of plants for Mr. Praeger's 'Irish Topographical Botany,' and in the same year Mr. Praeger himself, under the guidance of Mr. Donough O'Brien, made a hurried tour of the crags and skimmed the botanical cream off the Mullough district. The Limerick Field Club, too, have from time to time made incursions into the barony, and the plants found by them have been published in 'Irish Topographical Botany;' and lastly, Mr. R. A. Phillips has lately found *Rosa obtusifolia* var. *frondosa*, a rose new to Ireland, on the shales and grits west of Foynes, and several other plants which are given in the list of records below.

Much the most interesting feature of the barony of Shanid is the striking contrast between the flora of the limestone district and that of the shales and Coal-measures. Taking the limestone first. As we enter the barony by rail from Limerick, the river on the right spreads its mud through many winding creeks and hollows in the low-lying and uneven beds of the Carboniferous limestone. The borders of these creeks and the mud-flats along the shore from Aughinish to Foynes offer very interesting studies in plant associations. The slimy mud, covered at high tide, is studded with green seaweeds, *Salicornia*, Thrift, *Suaeda*, &c., and the Grass-wrack grows abundantly. Higher up on the shore, on the part between the marks of the spring and ordinary tides, *Glyceria maritima*, Sea Lavender, the Sea Aster, Sea Beet, Sand Spurry, *Matricaria inodora*, and *Artemisia maritima* flourish. Here, too, *Glyceria Foucaudii* grows, a grass new to Ireland discovered by us in June, 1903,

an account of which has already been published in the *Irish Naturalist*. It is confined to these tidal muds, and is particularly luxuriant along the Robertstown Creek, which is the creek referred to by Mr. More, and which has furnished many of the rarer plants on our list.

Last year, we added another rare grass to the flora of the South of Ireland from this part of the barony. On Trummera Big, one of the small islands off Aughinish, we found *Glyceria festucæformis*, growing also on the intertidal part of the beach. This discovery has also been already published in the *Irish Naturalist*.

In the meadows bordering these creeks, the Pyramidal Orchis, the Great Knapweed, the Yellow Goat's-beard, and the Blue Salsify are conspicuous plants. In the drains are Dropworts, the Narrow-leaved Water-Parsnip, the Bull-rush, *Carex riparia*, &c., and the ponds are choked with *Potamogeton pectinatus*, *Chara hispida*, and *Zannichellia*, &c.

As the land rises from the shore, the creeks and hollows become marshes floored with sticky marl, in which *Juncus maritimus*, *J. obtusiflorus*, *Cladium Mariscus*, *Phragmites communis*, *Carex acuta*, and *Schænus nigricans* are the characteristic plants, with Bog Thistle, Arrow-grass, *Pedicularis palustris* and *Carex extensa* as a thick undergrowth. In one of these marshes at Barrigone we found *Equisetum variegatum*. Further inland the land rises higher and forms the well-known crags of the Mullough district, drained by a small stream, known as the Ahacronane river, which, rising south of the Mullough mills, flows through a fertile hollow in the crag-lands to join the Shannon at Robertstown. The whole vegetation of these crags is stunted and close-growing. They are covered in many parts with scrub of Thorn, Holly, Sloe, Cherry, Crab-apple, Spindle-tree, Guelder Rose, Dogwood and Hazel, the last two growing to fair sized shrubs, in the lower damper ground through which the stream flows. The Burnet Rose, *Viola hirta*, *Rubia peregrina*, the Stone Bramble, the Lesser Burnet, Mullein, *Geranium columbinum*, *Euphrasia Salisburgensis* and *Orchis pyramidalis* are characteristic plants of the district. Of the rarer plants, the Juniper, found in only one spot, the Moonwort, *Spiranthes autumnalis*, Musk Mallow, Gromwell and Columbine are the most notable. At

Mullough mills, Goldilocks grows sparingly in a wood; by the edges of the stream *Thalictrum flavum* and *Lysimachia vulgaris*; and in the stream itself *Potamogeton densus*, *Elodea*, and *Chara contraria*. By the roadsides, the Dwarf Elder forms a handsome and conspicuous fringe in many places, and the Swine's Cress, *Pimpinella magna*, Poppies and Vervain are frequent.

On the crags at Barracks, the Fennel and the Wallflower are found; and the Common Mallow and occasionally Tree Mallow grow near cottages. We had hoped to find more of the characteristic Burren plants on this limestone tract, but, like all the botanists who have walked these crags, we were doomed to disappointment. Mr. Praeger, in his exploration in central Clare, found a full Burren flora as far south as Ennis. Of the sixteen plants on his list we have only five—viz., *Arabis hirsuta*, *Rubia peregrina*, *Euphrasia Salisburgensis*, *Juniperus nana* and *Ceterach officinarum*. Mr. Stewart's list has another, *Asperula cynanchica*, from Foynes. We gathered this plant also somewhere in the barony, but unfortunately we lost the locality, and have never been able to re-find it. A diligent search has failed to reveal any of the others, and we are inclined to agree with Mr. Stewart, who accounts for their absence on geological considerations. It will be seen from the geological map that the rock which forms Burren is the Upper Carboniferous limestone, a rock which weathers into tabular masses with deep clefts and fissures, in the sheltered recesses of which these plants flourish. This Upper Carboniferous limestone extends down through central Clare, forms the islands in the mouth of the Fergus, and enters the barony of Shanid at Dernish, three quarters of a mile east of Foynes railway station, where it passes under the shales and grits, which form the surface rocks of Foynes Island and the western portion of the barony. It was on the outcrop of this rock, which in its bedded structure and rich grasses most resembles Burren, on the road west of Shanagolden, that we had hoped to find some of the Burren plants, rather than on the Lower Limestone beds that form the crags. It is however, covered with a tough grey till, an ice deposit from the limestone area. This till abuts on the dark rocks of the hills

which pass out of the barony at Rooskagh, and stretch in an almost unbroken line from that mountain, through Ballylin and Knockpatrick, to terminate in the slaty cliffs that bound Foynes harbour and the last tongue of the sloblands on which the village stands. This north-eastern limestone district is the most accessible portion of the barony, which perhaps is the reason it has received most attention from botanists. In the south-east, in the neighbourhood of Cahirmoyle, the rock is also limestone, but it is covered with stiff clay. This is a country of large rich meadows, and the flora, though luxuriant, is not so varied as on the bare limestone of the crags. Orchids, the two Gentians (*G. Amarella* and *G. campestris*), *Chlora perfoliata*, Grass of Parnassus, and magnificent Ash trees are the most characteristic plants.

West of the harbour the whole aspect of the country and of the vegetation changes. The rocks are Millstone Grit and Carboniferous Shales, with Coal-measures in the south and west, and the level of the surface rises suddenly, and averages several hundred feet higher than the limestone. The slope is towards the north-west, and the surface falls gently from Knockpatrick and the line of hills towards the Kerry border, in a series of softly undulating uninteresting grassy moorlands, interspersed with occasional stretches of bog. The sloblands, which were the chief feature of the limestone shore, cease with these rocks, and the coast becomes steep and rocky. The stunted plantings of the crag-lands are replaced by the fine overhanging woods at Ballynacragga, Mount Trenchard, and those along the shore. The Ceterach is now confined to walls, and does not grow on the native rock as it did on the limestone; and the Dogwood, Hairy Violet, Burnet Rose, Bee Orchis, Mullein and other plants of the crags are nowhere to be met with. Instead, the woods are carpeted with *Luzula maxima*, Lady Ferns, Foxgloves, and Wild Hyacinths. Gorse, Ling, Heather, Bilberry, Bracken and *Carex binervis* are the most characteristic plants of the heaths, and in the bogs we find the Royal Fern, Hard Fern, *Viola palustris*, *Drosera anglica*, *D. rotundifolia*, *Juncus squarrosus*, *Carex limosa*, and others not seen anywhere on the limestone. Of the rarer plants, the woods at Mount Trenchard, especially in the more

western part where less planting has been done, have yielded *Carex strigosa*, *Veronica montana* and *Milium effusum*, all new to the county, and *Neottia Nidus-avis*, one of the finds of the Limerick Field Club, flourishes on the roots of Beech and Laurels. *Hieracium vulgatum*—the only *Hieracium* that we have found in the barony besides the ubiquitous *H. Pilosella*—was gathered at Mount Trenchard on the walls of the kitchen garden, and growing with it was *Linaria purpurea*, which has been known in this spot for the last forty years. *Asplenium marinum* was at one time abundant on the old sea-wall, but this was swept away in a storm some years ago, and since the new wall was built it has entirely disappeared. The only spot in which it is now known to occur in the whole county is a small dark cave on the shore below Ardanoir, where it grows with the beautiful *Asplenium Adiantum-nigrum* var. *acutum*. Where the White River joins the Shannon at Loghill the shore for some distance is low and swampy, and several of the salt marsh plants re-appear. Some of these, Glaux, Sea Aster, Sea Lavender, *Carex extensa*, &c., have travelled up the river-banks for some distance, and are found in the swampy saline meadows within reach of the tide, but gradually disappear as these pass into the inland non-saline meadows. About a mile up on the right bank there are the remains of an old mill, and in the meadows just below it *Mentha rotundifolia*, *M. piperita*, and *Tanacetum vulgare* have taken possession of the place, and are quite at home among *Pulicaria dysenterica*, *Juncus acutiflorus*, and huge tussocks of *Carex paniculata*.

The banks of this river have also yielded several rare roses—*Rosa hibernica* var. *glabra*, *Rosa involuta* and *Rosa obtusifolia* var. *frondosa*.

Another rose of interest—*Rosa stylosa*, var. *systyla*—was collected in this western part of the barony. From Loghill to Tarbet the shore is mostly low and shingly, and bordered with occasional stretches of scrub composed chiefly of Hazel, Sloe, Rowan, Holly, and Spindle-tree. On the edges of one of these, near Clare View, we gathered some fine specimens of *Rosa stylosa*, var. *systyla*, growing in absolutely native surroundings. We have it also from two other places along the shore, and

from two inland stations on the hills at the back of Ardanoir. In all of these it looks as native as the plants amongst which it is growing. Mr. Phillips has collected it at another spot in the barony. The only previously known localities for this rose, in Ireland, are in the neighbourhood of Cork. The record in the "Flora of Cork" is "Hedges at Evergreen, Mr. J. Drummond; Many places about Cork, rather common." In "Cybele Hibernica," Ed. I., there is the additional record "On rocks at Myrtle Hill, near Cork! perhaps planted, I. C." "Cybele" 2nd Edition says of these localities "No doubt planted," "Perhaps semi-naturalized about Cork." It is difficult to see why this rose should have been planted. To the uninitiated it looks just like any other ordinary Dog Rose; there is nothing remarkable about the flower, and it has nothing exceptional in the way of perfume or anything else to recommend it to gardeners. Whether it is native in the barony of Shanid we cannot say, but it has all the appearance of a native plant; and but for the remarks in "Cybele" 2nd Ed. we would never have thought of questioning the matter. It may be that it is a not uncommon species, which from its general resemblance to *Rosa arvensis* has been overlooked hitherto. It is worth noting that while *Rosa arvensis* is most abundant on the limestone, all the localities for *Rosa stylosa* are on the shales and grits. At Tarbet, the limit of our boundary, there is a stretch of somewhat sandy shore running out into a point. On this, the nearest point to the sea, we looked for some of the more essentially maritime plants. Of these, *Carex arenaria*, *Psamma arenaria*, *Triticum junceum*, and *Cakile maritima* are the only four of the universal seaside plants that we have not found at some point along the shore.

We have not been able to give the inland country an exhaustive search, and much of it is still unexplored. Though the district is a populous one, there are few villages, and no accommodation to be had in those there are. Even at Athea we could not get a bed. All our excursions, therefore, were made from Foynes or from Cahirmoyle, and this necessitated such long days and so much driving that we could do little more than take a general survey. The natural division of the

country is into the valley of the Galey in the south, where the rocks are Coal-measures, and the valley of the White River, which flows through the shales and grits, in the north. A good deal of it is under grass, but the high ground which forms the watershed is chiefly bog, only remarkable for the plants we did not find on it. We did not see either *Drosera intermedia* or *Rynchospora fusca*. The chief species noted were *Drosera anglica*, *D. rotundifolia*, *Juncus squarrosus*, *Scirpus cæspitosus*, *Narthecium Ossifragum*, *Erica Tetralix*, *E. cinerea*, *Calluna vulgaris*, *Carex limosa*, *Myosotis repens*, and *Lycopodium Selago*. Most of the rare plants of the valley of the White River have been mentioned already. For a great part of its course, as far as and beyond Ballyhahill, the banks are steep and covered with a natural and almost impenetrable wood. Near Ballyhahill, in a grove of Sallies, the Elecampane grows luxuriantly. Except along the rivers the county is a bleak and treeless waste.

Several interesting plants grow on the banks of the Galey. *Euphorbia hiberna* is everywhere along its course. At Athea the meadows on either side of the river were covered with it, and we traced it almost to the source on the side of Rooskagh.

Agrimonia odorata and *Rubus argentatus* are two other plants from its banks. *Ulex Gallii*, a few bushes of which we noted on the side of the mountain, is a welcome addition to the flora of the county. Rooskagh itself (1,132 feet) was a great disappointment; we spent a whole wet day on its summit hunting for *Empetrum nigrum* and other mountain plants without success, nor did we find any plant of interest to reward us.

But a little to the north of Rooskagh is the Glenastar waterfall, and here, in July, 1905, Mr. Aubrey Gwynn found a very interesting plant—*Epilobium angustifolium*. We visited the spot in August last, when the plant was in flower. It grows in considerable quantity on the northern side of the stream, but only, so far as we could see, in the neighbourhood of the waterfall, and, indeed, this is the only suitable ground for it. Above the fall the stream flows through flat bogland, and we did not look for it there, but we searched the lower part of the stream, and did not find it. There is no reason to

suppose the plant is other than native in this locality; the habitat is a natural one, moist, sheltered, and steep—so steep as to be almost inaccessible, and there are no gardens near, nor is it a plant that we have seen in any of the gardens in the neighbourhood.

Mr. Praeger, in the introduction to "Irish Topographical Botany," gives the total number of species of Limerick plants as 623, and says there is no part of the county that will not repay further work. The fact that we have been able to add over 60 species to the flora of the county from the barony of Shanid, and these, too, chiefly from the northern and more explored portion of it, fully bears out this statement. Altogether the number of species we have noted in the barony is 637.

Before closing we would like to render our best thanks to all those specialists who have helped us in the identification of critical species—Mr. Rogers, Mr. Marshall, Mr. E. F. Linton, Mr. Beeby, Mr. Pugsley, Mr. Bennett, and Mr. Praeger. The Eyebrights were named by the late Mr. F. Townsend. We would like to express the deep obligation we are under to Mr. Donough O'Brien, who at all times put himself and his horse and trap at our disposal, and assisted us in our explorations, and to Mrs. Dermod O'Brien, of Cahirmoyle, for hospitality. And last, but not least, we must acknowledge the help we had from Master Denis Gwynn in collecting specimens.

A list of additional county records obtained by us from the barony of Shanid is given below, also lists of the plants not noted from the barony previously and of those genera the distribution of which has not yet been thoroughly worked out.

ADDITIONAL COUNTY RECORDS FROM SHANID BARONY.

Ranunculus Drouetii.	*Erysimum cheiranthoides.
R. peltatus.	Cochlearia danica.
R. Baudotii.	*Lepidium Draba.
R. Auricomus.	Viola palustris.
†Papaver Argemone.	V. silvestris.
Fumaria capreolata.	V. canina.

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|---------------------------------|------------------------|
| Polygala oxyptera. | Lycium barbarum. |
| Sagina maritima. | Veronica hederæfolia. |
| Montia fontana. | V. montana. |
| ‡Althæa officinalis. | *Orobanche minor. |
| Linum angustifolium. | ‡Mentha rotundifolia. |
| Ulex Gallii. | Marrubium vulgare |
| Trifolium medium. | Stachys arvensis. |
| Rubus infestus. | Galeopsis versicolor. |
| R. curvidens. | Lamium amplexicaule. |
| R. mutabilis. | L. hybridum. |
| R. Marshallii, var. semiglaber. | *Plantago media. |
| Rosa involuta. | Juniperus nana. |
| R. hibernica. | Scirpus fluitans. |
| R. glauca. | Carex strigosa. |
| R. stylosa. | C. Hornschuchiana. |
| Callitriche stagnalis. | Milium effusum. |
| C. obtusangula. | Glyceria plicata. |
| Peplis Portula. | Atropis festucæformis. |
| Epilobium angustifolium. | Atropis Foucaudi. |
| Galium erectum. | Agropyron pungens. |
| *Inula Helenium. | A. acutum. |
| Hieracium vulgatum. | Asplenium marinum. |
| *Tragopogon porrifolium. | Equisetum variegatum. |
| Myosotis repens. | Chara contraria. |
| M. collina. | |

ANNOTATED LIST OF RARER PLANTS.

- ***Clematis Vitalba**, Linn.—Woods west of Foynes; Cahirmoyle. Self-sown.
- Thalictrum flavum**, Linn.—Stream at Ballyclough; Mullough Mills.
- Ranunculus elrcinatus**, Sibth.—Quarry east of Foynes; River Deal near Newbridge.
- R. trichophyllus**, Chaix.—Pond by the railway at Foynes.
- R. pseudo-fluitans**, "Bab."—River Deal near Newbridge.
- R. Drouetii**, Godr.—Swamp at Barrigone.
- R. peltatus**, Schrank.—Aughinish.
- R. Baudotii**, Godr.—Pond by the railway near Foynes.
- R. Auricomus**, Linn.—Wood at Mullough; Foynes; Glenastar.
- ‡**Aquilegia vulgaris**, Linn.—About a dozen plants growing on the limestone crags by the railway about a mile east of Foynes.—R. D. O'Brien.
- ***Papaver somniferum**, Linn.—Wheat field at Barrigone; Robertstown.
- P. Rhæas**, Linn.—Robertstown; gravel pit at Kilbradran.

- P. dubium**, Linn.—Robertstown; Kilbradran.
- †**P. Argemone**, Linn.—Robertstown.
- †**P. hybridum**, Linn.—Railway near Barrigone—Miss Briscoe.
- ***Meconopsis cambrica**, Vig.—Shore below Ardanoir, spreading.
- ***Cheildonium majus**, Linn.—Entrance to Glenastar: Foynes village.
- Fumaria confusa**, Jord.—Gravel pit near Foynes; Cahirmoyle.
- F. pallidiflora**, Jord.—Garden at Ardanoir; Foynes.
- F. officinalis**, Linn.—Foynes; Cahirmoyle.
- ***Chelranthus Chelri**, Linn.—Crags at Barracks.
- Cochlearia danica**, Linn.—Pier near Rock Lodge, Glin.
- C. anglica**, Linn.—Aughinish; Foynes Island. Var. **Hortii**—frequent along the shore.
- Sisymbrium Thallanum**, Gay.—Corgrigg; on boulders at Tiernore near Shanagolden.
- ***Erysimum cheiranthoides**, Linn.—Cultivated fields near Ardagh.
- †**Brassica Rapa**, L., var. **Briggsii**, H. C. Wats.—Limestone crags near Shanagolden; quarry near Foynes.
- Brassica nigra**, Koch.—Fields near Loughill—R. A. Phillips.
- B. alba**, Boiss.—Field at Barracks, near Foynes.
- ***Lepidium Draba**, Linn.—Plentiful by the railway near Ardagh; and at Elmhill.
- Raphanus Raphanistrum**, Linn.—Cultivated field near Ardagh.
- Viola palustris**, Linn.—Common in bogs and in damp ground off the limestone.
- V. odorata**, Linn.—Near Mullough.
- V. hirta**, var. **glabrata**, Beeby.—Aughinish.
- V. silvestris**, Reich.—Boniska; Ballynacragga woods, frequent.
- V. silvestris** × **Rivinalana**.—Woods near Ardanoir; hills at the back of Mount Trenchard.
- V. Rivinalana** × **ericetorum**.—Near Glin.
- V. ericetorum**, Schmidt.—Edge of a swamp at Ballyclough: Ardanoir.
- V. arvensis**, Murr.—Old Abbey; Aughinish.
- Polygala oxyptera**, Reichb.—Dernish
- P. serpyllacea**, Weihe.—Hills behind Ardanoir.
- ***Saponaria officinalis**, Linn.—Roadside at Loughill.
- †**Lycchnis Githago**, Scop.—Wheat fields at Barrigone.
- Cerastium tetrandrum**, Curtis.—Railway at Foynes; Dernish.
- Sagina maritima**, Don.—Sea wall at Mount Trenchard; Glin.
- Spergularia rupestris**, Lebel.—Shore at Loughill.
- Montia fontana**, Linn.—Common off the limestone.
- Hypericum humifusum**, Linn.—River-bed at Athea; banks of White River; Ardanoir.
- †**Althæa officinalis**, Linn.—Lehies, Dernish.
- ***Lavatera arborea**, Linn.—Aughinish, by cottages; near Barrigone.
- Malva moschata**, Linn.—Old Abbey; Mullough, frequent.
- Linum angustifolium**, Huds.—Shore between Mount Trenchard and Loughill.

- Ulex Gallii**, Planch.—Heathy ground by the banks of the Galey below Rooskagh.
- Cytisus scoparius**, Link.—Very rare in the barony—a few plants at Loughill and also at Glenastar.
- Trifolium medlum**, Linn.—Cahirmoyle.
- Viola angustifolia**, Linn.—Very common by the shore, the railway, and roadsides, both on and off the limestone.
- ***Prunus Insititia**, L.—Banks of the Deal River near Newbridge.
- P. Avium**, Linn.—Cahirmoyle; woods at Glenastar, and on the crags at Mullough.
- †**P. Cerasus**, Linn.—Ballynakill; Foynes
- ***P. Padus**, Linn.—Growing with Dogwood in an orchard near Morgans. Planted?
- Rubus pilcatus**, W. & N.—River Deal at Newbridge; west side of the hill over Pat Daley's Cross near Cahirmoyle.
- R. rhamnifolius**, W. & N.—Shore below Ardanoir.
- R. pulcherrimus**, Neum.—Shore at Ardanoir—R. A. Phillips; near Pat Daley's Cross near Cahirmoyle.
- R. Selmeri**, Lindeb.—Loughill, and on the hills west of Foynes.
- R. argentatus**, Muell.—Banks of the Galey below Rooskagh; Pat Daley's Cross near Cahirmoyle.
- R. silvaticus**, W. & N.—White River at Loughill—R. A. Phillips.
- R. curvidens**, A. Ley.—Shore west of the harbour at Foynes. "A form one step nearer to typical *anglosaxonicus* in the nearly glabrous stem and shape of leaflets"—W. M. R.
- R. radula**, Weihe.—"Near type"—W. M. R. Shore west of the harbour at Foynes.
- R. Infestus**, Weihe.—White River at Loughill.
- R. mutabilis**, Genev.—Behind Ardanoir.
- R. rosaceus**, var. **hystrix** (W. & N.).—Wood at Ardanoir.
- R. Marshalli**, Focke & Rogers, var. **semiglaber**.—Hill behind Ardanoir. "I can see no difference between this and my Carnarvonshire *semiglaber*."—W. M. R.
- R. dumetorum**, W. & N.—Foynes.
- R. corylifolius**, Sm.—Banks of the Deal River near Newbridge. Var. **cyclophyllus**, Lindeb.—Shore below Ardanoir.
- R. cæslus**, Linn.—Foynes; Cahirmoyle.
- Potentilla procumbens**, Sibth.—Roadsides at Foynes.
- Alchemilla vulgaris**, var. **alpestris**, Schmidt.—Ardanoir.
- A. vulgaris**, var. **filicaulis**, Buser.—Dysert Castle.
- Agrimonia odorata**, Mill.—Glenastar; banks of the Galey.
- Rosa involuta**, Sm.—Right bank of the White River near Loughill.
- R. hibernica**, Sm., var. **glabra**, Baker.—White River near Loughill (see *Irish Naturalist*, October, 1903).
- R. tomentosa**, Sm., var. **subglobosa** (Sm.).—White River near Loughill; River Galey below Rooskagh.

- R. rubiginosa**, Linn.—Craggs at Ballyclough ; Foynes.
- R. obtusifolia**, Desv., var. **frondosa**, Baker.—New to Ireland, and first found by Mr. R. A. Phillips at Loghill, 1905 ; frequent in the barony both on and off the limestone.
- R. canina**, Linn.—The following varieties were gathered :—
- R. lutetiana** (Leman).—Shore at Ardanoir ; and the form **andegavensis** (Bast) at Clareview, near Tarbet.
- R. sphærica** (Gren.).—Mount Trenchard.
- R. dumalis** (Bechst.).—Seems to be the common variety, and is found both on and off the limestone.
- R. urbica** (Leman).—Frequent.
- R. arvatca**, Baker.—Frequent.
- R. glauca**, Vill, var. **subcristata**.—Near Ardagh, Shanagolden, and the shore near Foynes. The only other Irish records for this rose are from the north of Ireland.
- R. stylosa**, var. **systyla** (Bast).—Shore at Clareview ; shore below Ardanoir ; edge of wood near Foynes ; two places on the hills behind Ardanoir—R. A. Phillips.
- Drosera anglica**, Huds.—Mountain bog on Knockfinish.
- Miriophyllum spicatum**, Linn.—Barrigone swamp.
- M. alterniflorum**, DC.—White River, and in stream at Mullough.
- Callitriche stagnalls**, Scop.—Ballyhahill ; Deal at Newbridge.
- C. hamulata**, Kuetz.—Deal River at Newbridge.
- C. obtusangula**, Le Gall.—Stream at Ballyclough.
- Peplis Portula**, Linn.—Foynes Reservoir.
- Epilobium angustifolium**, Linn.—In quantity on the north face of the waterfall at Glenastar—Aubrey Gwynn.
- Slum erectum**, Huds.—Robertstown.
- †**Gallum Mollugo**, var. **insubricum** (Gaud.).—Roadside near Ardagh.
- ‡**G. erectum**, Huds.—Field at Ardanoir.
- ‡**Valerianella dentata**, Poll.—Railway near Foynes, frequent.
- ***Inula Helenum**, Linn.—At Ballyhahill, growing among willows by the side of the river ; also near Cahirmoyle.
- Bidens cernua**, Linn.—Mullough.
- B. tripartita**, Linn.—Barracks ; Newbridge.
- ***Mariana lactea**, Hill.—In great abundance at Shanid Castle.
- ***Cichorium Intybus**, Linn.—Several places near Ardagh.
- ***Crepis blennis**, Linn.—Roadside and fields west of Foynes.
- C. paludosa**, Moench.—Banks of the White River ; banks of the Galey ; Glenastar.
- Hieracium vulgatum**, Fr.—Kitchen garden walls, Mount Trenchard.
- ***Tragopogon porrifolium**, Linn.—Meadows at Robertstown Creek ; railway banks, hay field at Ardanoir, and in several other places about Foynes.

- Lysimachia vulgaris**, Linn.—Mullough; Ballyclough.
- Myosotis repens**, Don.—Near the White River; Knockfinish; frequent near Foynes Reservoir.
- M. collina**, Hoff.—On limestone crags near Old Abbey; walls at Cahirmoyle.
- Solanum Dulcamara**, Linn.—Deal River near Newbridge.
- ***Lycium barbarum**, Linn.—Roadsides near Newbridge; cottages about Foynes.
- Veronica hederæfolia**, Linn.—Common.
- V. montana**, L.—Woods at Ballynacragga; Mount Trenchard.
- ***V. Teucrium**, L.—A field near Knockpatrick is overrun with this plant, growing with *Polygonum Convolvulus*. Possibly the site of an old garden.
- Euphrasia Rostkoviana**, Hayne.—White River at Loughill.
- E. brevipila**, B. & Gr.—Foynes Island; Barracks; Cahirmoyle.
- E. Sallsburgensis**, Funk.—Abundant on the crags at Mullough.
- Orobanche minor**, Sm.—Roadside near Foynes.
- ***Utricularia minor**, Linn.—Bog south-west of Foynes.
- ‡**Verbena officinalis**, Linn.—Frequent by roadsides on the limestone.
- ‡**Mentha rotundifolia**, Huds.—Meadow by the White River near Loughill.
- ‡**M. piperita**, Linn.—Meadow by the White River near Loughill.
- M. sativa**, Linn.—Foynes; Ardagh.
- Calamintha officinalis**, Moench.—Corgrigg; limestone cliffs near the quarry at Foynes.
- ***Marrubium vulgare**, Linn.—Roadside near Barrigone; rough ground near road at Mullough.
- Stachys arvensis**, Linn.—An abundant weed in the garden at Ardanoir; Ardagh.
- Galeopsis versicolor**, Curt.—Potato field at Foynes; Cahirmoyle.
- Lamium amplexicaule**, Linn.—In cultivated fields at Ardagh.
- L. hybridum**, Vill.—Cultivated fields near Cahirmoyle.
- ‡**Ballota nigra**, Linn.—Near Morgans.
- ***Plantago media**, Linn.—Grass field at Cahirmoyle.
- ***Chenopodium Bonus-Henricus**, Linn.—Near Old Abbey.
- Euphorbia hiberna**, Linn.—Abundant on the banks of the Gale.
- Ulmus montana**, With.—Banks of the White River.
- ***Humulus Lupulus**, Linn.—Near Cahirmoyle; Robertstown.
- Betula verrucosa**, Ehrh.—White River near Ballyhahill.
- Salix pentandra**, Linn.—Several large bushes near Cahirmoyle.
- S. fragilis** × **alba** (= *S. viridis*, Fr.)—River Deal near Newbridge.
- S. aurita** × **cinerea** (= *S. lutescens*, A. Kern.)—Mullough; shore at Ardanoir.
- S. repens**, Linn.—Rock Hall; hills behind Ardanoir.
- S. viminalis** × **capreæ** (= *S. Smithiana*, Willd.)—White River.

- †**S. purpurea**, Linn.—River Deal.
- Juniperus nana**, Willd.—On craggy ground near Barrigone.
- Spiranthes autumnalis**, Rich.—On the crags at Mullough Mills—Mrs. Dermod O'Brien.
- Ophrys apifera**, Huds.—Several places by the railway near Robertstown.
- Habenaria chloroleuca**, Ridley.—Common.
- ***Iris foetidissima**, Linn.—Foynes Island.
- Allium vineale**, Linn.—Railway near Barrigone.
- A. ursinum**, Linn.—Woods along the shore.
- Potamogeton polygonifolius**, Pour.—White River; rare.
- P. lucens**, Linn. (shading off into *P. Zizii*).—River Deal at Newbridge.
- P. densus**, Linn.—Ahaslough River; stream near Ballyclough House.
- P. pectinatus**, Linn.—Pond by the railway at Foynes.
- Zostera marina**, var. **angustifolia**, Fr.—Robertstown Creek.
- Scirpus fluitans**, Linn.—Frequent off the limestone.
- S. sylvaticus**, Linn.—River Deal at Newbridge.
- Cladium Mariscus**, R. Br.—Abundant in swamps at Barrigone and at Ballyclough.
- Carex divulsa**, Good.—In the woods below Ardanoir; Mount Trenchard; Clareview; Ballynacragga; White River; frequent.
- C. Hudsoni**, Ar. Benn.—Swamp at Barrigone.
- C. ilmosa**, Linn.—Wet bog on Knockinish.
- C. strigosa**, Huds.—Woods at Shanagolden; Ballynacragga; Boniska; Mount Trenchard.
- C. Hornschuchiana**, Bab.—Hill behind Ardanoir.
- C. xanthocarpa**, Dyl. (= *C. flava* × *Hornschuchiana*).—Foynes; Ahaslough River.
- C. acutiformis**, Ehrh.—Swamp at Ballyclough; Ahaslough River.
- C. riparia**, Curtis.—Rock Lodge.
- ***Phalaris canariensis**, Linn.—Roadside at Foynes; shore at Mount Trenchard Point, not uncommon.
- Millium effusum**, Linn.—Woods at Mount Trenchard, and near Tarbet with *Melica uniflora*.
- Catabrosa aquatica**, Beauv.—Quarry east of Foynes, and at Cahirmoyle.
- Glyceria plicata**, Fr.—Robertstown; quarry near Foynes; Ballyclough.
- Atropis festucæformis**, Heynh.—Rocky beach of Trummera Big, a small island off Aughinish.
- A. Foucaudi**, Hackl.—Robertstown Creek and Aughinish.
- Bromus sterilis**, Linn.—Common by roadsides about Foynes
- B. commutatus**, Schrad.—Foynes.
- Agropyron caninum**, Beauv.—Poultallin Point, Foynes
- A. pungens**, R. & Sch.—Shore at Foynes and at Robertstown.

- A. acutum**, R. & Sch.—Foynes Island.
Lepturus filliformis, Trin.—Robertstown. Var. **Incurvatus** (Trin.)—Foynes.
Hordeum secalinum, Schreb.—Roadsides near Foynes—Denis Gwynn.
Asplenium Adiantum-nigrum, var. **acutum**, Poll.—Cave on the shore below Ardanoir, Foynes.
A. maritimum, Linn.—Cave on shore below Ardanoir, Foynes.
Lastræa æmula, Brackenridge.—Glenastar; Mount Trenchard woods.
Osmunda regalis, Linn.—Bogs S.W. of Foynes; shore at Rock Lodge, frequent.
Botrychium Lunaria, Sw.—Craggs at Mullough.
Lycopodium Selago, Linn.—Bog at Knockfinish; high ground by the river at Athea.
Equisetum variegatum, Sch.—Marsh near Barrigone.
Chara aspera, Willd., var. **capitata**, Braun.
C. contraria, Kuetz.—Mullough stream.

Dublin Museum.

NOTES ON COLEOPTERA COLLECTED DURING 1906.

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

IN the early part of the year I worked moss, and among my captures by this means is a beetle which is new to the Irish List, viz. :—*Bathyscia Wollastoni*, Jans. I took this species in a bag of moss from Dromantine, Co. Down, on the borders of Mr. Innes-Cross's demesne. The locality is very similar to that in which the discoverer of this species, Mr. E. W. Jansen, found it.¹ In the same locality I also took *Tachyusa atra* Grav., *Quedius boops*, Grav., *Stilicus rufipes*, Germ., *Stenus bimaculatus*, Gyll., *Longitarsus ater*, F., and *Liosoma ovatum*, Clairv., of which I took quite a number by sweeping in the same place in the summer.

In several bags of moss from the neighbourhood of Poyntzpass I took a number of beetles, the most remarkable of which

¹ *Entomologists' Annual*, 1857, p. 72.

were *Gymnusa brevicollis*, Payk., and *Longitarsus holsaticus*, L. I took these two species in moss from the side of the road from Poyntzpass to Markethill, on high ground, and by no means marshy, quite different from the places in which I took these beetles at Armagh, which were low and marshy. Besides these species I took *Homalota fungi*, var. *clientula*, Er., *Pselaphus Heisei*, Herbst., *Tychus niger*, Payk., *Bythinus puncticollis*, Denny., *Ptenidium nitidum*, Heer, and *Ephistemus globosus*, Waltl.

Under stones, on which a haystack had been built, were a number of *Oligota inflata*, Maun., and *Ephistemus gyrimoides*; they were taken in March, just after the hay had been removed.

I got two bags of moss sent to me from Edentubber, Co. Louth—a place at a considerable elevation on the mountain mass which culminates in Carlingford Mountain. It was rather late for moss, being in the beginning of April; however, there were plenty of beetles, the most noteworthy being *Stomis pumicatus*, Panz., *Amara lunicollis*, Schiod., *Homalota villosula*, Kr., *H. longicornis*, Grav., *Megacronus analis*, F., *Quedius rufipes*, Grav., *Cænopsis Waltoni*, Schön., *Barynotus Schonherri*, Zett., *Ceuthorrhynchus quadridens*, Panz., and *Phytobius quadrituberculatus*, F.

In the latter part of April I had a day's hunting on the beach at Greenore, but the results were rather disappointing, as beetles were by no means numerous; the only captures worth recording are *Cafius sericeus*, Holme, *Stilicus orbiculatus*, Er., and *Saprinus maritimus*, Steph. I was greatly amused by the attitude assumed by a couple of *Brosicus cephalotes*, L., which I came upon in turning over lumps of seaweed. They raised themselves up on their hinder pairs of legs, stretched out their front legs stiffly, and opened their jaws to their fullest extent. I presume this attitude was adopted to terrify me, and it might be successful with a person unacquainted with their inability to inflict any injury. The two beetles remained for several minutes in this attitude, in fact all the time that I was examining the seaweed where they were, for I did not disturb them, being curious to see how long they would keep up the position.

At Tanderagee, in June, I took several *Bembidium tibiale*, Duft., on the banks of the Cusher, and, by sweeping, *Phyllobius calcaratus*, F.

In the same month I took by sweeping in the evening on the bank of the canal, near Poyntzpass, *Pelophila borealis*, Payk., a single specimen, which must have run up the herbage; *Donacia sagittariæ*, F., and *Telmatophilus caricis*, Ol. A few days later I took a couple of *Blethisa multipunctata*, L., on the shore of Lough Shark in Co. Down, and along with it *Philonthus dimidiatus*, Steph.

At the end of July I spent a day at Newcastle, Co. Down, and hunted over the sandhills. I did not get very many beetles, and was disappointed at not meeting with *Dyschirius* or *Bledius*, most probably because I did not hit on their particular habitat. *Chysomela hyperici*, Forst., was plentiful on *Hypericum*, and I got a number of larvæ of *Cionus hortularius*, Marsh., on *Scropularia nodosa*, from which I successfully reared a number of the beetles. Besides, I need only mention *Otiorrhynchus muscorum*, Bris., and the large white variety of *Philopodon geminatus*, F.; this is, as far as I know, the most southerly locality yet recorded for this form.

On August 8th I captured a single specimen of *Antherophagus nigricornis*, F., in my garden. As I previously met with *A. pallens*, Gyll.,¹ in a field not a hundred yards from where I captured this beetle, it seems probable that further search among nests of *Bombus* might very likely produce a number of both species. On the same date I took *Pterostichus vernalis*, Gyll., in one of my fields.

On the whole, I did not find 1906 a good year for beetles, though this may have been my fault rather than that of the beetles, for I was very unfortunate in my distant expeditions. I went all the way to Lough Neagh at Ardmore to get *Bembidium argenteolum*, and not only did I not find a single specimen of it, but hardly a beetle at all.

Poyntzpass, Feb. 12, 1907.

¹ *Irish Naturalist*, xii., p. 109.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a number of freshwater Crayfish from Dr. H. C. Drury, six Rudd from Mr. F. Godden, three Lizards from Mr. Stone, a pair of Rheas from the Duke of Bedford, a Barn-Owl from Dr. M'Kenna, a green Parrakeet from Mr. A. M'Cormack, two Goldfinches and six Redpolls from Mr. W. W. Despard, a pair of Godwits from Mr. H. B. Rathborne, a Hedgehog from Mr. F. Godden, and a Rhesus Monkey from Mr. C. O'Neil Carden. A Canadian Porcupine has been born in the gardens, an occurrence of unusual interest. A yellow Baboon, a Mona Monkey, a Marmoset, a pair of Mongooses, a Llama, a Hairy Armadillo and a large number of birds have been purchased.

DUBLIN MICROSCOPICAL CLUB.

APRIL 10.—The Club met at Leinster House, Prof. G. H. Carpenter (President) in the chair.

F. W. MOORE showed stamens of *Cyanotis Zanoni*, a rare species of this genus which is closely allied to *Tradescantia*. The filaments had many very fine, multicellular collecting-hairs, in which numerous pollen-grains had been caught.

Prof. CARPENTER showed specimens of the "biting-louse" of the sheep—*Trichodectes sphaerocephala* from Co. Limerick. The characteristic dentate mandibles of the parasite, holding a hair of the host-animal, were demonstrated under the high power.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

A meeting was held in the Museum on 16th April, 1907, when the following papers were read:—"The Scotch-Irish in America" by the Hon. S. S. KNABENSHUE, and "Impressions of the 'States' by a Scotch-Irishman" by E. J. ELLIOTT.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 13.—Nevin H. Foster, M.B.O.U., Vice-President, in the chair. A paper was read by ROBERT PATERSON, M.R.I.A., on "The Nuptial changes in the Bill of the Common Puffin." By means of diagrams the various horny pieces that drop off the bill after the breeding season is over, were shown. The following joined in the discussion at the close of the paper:—The Chairman, Mrs. Patterson, H. L. Orr, W. J. C. Tomlinson, George Donaldson, and W. H. Gallway.

MARCH 19.—W. H. Phillips, President, in the chair. A series of papers illustrated by numerous lantern slides, were read on "Lambay; its fauna, flora, and antiquities," by R. LLOYD PRAEGER, M.R.I.A.; ROBERT PATTERSON, M.R.I.A., and ROBERT WELCH, M.R.I.A.; the substance of which appeared in the January and February numbers of this Journal. At the close of the meeting a vote of thanks was passed to the Hon. Cecil Baring, owner of the island, for the special care and attention which he has shown in the plants and animals of Lambay.

MARCH 27.—Robert Patterson, M.R.I.A., in the chair. A paper on "Fruits and Vegetables" was read by ARTHUR DEANE, the Curator of the Municipal Art Gallery and Museum. The paper was illustrated by a number of specimens, and R. Welch, G. Donaldson, N. Carruthers, W. H. Gallway, and C. M. Cunningham, took part in the discussion at the close.

APRIL 9.—The President, W. H. Phillips, in the chair. A lecture was delivered before a large audience by Professor GRENVILLE A. J. COLE, F.G.S., M.R.I.A., the subject being "Continental Glaciation." The lecture was illustrated by a number of slides of ice markings and glaciers, from nearly all parts of Europe, Africa and America, and also striated rocks from different parts of Ireland. Some discussion followed, in which Madame Christen, W. Gray, R. Welch, A. Milligen, and W. J. C. Tomlinson, took part.

APRIL 17.—ANNUAL MEETING. The outgoing President (W. H. Phillips) in the chair. The Secretary (W. H. Gallway) read the forty-fourth annual report, which showed that the Club was in a very flourishing condition. At the last annual meeting, the membership was 395; this year it is 418. Eight successful excursions were held, the average number present being 63. The Treasurer submitted his statement of accounts, which showed a small deficit. The Librarian, and the Secretaries of the Geological and Botanical sections read their respective reports, which were of a satisfactory nature. Robert Patterson was elected President for the ensuing year, and a vote of thanks was passed to the outgoing President for his services during the past two years. The Committee was re-elected, W. J. C. Tomlinson taking R. Patterson's place. The other office-holders were re-elected, and the Secretaries for the next Session are W. H. Gallway and J. N. Milne. There were two competitors for the prize offered by W. J. Fennell for the best paper on the "Occurrence and Distribution of Iron Ores in Antrim and Down," Messrs. Tomlinson and Strachan, and the judges considered the two papers of such high merit that it was decided that Mr. Fennell's prize be given to Mr. Tomlinson, and that another special prize from the Club be given to Mr. Strachan. Six new members were elected, and a vote of thanks to the retiring Secretary, Mr. Tomlinson, concluded the proceedings.

APRIL 13.—BOTANICAL SECTION. Rev. C. H. WADDELL, B.D., exhibited and described some interesting plants collected during the summer session, also some rare plants kindly sent by Madame Christen for the Club's herbarium.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 13.—EXCURSION TO SEAPOINT. A very severe on-shore gale with heavy rain prevented this excursion being a success as regards numbers. In accordance with the views of the Committee that excursions should not be abandoned, it was carried through by the Conductor J. B. Butler, B.A., C. Murray, B.A., and J. de W. Hinch (Hon. Sec.). The party started at 2 p.m. and some hours were spent in Mr. Butler's aquarium examining the specimens, and when the tide went down collecting from the rock-pools in the neighbourhood was indulged in for some time. The party returned to town late in the evening.

APRIL 17.—The concluding meeting of the winter session was held in the Royal Irish Academy, the President (C. B. Moffat, M.A.) in the chair. In anticipation of the Triennial Field Club Union Conference to be held in Cork in July, the business of the meeting consisted of a series of short lectures (illustrated by lantern slides) on the geology, botany, and zoology of that neighbourhood. PROF. COLE dealt with the geology and topography of the district, PROF. CARPENTER with the zoology and the problems of distribution in Southern Ireland, and R. LL. PRAEGER, B.E. (Hon. Sec. Field Club Union) with the Botany. R. LL. Præger then gave a short account of the Union and an outline of the work of the Conference. R. J. USSHER, D.L., supplemented Prof. Carpenter's account of the zoology by a description of the rarer migratory birds of Waterford and Cork. W. F. GUNN exhibited *Azolla caroliniana* and gave an account of the method of fructification. H. W. Doveton Dunlop was elected a member

NOTES.

BOTANY.

Rhytisma Andromedæ (Pers.)—A Correction.

In the May issue of the *Irish Naturalist* I included the above species in a list of Fungi new to Ireland. I am indebted to Dr. G. H. Pethybridge for calling my attention to the fact that it had previously been recorded as an Irish plant in a footnote to a paper by G. H. Pethybridge and R. LL. Præger on "The Vegetation of the District lying south of Dublin." (*Proc. R. I. Acad.*, vol. xxv. (B), No. 6. Dec., 1905.) It was also exhibited subsequently before the Dublin Microscopical Club as reported in *Irish Naturalist* for April, 1906.

J. ADAMS.

Royal College of Science,
Dublin.

ZOOLOGY.

The Problems of an Island Fauna.

It gives me much pleasure to say that I fully agree with Dr. Scharff that the views put forward under the above heading in my address, which he has so kindly criticised in the May number (pp. 178-9, *supra*), are open to many objections, and that we have not sufficient data, as yet, to prove that a low rate of fertility is apt to prevail on islands. I would, however, take exception to one of Dr. Scharff's arguments—that which he founds on the circumstance that animal life on islands is apt to be abundant in individuals—because I cannot think that the fertility of a species has any effect on its abundance or scarcity in a district, except in the extreme case of the fertility falling below the minimum standard necessary to keep the species from dying out. So long as that minimum is ever so slightly exceeded, the species must increase until its numbers are as large as the local conditions will allow to exist; and this number will be the same whether the fertility is high or low, though it will, from other causes, vary in different countries. From my point of view therefore—and I need scarcely say that it is the point of view of Darwin and of Alfred Russell Wallace, and almost the starting point with the latter of the Natural Selection hypothesis—the fact that a particular species is more numerous on an island than on an adjoining continent is no objection whatever to the suggestion that it may be more fertile on the continent than it is on the island.

A recent conversation which I had with the Rev. Allan Ellison, on an entirely different subject, supplies me with a curious illustration of the fact I am seeking to urge. Mr. Ellison tells me that in the part of England where he is now resident, the average fertility of the Chaffinch is about 20 per cent. greater than in Ireland. In Ireland the usual number of eggs, according to Mr. Ellison's very extensive experience, is four, and the maximum number five. In Hertfordshire he finds clutches of six quite common, and less than five rare. And yet, Mr. Ellison adds, the Chaffinch is incomparably more abundant in Ireland than it is in England. Here we have a clear case of fertility and abundance varying in inverse ratio, proving, I think, that Dr. Scharff's objection to my argument on this score is not conclusive. It is only fair to add that Mr. Ellison takes an entirely different view from mine as to the reason for this difference in fertility between English and Irish Chaffinches. He thinks that in consequence of small birds being so persecuted in England a higher rate of fertility has been evolved through Natural Selection to save them from extinction. I doubt whether Natural Selection would work with sufficient rapidity to meet a danger of that kind in that manner. However, all that I am contending for here is that it is possible for a species in a country where its rate of fertility is low—but still sufficient for its requirements—to be more numerous than in another country where its rate of fertility is high.

The Well-Shrimp in Co. Clare.

Last November Dr. M'Weeney sent to the Museum for identification two minute Crustaceans contained in water sent to him for examination from a well in Co. Clare.

They were examples of *Niphargus kochianus*, Spence Bate, which has twice been recorded from wells in Ireland, but on both occasions from the neighbourhood of Dublin. It has also been found in open water in Ireland, viz., in Lough Mask by Mr. W. F. de V. Kane (*Ann. and Mag. Nat. Hist.* (7), xiv., 1904), who gives an interesting account of his unexpected capture of about 130 examples of this species at a depth of from 130 to 150 feet, when dredging for *Mysis relicta*, and refers to the possibility of this normally subterranean species having obtained admission to the lake by means of underground currents.

A. R. NICHOLS.

Dublin Museum.

Eared Grebe in Belfast Lough.

I had the pleasure of examining on the 28th of February a fine specimen of the Eared Grebe (*Podiceps nigricollis*), which was shot on the 26th by R. H. Leeke, Esq., of the Rifle Brigade, now stationed at Holywood, who brought it to Messrs. Sheals, of Corporation-street, Belfast, for preservation, where I saw it. It proved to be a male on dissection.

This specimen was coming into summer plumage, the ear-tufts being well developed, and the sides beginning to turn a chestnut-brown. This grebe has been known to breed in England (see *Zoologist* for 1906), and, according to Ussher and Warren, "Birds of Ireland," it has only occurred about twenty-one times in this country, so it may be considered a rare visitor to our waters. It was accompanied by two other birds, presumably of the same species.

W. H. WORKMAN.

Windsor, Belfas

Crossbill breeding in Co. Wicklow.

It may be of interest to record that on the 17th April I took a Crossbill's (*Loxia curvirostra*) nest in Co. Wicklow with four eggs, fresh, nest in spruce, about 30 feet from ground, and lined with sheep's wool and rabbit fur. I have searched in vain for eight years in Wicklow woods before finding this nest; some years I have not seen a Crossbill.

R. HAMILTON-HUNTER.

Kingstown.

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THE CANADIAN CRANE IN CO. CORK.

BY A. R. NICHOLS, M.A.

THROUGH the kind exertions of Mr. R. J. Ussher, the Dublin Museum has lately acquired from Mr. T. J. Canty, of Clonakilty, a specimen of the Canadian Crane (*Grus canadensis*), shot in Co. Cork. To the list of American Birds obtained in Ireland must now be added this grey American crane, generally known as the Canadian Crane or Sand-hill Crane.

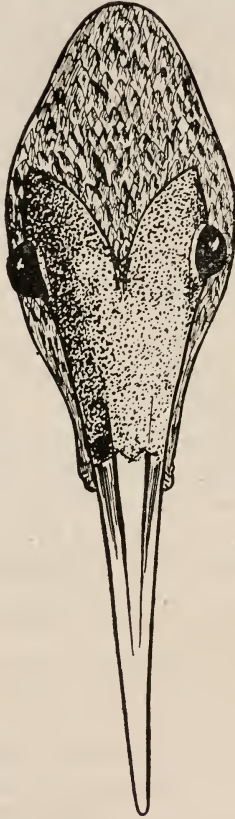
The neighbourhood of Cork would seem to be a favourite place for the landing of birds that occasionally visit Ireland, especially of those that come from the south, such as the Griffon Vulture, Spotted Eagle, various species of Warblers, Bee-eater, Hoopoe, Night-Heron, White Stork, Spoon-bill, &c. Visitors from America, for instance the American Bittern and Hooded Merganser, which probably arrive from the north-west, have also been obtained in Co. Cork.

A small specimen of this American Crane was shot on September 14th, 1905, while feeding near the sea-shore at Galley Head, about 10 miles from Clonakilty, Co. Cork, where, for about three days previously, it had been frequenting a marshy piece of ground covered with tall marsh grass, and through which a small stream runs. I am informed by Messrs. Rohu, of Cork, who mounted the crane, that it was found to be in a "veryspent condition," owing, they presumed, to its long flight.

G. canadensis has a wide range extending over the greater part of North America from the Arctic regions to Mexico, but is apparently rare along the Atlantic coast.

It seems difficult to imagine that a bird of the nature of a crane could have crossed the Atlantic Ocean without having derived some assistance in its transit by having rested on vessels, and I am not aware of a Canadian Crane having been shot before in Europe, although a few stragglers have been recorded from Siberia and Japan. This species of crane is sometimes kept in confinement; the specimen shot in Co. Cork, however, is in good condition, the feathers clean and not abraded, and there do not appear to be any indications that it was an escaped bird.

The dimensions of the specimen are:—Total length measured along the back, 36 ins.; length of wing from tip of longest primary to carpal joint, 18 ins.; tarsus, 7 ins.; culmen, about $3\frac{1}{2}$ ins.



CANADIAN CRANE (*Grus canadensis*).

Head (seen from above) showing the bare part forked behind to receive the pointed projection of the occipital feathers.

Two-thirds natural size.

There would seem to be a considerable amount of variation in the individuals of this species, especially in size; the larger or southern form (*G. mexicana*) has sometimes been considered

a distinct species from the smaller or northern form (*G. canadensis*). Blaauw in "A Monograph of the Cranes," (London, 1897), says that he cannot agree to this division, as after taking measurements of the tarsi of a number of specimens of both forms, he finds there is a regular graduation in size from the smallest specimens (7 ins.) of *G. canadensis* to the largest of *G. mexicana* (10½ ins.). The Cork specimen is thus a small individual of the northern form.

Blaauw, in his description of *G. canadensis*, gives the colour of the primaries as blackish with white shafts; in the Cork specimen the shafts are blackish with the exception of their bases, which are white. Possibly the bird had not quite reached maturity; a condition to which the fact of some of the feathers of the back being more or less washed with brown would seem to point. The crown of the head, however, is devoid of feathers as in adult birds, and the peculiar way in which the naked part of the crown extends backwards to meet a pointed projection of the feathers of the occiput is shown in the accompanying figure.

Dublin Museum.

REVIEWS.

THE FAUNA OF EUROPE.

European Animals: their Geological History and Geographical Distribution. By R. F. SCHARFF, Ph.D., B.Sc., Swiney Lecturer on Geology. Pp. xiv. + 258. Frontispiece and 70 text figures. London; Archibald Constable and Co., Ltd., 1907. Price 7s. 6d. net.

This book, eagerly expected by students of geographical distribution, follows closely the course of lectures delivered at South Kensington last autumn by Dr. Scharff under the Swiney trust. The appointment of a zoologist for this honourable task indicates the recognition of animal distribution as an important guide to geological history. Eight years have passed since the publication of Dr. Scharff's "History of the European Fauna" (see *I. Nat.*, vol. viii., 1899, p. 239), and the first desire of the reader in turning to the present volume will be to find if recent studies have modified Dr. Scharff's views as set forth in 1899. It will be seen that the main positions of his former works are still firmly held. Many fresh facts, gathered from his own observations and reflections and from a marvellously wide survey of old and new literature,

only confirm his belief in the survival of the Irish fauna through the Ice Age, and the claim of the "Lusitanian" element to rank as its oldest component.

Many of the facts familiar to readers of the "European Fauna" are, of course, repeated in the present work, but they are to be found in a new setting. The arrangement in the former book was faunistic, the animals being treated in great groups, each characterised by a common centre of origin—"Lusitanian," "Arctic," "Siberian," "Oriental," "Alpine." Here the plan is geographical. After an introductory chapter the author gives us in succession chapters on Ireland, Scotland, England and Wales, the Spanish Peninsula, Scandinavia, the Alps, Eastern Europe and the Caucasus, the Western Plain of Europe, the Eastern Mediterranean Region, and the Western Mediterranean Region. As each country or district is reviewed, the faunistic groups inhabiting it are enumerated, while their probable centres of origin, their paths, and periods of immigration are discussed. A pleasing feature in the book, as to which Dr. Scharff and his publishers may be alike congratulated, is the striking nature of the illustrations, an excellent photograph of some animal being superposed on a map which shows its distribution boldly and clearly.

Dr. Scharff's views as to the importance of Ireland as a key to the wider problems of the European fauna are well known to all Irish naturalists. In the chapter on Ireland in the present book the comments on the "Irish-American" fauna, represented by the freshwater sponges of our western lakes, are especially interesting. With the illustrative maps before our eyes, it is hard to resist Dr. Scharff's suggestion that the Freshwater Pearl-mussel (*Margaritana margaritifera*) and the Great Auk belong to the same distributional group; although the former still inhabits, and the latter inhabited until recently, western districts of the European continent. Dr. Scharff is now disposed to consider this American element of our fauna as older than the Arctic; indeed, he states that it "may be almost of equal age" to the Lusitanian element.

With regard to the Glacial Period and its influence on the European fauna, Dr. Scharff strongly maintains his former well-known position. The presence of a vole on the Orkneys, specifically distinct from the common British species, and the nature of the fauna of Iceland, the Faeroes and Shetland, point, as he claims, to the isolation of those islands in Pliocene or early Pleistocene times, and the consequent survival of their animal population through the Ice Age. The survival of the Lusitanian fauna through the Glacial Period—admitted by many naturalists who are unable to follow Dr. Scharff in minimising to any great extent the effects of that period—seems clear indication to him "that the climate was mild throughout." He suggests that "a more uniformly humid climate in Europe may have favoured the production of glaciers without decreasing the temperature." The chapter on Scandinavia will be found particularly valuable for the evidence brought forward in support of the survival of animals through glacial times in that northern land, complaint being made that most zoologists

who have studied Scandinavian animals have accepted without question the total extinction of the fauna demanded by glacial geologists. As in Ireland, so in Scandinavia, the Lusitanian element of the fauna appears to be the oldest. The Alpine fauna raises many interesting problems. Dr. Scharff points out that it is too commonly identified with the Arctic fauna. He quotes many authorities and marshals an array of facts in support of the view that it passed into what is now the Alpine region of Europe long before the Ice Age. The presence of species common to the Alps and northern Europe is explained by a common Asiatic origin, and not by a mingling in the European plain during glacial times. Our familiar Irish Hare is quoted as a possible example of such an origin, although the alternative possibility is suggested that our islands may have formed part of the track by which this species passed from Scandinavia to France, the Pyrenees, and the Alps.

In his chapter on the fauna of the western plain of Europe Dr. Scharff has much of interest to write on some of the most familiar of British and Irish animals. The notes on the ranges of the Carrion and Hooded Crows are especially valuable; from the extension of the latter species over north-western Europe cutting into the range of the former, it is concluded that the "Hoodie" is a younger and more vigorous species than his black relation. The Rook, regarded as of more recent origin than either, "may have come from Western Siberia with the Steppe fauna, although, unlike most members of that fauna, it seems gradually to extend its range in a westward direction at the present time." The concluding chapters of the book dealing with the fauna of the eastern and western Mediterranean are also of great interest. As in his recent paper (*Proc. R.I.A.*, xxiv., B. 1903), Dr. Scharff lays stress on the affinity of animals from the Atlantic islands with those from the western Mediterranean region and finds fresh support for the theory of a Miocene Atlantis. Thus his book closes with a repudiation of the doctrine of permanent oceanic basins, as it opens with a sceptical criticism of the possibility of transport of animals to islands by marine currents, despite the classical experiments of Darwin and the recent work of Aucapitaine in the same field. The writer of this review, who began his studies of geographical distribution with a not unnatural bias in favour of the permanence of oceans as taught by Darwin and Wallace, has now been led to believe, largely as a result of systematic work on the Collembola, in the former extension of continental tracts across the oceans (See *Proc. R. Soc. Edinb.*, xxvi., 1907, p. 478).

As to the discrepancy between the history of the European area as interpreted by the zoologist who has written this fascinating book, and by the vast majority of those geologists who have made a special study of the later Tertiary deposits, it might be unwise to hazard an opinion. It is to be hoped that the publication of Dr. Scharff's work will give pause to dogmatic statements about the total extinction of the fauna of North-western and Central Europe during the Ice Age. At the same time it is a matter for regret that Dr. Scharff has ignored the geological facts that tell against such an opinion as that "the whole of the existing Irish

fauna and flora is of pre-glacial age." Geologists, as is mentioned by Dr. Scharff, are far from agreeing as to the exact conditions of the Ice Age and the nature of its climate. But how many geologists would accept, as an adequate statement of the conditions, Dr. Scharff's admission "that glaciers existed more extensively than at present"? It cannot be doubted that this like many other discrepancies in scientific interpretation will in the end be helpful in leading us to clear and true views. What is now required is a careful revision of the geological evidence bearing on the Glacial Period with due weight accorded to the distributional facts which are so admirably set forth in the volume before us. When this has been done, we shall be able to re-write in detail the history of our islands and our continent. Irish naturalists may justly feel proud of Dr. Scharff's contributions to the great problem, especially because his interest in the fauna of Ireland has led him on step by step to ever widening fields of study, as the Irish scholars of long ago left traces of their paths in the isles of the northern Atlantic and by the waters of the southern sea.

G. H. C.

FOR MOTH COLLECTORS.

The Insect Hunter's Companion. By the Rev. JOSEPH GREENE, M.A. Being instructions for collecting and preserving Butterflies, Moths, Beetles, Bees, Flies, &c. Revised and Extended by A. B. FARN. 5th edition. London: West, Newman & Co., 1907. Pp. 120. Price 1s. 6d. net.

It is pleasant to welcome this "old friend in a new dress." The practical little book of the late Mr. Greene, who, thirty years and more ago, was adding to our knowledge of the Lepidoptera of Ireland, will still be useful to the young entomologists of to-day. It cannot be said that Mr. Farn has brought the book "up to date." Had he done so it would have been an entirely different work. The classification, the nomenclature, the absence of morphological interest, mark the book as a product of the past, and the young collector who works with this alone will find that he has much to change in his mental outlook when he mixes with students of insects trained on modern lines. But the work is before all an insect *hunter's* companion, and the joys of the entomological chase, usually innocent, despite the rapacity of many collectors, are still as fresh as they were thirty years ago. Mr. Greene's directions for the capture of moths, caterpillars, and pupæ are as valuable as ever, and his anecdotes will not grow stale. By far the greater part of the book is allotted to the "Macrolepidoptera." Mr. Farn adds a short chapter on "Microlepidoptera," and Mr. E. A. Fitch contributes two pages on the breeding of gall-flies.

G. H. C.

BRYOLOGICAL NOTES FROM COUNTY DOWN.

BY J. H. DAVIES.

ON my notes of mosses recently gathered in County Down are the names of a few, which, perhaps, may be deemed sufficiently interesting to justify one in recording them here.

The short list now supplied contains the names of twelve species and varieties—those to each of which an asterisk is prefixed—that have not been reported from this county before. They include two species and one variety, viz.:—*Tortula angustata*, *Barbula gracilis*, var. *viridis*, and *Hypnum imponens*, which, so far as I know, have not previously been recognised in Ireland. The finding, in County Down, of these additions to the Irish moss-flora, it may be confessed, was a positive delight, the more so in that they are rare plants elsewhere in the British Isles. *Tortula angustata*, a species which had been in mind as one that might be expected here, had often been sought far and wide without success, until at length, singularly enough, it was very lately met with on a roadside bank, within a few paces of the entrance to my dwelling at Lenaderg. For *Barbula gracilis*, var. *viridis*, there seems to be only a solitary station in Great Britain, that being in Sussex. The type has also been detected here, and for that the only other certain Irish record is from County Limerick. *Hypnum imponens*, one of the rarest of British mosses, is a somewhat robust and conspicuous plant of a beautiful dark yellowish colour, variegated with golden brown, and of so striking an appearance, when seen growing, that it would hardly escape the eye of one who observes these things.

Another interesting species noted below, *Archidium alternifolium*, which had not been seen in Ireland for some seventy years or more, seems noteworthy were it only by reason of its history in this island. To Dr. Moore, when preparing his serviceable *Synopsis* for the Royal Irish Academy, the plant was unknown as Irish, unaware as he seems to have been, that Drummond had discovered it near Belfast in the early part of last century. Dr. Taylor, in *Flora Hibernica*, Part II., p. 7 (1837), under the name of *Phascum alternifolium*, Dicks., gives two southern localities for the present plant (Co. Cork and

Co. Kerry), but Moore, through an apparent misunderstanding of its confused synonymy, has, in his *Synopsis*, erroneously placed these under *Pleuridium alternifolium*. The plant appears year after year in my garden, in company with *Phascum cuspidatum* and *Pottia truncatula*, but during the time it has been under observation it has remained sterile.

The record now given for *Thuidium recognitum* is new for Ulster. From my friend, Canon Lett, I have examples of the plant, gathered by him so long ago as 1884 (Co. Louth), and 1898 (Co. Kerry). The superficial resemblance of this species to the common *T. tamariscinum* is so close that it may be easily overlooked, and is probably not so rare as might be supposed.

It is to be mentioned that such of the mosses now under notice, as to the right identification of which there could be any doubt, have passed through the hands of Mr. H. N. Dixon. For his kindness in examining them I may be permitted here to make grateful acknowledgment.

***Archidium alternifolium**, Schp.—On garden soil, Lenaderg.

Campylopus atrovirens, Schwaeg.—A very slender form of this, nearly approaching the var. δ *gracilis*, Dixon, on slope of Slieve Donard, above Bloodybridge.

***Dicranum Bonjeani**, De Not., var. δ **rugifolium**, Bosw.—Marshy places, slope of Slieve Donard, near Bloodybridge. A fine and strikingly beautiful moss when characteristic, as in this instance.

***Grimmia Hartmanni**, Schp.—With *Racomitrium heterostichum*, var. β *alopecurum*, on rocks by the margin of Altnadua Lough. The rocks are those nearly surrounded by a luxuriant growth of *Lobelia Dortmanna*.

***Tortula angustata**, Wils.—Bank by roadside at Lenaderg, May, 1907. The only Irish locality.

***Barbula gracilis**, Schwaeg.—Sides of stone steps in a path at Lenaderg. *Var. β **virens**, B. & S.—On bricks at base of wall, Lenaderg. The only Irish station for this variety. The type very rare.

***Barbula convoluta**, Hedw., var. β **Sardoa**, B. & S.—Walls at Lenaderg.

***Weisia crispa**, Mitt.—Sprawlingly on rather stiff soil at Lenaderg.

Weisia tenuis, C. M.—Plentiful on sandstone coping of the railway bridge over the River Bann between Lenaderg and Laurencetown, and on sides of stone steps of like formation in garden paths at Lenaderg. Rare in Ireland; beyond the confines of Counties Down and Antrim being known only from Brandon Mountain.

- Weisia calcarea**, C. M.—This rare moss was noted some time ago as occurring on lime-washed walls at Lenaderg. It has since been seen on similar walls in the neighbourhood, showing a partiality for those that are moist and shady. Unlike the allied species last named, it is invariably sterile.
- Trichostomum mutabile**, Bruch., var. β *littorale*, Dixon.—Roots of trees, Kilbroney River, Rostrevor.
- Ulota phyllantha**, Brid.—Of this species, common throughout the county, an unusual form was noticed on an ash tree at Rostrevor, a form which Mr. Dixon considers comes very near var. β *stricta* of Nicholson, with straight leaves, very little crisped when dry, and without gemmæ.
- Webera annotina**, Schwaeg.—Base of wall, Lenaderg.
- ***Bryum erythrocarpum**, Schwaeg.—Stiff soil amongst grass, Lenaderg.
- Heterocladium heteropterum**, B. & S.—Abundant on stones and on the ground in the old wood at Rostrevor.
- ***Thuidium recognitum**, Lindb.—Amongst grass in several spots at Lenaderg.
- Brachythecium glareosum**, B. & S.—Marshy meadows, Lisnafiffy.
- Brachythecium salebrosum**, B. & S.—Grassy hillocks, Lenaderg.
- ***Amblystegium Juratzkanum**, Schp.—Damp brick wall, Lenaderg. Reported elsewhere in Ireland only from Co. Antrim.
- Amblystegium irrilguum**, B. & S.—Dripping rocks, Rostrevor. Not rare in Co. Down and Co. Antrim, but seemingly very rare in other parts of Ireland.
- ***Hypnum imponens**, Hedw.—On the ground and on stones amongst grass by a wayside at Corbet (Tullyconnaught), April, 1907. Unknown elsewhere in Ireland.

Lenaderg, Co. Down.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Rabbits from Mr. W. J. Williams, a Cockateel from Miss D. Hollwey, three Hybrid Finches from Mr. Costello, and a Snow-bird from Dr. E. Trumbull. Three Lion cubs (two males and one female), and four Prairie Marmots have been born in the Gardens. A Rock Wallaby, a Brown Bear, and a pair of Crowned Cranes have been purchased.

FURTHER ADVANCES IN IRISH MARINE ZOOLOGY.

BY R. F. SCHARFF, PH.D., F.L.S.

IN the September number of the *Irish Naturalist*, 1906, Prof. Carpenter reviewed the work of the naturalists attached to the Fisheries Branch of the Irish Department of Agriculture and Technical Instruction under the heading of "Advances in Irish Marine Zoology." Since he wrote his paper a good deal of additional matter has been published on Irish marine zoology. It has not all been the work of the naturalists attached to the Department, but the greater part of the new papers appear in the "Report on the Sea and Inland Fisheries of Ireland for 1904" (printed in 1906 and issued in February, 1907), which is published by the Department. The various notes and essays may be grouped with advantage under different headings.

GENERAL BIOLOGY.—An important paper¹, deals with the plankton, the term now generally employed to designate the more minute living organisms floating near the surface of the sea. These may be either vegetable or animal organisms, both adult and young. A special training is necessary to recognise and classify the numerous larval forms, often of fantastic shapes, which abound in the plankton, quite apart from the many adult specimens with which the sea teems at certain times.

Dr. L. H. Gough, of Plymouth, describes the results of tow-nettings taken regularly every fortnight in 1904 near some of the Irish light-house stations. We are not told by Dr. Gough whether any of the numerous species of vegetable and animal organisms he records are new to the Irish marine area, for his purpose was merely to trace their dispersal from place to place. This has a distinct bearing on fish migration.

In another note, the Misses Delap describe² the plankton of Valencia Harbour, as far as they were able to determine the animal organisms brought to light in their tow-net operations.

¹ GOUGH, L. H.—Plankton collected at Irish Light Stations in 1904. *Fisheries, Ireland, Sci. Invest.*, 1904, vi., pp. 1-79. [1906].

² DELAP, M. and C.—Notes on the Plankton of Valencia Harbour. *Fisheries, Ireland, Sci. Invest.*, 1905, vii. [1906]

Their observations seem to be limited to certain groups, such as Cœlenterates, Polychæts, Molluscs, and Tunicates.

PROTOZOA.—Mr. G. C. Gough's list of the Foraminifera of Larne Lough and district¹ contains several species new to the district and one new to the Irish fauna. Until a properly authenticated list of Irish Foraminifera has been published, which is still a desideratum, it may be somewhat premature to refer to a species as new to the Irish fauna, for there are a good many records hidden in the Proceedings of the Dublin Microscopical Club and other societies which ought to be collected and tabulated so as to form a basis for future workers; but possibly Mr. Joseph Wright possesses a manuscript list which may have been accessible to Mr. Gough.

CŒLEENTERATES.—Miss M. J. Delap carried her previous investigations further in keeping some of the large jelly-fishes—viz., *Aurelia aurita* and *Pelagia perla*—in an aquarium², observing the progress of their early development from the egg through the larval stages.

WORMS.—Mr. Holt records³ the occurrence of a peculiar marine leech, *Branchellion torpidinis*, in Irish waters. He found it attached to the fin of a specimen of the Thornback Ray.

CRUSTACEA.—This group is specially dealt with by Mr. Kemp, Mr. Pearson, and Mr. Tattersall. Mr. Kemp⁴ describes two species of the cray-fish *Acantheephyra* from the deep waters off the west coast of Ireland, viz., *A. purpurea* and *A. debilis*. This genus, though widely spread, seems to have its headquarters in the Indian Ocean, and its occurrence in Irish waters is therefore of considerable distributional interest.

¹ GOUGH, G. C.—The Foraminifera of Larne Lough and district. *Fisheries, Ireland, Sci. Invest.*, 1905, iii. [1906]. The Bottom Deposits of Larne Lough. *Ib.*, 1906, iv. [1906].

² DELAP, M. J.—Notes on the rearing, in an Aquarium, of *Aurelia aurita* and *Pelagia perla*. *Fisheries, Ireland, Sci. Invest.*, 1905, vii. [1906].

³ HOLT, E. W. L.—*Branchellion torpidinis*, *Fisheries, Ireland, Sci. Invest.*, 1905, v. [1906].

⁴ KEMP, S. W.—On the occurrence of the Genus *Acantheephyra* in deep water off the west coast of Ireland. *Fisheries, Ireland, Sci. Invest.*, 1905, v. [1906]. *Macrura* from the W. Coast of Ireland. *Ib.*, 1905, i. [1906].

He also alludes in another note to ten *Macrura* which had hitherto been unrecorded from the British and Irish area, and which were taken by "Helga" off the west coast of Ireland.

In the *Annals of Nat. History* Mr. 'Tattersall' gives us a preliminary description of six new forms of Opossum Shrimps (*Mysidæ*) from a considerable depth off the west coast of Ireland. Two of these belong to new genera (*Bathymysis* and *Metamblyops*).

The first part of Mr. Pearson's list of Irish Marine Copepoda has already been alluded to by Prof. Carpenter. He now publishes² the second portion, including the pelagic species. In every case the vertical range of the species, as well as the general distribution, is indicated.

The pelagic Amphipods are described by Mr. Tattersall³ in an interesting paper on the species frequenting the Atlantic slope. Over twenty species are recorded as new to the Irish marine area, among them one belonging to a new genus (*Metacyphocaris*). Mr. Tattersall's observation on the four kinds of Amphipods which are known to form a very large part of the food of three of our principal food fishes during the late autumn and early winter, brings to our minds the practical utility of the study of these and other marine organisms.

MOLLUSCS.—A single specimen of the prosobranch gastropod, *Lamellaria pellucida*, is recorded⁴ by Mr. Farran from off the Fastnet Rock, county Cork. He referred the specimen to the American variety *Gouldi* rather than to the type.

TUNICATES.—The Tunicates are, perhaps, the most neglected group of Irish marine animals, on account of the extreme difficulty of their determination. It is with particular pleasure, therefore, that we notice that Mr. Farran has had the

¹ TATTERSALL, W. M.—Preliminary diagnoses of six new *Mysidæ* from the West Coast of Ireland. *Ann. & Mag. Nat. Hist.* (7), vol. xix., 1907.

² PEARSON, JOSEPH.—A list of the Marine Copepoda of Ireland, Part ii.—Pelagic species. *Fisheries, Ireland, Sci. Invest.*, 1905, vi. [1906].

³ TATTERSALL, W. M.—Pelagic Amphipoda of the Irish Atlantic Slope. *Fisheries, Ireland, Sci. Invest.*, 1905, iv. [1906].

⁴ FARRAN, G. P.—*Lamellaria pellucida*, var. *Gouldi*. *Fisheries, Ireland, Sci. Invest.*, 1905, v. [1906].

courage to take up their study. He has published¹ some notes on the distribution off the west coast of Ireland of the species of *Doliolum*, *Salpa*, and *Pyrosoma*.

FISHES.—Messrs. Holt and Byrne furnish us with a report² on the fishes of the Irish Atlantic slope. Nearly twenty species are added to the list of Irish fishes, one (*Melamphaes eurylepis*) being new to science. The name *Nettophichthys retropinnatus*, given to an eel-like fish in 1890, is now withdrawn in favour of *Synaphobranchus pinnatus*, as the old name was founded on a much damaged specimen. Figures of some of the new Irish species accompany this report.

Finally, a special part on Inland Fisheries³ contains the translation of a paper by Dr. Hein, of the Fisheries laboratory of Munich, which is of exceptional interest, because it is shown experimentally that Trout fry begin to feed through the mouth long before the yolk sac is absorbed. The remainder of this part is taken up with statistical matters relating to the artificial propagation of the Salmon tribe and to the inland fisheries generally.

Dublin Museum.

NOTES.

BOTANY.

Occurrence of Jew's-Ear Fungus on Horse Chestnut.

The peculiarly shaped fungus known by the above name (*Hirniola Auricula-judæ*, Berk.) is usually found only on Elder. It was found on 7th June at the foot of the Glen of the Downs growing on a dead branch of Horse Chestnut. It has been previously recorded from Co. Wicklow by the late Mr. Greenwood Pim.

J. ADAMS.

Royal College of Science, Dublin.

¹ FARRAN, G. P.—On the distribution of the Thaliacea and Pyrosoma in Irish waters. *Fisheries, Ireland, Sci. Invest.*, 1906, i. [1906].

² HOLT, E. W. L., and L. W. BYRNE.—First Report on the Fishes of the Irish Atlantic Slope. *Fisheries, Ireland, Sci. Invest.*, 1905, ii. [1906].

³ Inland Fisheries. *Fisheries, Ireland, Sci. Invest.*, 1905, viii. [1907].

Another locality for *Weisia rostellata*.

Some years ago I had the satisfaction of reporting this pretty little moss from Knockmore, near Lisburn, Co. Antrim, that being at the time the only Irish station. In September last it was found again on bare ground in an orchard at Ballinderry, in the same county.

J. H. DAVIES.

Lenaderg, Co. Down.

Altitude attained by Nettle and Dock.

The Common Nettle (*Urtica dioica*, L.) and Broad-leaved Dock (*Rumex obtusifolius*, L.) were recently found at the side of the road running over the shoulder of Seahan Mountain, Co. Dublin, at an altitude of almost 1,600 feet. The greatest heights previously known, as given in "Cybele Hibernica," were 1,500 feet for Nettle and 1,350 feet for Dock.

J. ADAMS.

Royal College of Science, Dublin.

[Mr. Colgan in his Flora of Co. Dublin records *Urtica dioica* from 1,600 feet on Feather Bed road.—EDS.]

***Lepidium Draba* again in County Down.**

At the end of May last, when it was then in flower, an extensive patch of this Crucifer was noticed on waste ground by the River Bann at Lenaderg. It had not been seen there before, so that one cannot well say whether it is established, as Mr. Carrothers informs me it is at Comber, in the same county, where he has observed it in quantity, in seven consecutive years.

J. H. DAVIES.

Lenaderg, Co. Down.

Botanical Exchange Club Report.

The Report for 1906, lately issued, contains notes on several Irish plants, collected chiefly by Mr. G. C. Druce last autumn.

ZOOLOGY.

Deiopeia pulchella in Cork.

In the *Entomologist* (vol. xl., 1907, p. 12) Miss R. M. Dakin has lately recorded the capture of a specimen of this moth—a rare migrant in our islands—at Cork on the 24th October, 1906.

Some Irish Gephyrean Worms.

Being anxious to determine what Gephyrean worm Dr Kinahan was referring to when he stated in the *Natural History Review*, vii., 1860, page 400, that *Syrinx granulatus*? (M'Coy) occurs plentifully in the sands of the *Zostera* banks of Dublin Bay, I asked Mr. Butler to bring me any Gephyreans he might obtain in the bay, and last month (April) he brought me two specimens of *Phascolion strombi* in the dead shells of *Dentalium entalis* that he had dredged in 8-10 fathoms between Sandycove and Bullock Harbour.

One of the specimens was living, so that I was able to watch the movements referred to by Mr. Colgan (*supra*, p. 180), and in one respect I was more fortunate, as occasionally the animal protruded its proboscis to its full extent, and showed the circle of tentacles crowning its extremity, and the minute hooks situated behind the tentacles (the hooks appeared to be irregularly arranged, instead of in four circles as stated by Forbes in "A History of British Starfishes").

P. strombi is probably common and generally distributed round the Irish coast, but it cannot be the Gephyrean referred to by Kinahan. In addition to the localities given by Mr. Colgan, I may mention there are specimens in the Dublin Museum from Inver Bay, Blacksod Bay, and off the S.W. coast; it is recorded by Thompson from Killary on the west coast, and Belfast and Strangford Loughs; it was obtained in Killybegs Harbour ("Porcupine"); it has also been dredged in rather deep water, viz., 70-90 fathoms, off the Maidens rocks, Larne, Co. Antrim, by Hyndman; off S.W. coast in 30-90 fathoms (R.I.A. Exp., 1885) and in 70 fathoms ("Research").

Syrinx granulatus, M'Coy, I believe to be identical with *Sipunculus papillosus*, Thompson, which would seem to be a species of *Physcosoma*, closely allied to *P. granulatum*, Leuckart (see H. L. Jameson, British Association Report, 1899, p. 432), found principally in the Mediterranean. I am not aware of any specimens of *Physcosoma* having been found on the east coast of Ireland, and think it is unlikely that *P. papillosus*, Th., occurs plentifully in the *Zostera* banks in Dublin Bay. I hope, however, that the dredgings now being carried on in Dublin Bay may help to clear up this point.

Glaucous Gull in Co. Antrim.

On the 25th February I received an immature specimen of above in the flesh, posted from Ballycastle, Co. Antrim. On writing to my correspondent I learnt it had been shot by him on Rathlin Island, on the 19th ult., it having been seen on the previous day with other gulls, and he considered it to be a stranger by its larger size. It measured from tip of bill to end of tail 27 inches.

W. C. WRIGHT.

Belfast.

Movement of Birds during Snow.

The westward rush of Redwings, Fieldfares, and Lapwings which I observed here during the snow-storm of December 26th to 28th, 1906, has been noticed in *Country Life* by Sir Douglas Brooke in Co. Fermanagh. My experience here is that whenever hard frost and snow set in there is a general movement to the west of the Thrush family, of Larks, and other Passeres and Lapwings, which has been traced along the coasts of Cork to the very extremities of Kerry; but I was not aware before that this was observable in Ulster.

During the same dates in December the rush for life of Plover and of many passerine species was remarked by Mr. Patterson on the coasts of Norfolk (*Zoologist*, 1906, p. 138), while in Sussex a westward or south-westward passage or continuous stream of hundreds of thousands of birds was described at St. Leonard's and Brighton (*ibid.*, pp. 112, 113), and the movement was noticed as far inland as Northfield (*ibid.*, p. 74); but near Reading Mr. Joy describes the many flocks he saw as passing due south, crossing the valleys and ridges (*ibid.*, p. 154). In December, 1874, at Exmouth, Mrs. Croasdaile saw large flocks of Fieldfares and Redwings passing S.W., but on the 4th January, 1875, after rain and thaw, a fine morning brought a steady stream of these birds returning in a N.E. direction (*ibid.*, p. 153).

R. J. USSHER

Cappagh, Co. Waterford.

Irish Notes in the "Zoologist."

The *Zoologist* for April contains notes on the Glaucous Gull in Co. Antrim, by W. C. Wright, and on Kerry Bird-life, by Eric R. Dunlop.

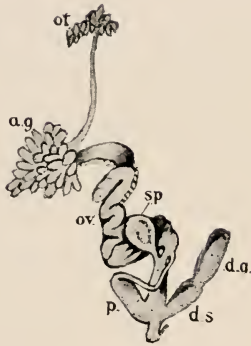
The *Zoologist* for May contains a note on the status of the Grey Wagtail, by Nevin H. Foster, and another on the Spring arrival of Sandwich Terns in Killala Bay, by Robert Warren.



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VITRINA ELONGATA IN IRELAND :

AN ADDITION TO THE FAUNA OF THE BRITISH ISLES.

BY J. W. TAYLOR, F.L.S.

[Read before the Irish Field Club Union, Cork Conference,
11th July, 1907.]

[PLATE 26.]

I HAVE the pleasure of being able to bring forward a well marked and universally acknowledged species of *Vitrina* recently discovered in Ireland, as an addition to the limited mollusca fauna of the British Isles. As a preliminary it will be of interest to say a few words bearing on some of the laws governing the distribution of all organized beings, which may assist us to a correct view of the presence in Ireland of this particular species, which elsewhere is restricted to the alpine regions of Central Europe, and separated by hundreds of miles from the locality where it has now been found.

We may take it as indisputable that weak, primitive or ancient forms of life cannot extend their range or increase the area they inhabit, at the expense or to the detriment of stronger, more recently developed and more adaptable competitive species, and any extension of range they do make can only be in the direction of areas occupied by species less highly organized and less dominant than themselves. *Truly* dominant species arise in the region where the most advanced forms already exist and they *only* can really prosper, multiply and extend their area of habitation in every direction to the disadvantage and eventual expulsion of competitive but more primitive species occupying the districts they may happen to invade.

A new and improved species being more adaptable and stronger than its more primitive progenitors, will gradually overcome them in the inevitable struggle for existence that will ensue, so that the weaker predecessors will be eventually driven from the evolutionary area and expelled further and further from the regions they previously occupied, until com-

pelled to take refuge in the mountains or in remote regions, where for a period they may gain sanctuary, and a respite from their future inevitable extinction. Darwin compares these weak and decadent species to the savage races of mankind which, by stress of competition with superior races, have been driven into the mountains and survive only in their fastnesses.

Dr. Scharff in speaking of alpine organisms is almost equally emphatic as to their relative weakness, describing them as ancient forms which show their weakness not only by the striking discontinuity of their distribution, but by their inability to compete with the more dominant lowland species, being able to withstand their rapid encroachments only in mountainous or boggy regions.

The alpine species were, however, undoubtedly at one time dominant species, and would during their period of prosperity become more or less widely diffused, and it is only by the development of more improved forms that they have been driven by stress of competition to retreat to the mountains, or have become isolated in more or less remote spots on the low ground, being enabled to retain their footing in those places by reason of the less severe competition they have to withstand; for it must be remembered that animals or plants inhabiting high latitudes or bleak and lofty altitudes, though now adapted thereto after ages of residence therein, did not resort to these inhospitable places from preference, but to escape the keener struggle for existence that goes on unceasingly in more favourable regions near the area of greatest evolutionary activity, and this is strikingly exemplified in the moist and warm climate of Ireland, where typically arctic and other plants live and thrive.

The greater abundance of species or individuals in certain regions, is likewise no reliable indication that the spot they now inhabit is their place of origin, unless the species or genus be really dominant, but as Mr. Bather, one of our most enlightened zoologists, has pointed out, the present metropolis of a species may be very far removed indeed from its original home; and, further, temperature has little influence on migration, but in the words of Darwin species are more effectively limited by competition with other organisms than by adaptation to climate, and this struggle is not limited to

diverse species, but is especially keen among individuals of the same kind and markedly so between local varieties or races when brought into competition. Thus all the individuals composing a species are not even approximately equal in dominancy, but, as Darwin has pointed out, certain mountain sheep will starve out other mountain varieties so that they cannot be kept together, and the same result occurs with other organisms, and there is no doubt this applies to mollusca also. These stronger forms will eventually survive, and we may regard them as the latest evolved forms and consequently nearest to the evolutionary area within which they arose.

The reality and keenness of this struggle for existence becomes evident when we realise that the normal increase of any organism is so rapid, that if unchecked, the progeny would in a very few years fill the whole earth; so that when we consider the enormous number of species existent on the globe, each one capable of quickly overcrowding the earth, we are able to conceive the enormous destruction and selective influence that continually goes on.

Bearing all these points in mind we can understand that although certain species may at the present day in some countries be strictly alpine in habit, yet in others, where the struggle for existence is not so keen and deadly, the same species may be found inhabiting the more fertile lowlands, and we have an exemplification of this in the occurrence in Ireland of the species I now bring forward.

The genus *Vitrina*, to which this species is allocated, is conchologically characterised by a vestigial shell of great tenuity and glassy transparency, but this general resemblance is superficial, as the internal organisation shows disparities of structure so great, that we may reasonably conclude that the component members of the group have descended from very diverse ancestors, for although still usually classified together, this is merely an expression of their arrival at a similar stage in the progress of the degeneration, leading eventually to the total loss of the shell.

Dr. Simroth, the great German limacologist, regards the *Vitrinæ* as a primitive group which has retained its simple structure and has been the stem from which many other groups may have sprung. From a study of the various species

Dr. Simroth emphasises the great divergence in their organisation and avows that he would not hesitate to use these differences to recast and rearrange the grouping of the species. *Vitrina elongata* belongs to the group named *Semilimax*, so named on account of the decreasing size of the shell relatively to the animal, and the creature's increasing affinity to the slugs, while our other species, *V. pellucida*, is referred to *Phenacolimax* or *Helicolimax*, the latter name expressing its greater similarity to the Helices.

Vitrina elongata is an old established, well marked, and universally recognised species, described and named by Draparnaud at the beginning of last century, and its claim to specific distinction has, I believe, never been challenged.

Vitrina elongata has several synonyms, and has been placed in at least six different genera by authors.

1802. *Helix semilimax*, Fér., *Naturforsch.* xxix., St. p. 236, pl. 1 f. A.—D.

1805. *Vitrina elongata*, Drap., *Hist. Moll.*, p. 120, pl. vii., ff. 40-42.

1815. *Testacella germaniæ*, Oken., *Lehrb. Nat.*, iii., p. 312.

1820. *Hyalina elongata*, Hartm., in *Stud.*, *Kurz. Verzeichn.*, p. 86.

1821. *Limacea vitrea* var. β . Hartm., in *Neue Alp.* i., p. 246.

1822. *Helicolimax elongata*, Fér., *Tabl. Syst.*, p. 25, et *Hist.*, pl. ix., f. 1.

The ANIMAL is considerably larger than the shell it bears, and cannot withdraw within the shell for shelter; it is very elongate and slender in form, and may attain a length of 15 mill.; the body is of somewhat pellucid grey, paler on the head and neck than in *V. pellucida*. The shield or mantle is also of a clear grey with jet black marblings, and is transversely somewhat concentrically striate; the spatuliform lobe on the right side of the body is marked like the shield, and extends beyond and covers the apex of the shell; the respiratory orifice is rather large, and is placed at the base of the spatuliform lobe; the ommatophores are rather stout, thickened basally, and bulbous at the extremities, where the small, black eye-specks are placed. The tail is very acute,

carinate, obliquely grooved, and delicately speckled with slate grey. Foot linear and whitish.

The SHELL is flattish, very thin and fragile, smooth, extremely glossy and transparent, with a very pale yellowish or greenish tint; the spire has $1\frac{1}{2}$ -2 whorls, the last forming nearly all the shell; suture shallow and not distinct; apex flat and not prominent, umbilicus none. Aperture exceeding two-thirds the greatest diameter of the shell, of a rounded oval shape, hardly interrupted by the penultimate whorl; columellar and basal margin very arcuate, with a very broad and striking membranous fringe. Length of shell 4-5 mill., breadth 2.5-3.5 mill., height 1.5-2 mill. (Plate 26, fig. 1.)

INTERNALLY we find important and striking differences; the ovotestes are connected by a simple, direct and scarcely convolute hermaphrodite duct with the pale and inconspicuous vesicula seminalis at the base of the lobulate albumen gland; the short-stemmed oval spermatheca arises from the free oviduct near the origin of the vas deferens; the penis is simple, short, thick, and very glandular the vas deferens entering near the end, opposite this organ and opening also into the atrium is a well-developed dart sac and glandular appendage, composed of a lower or basal part with thinish walls, at the end of which is a strong and perforate projecting papilla which forms the outlet of a gland and leads through a chitinous and curved love-dart, which is of a pale brownish colour and widens at its free end into a funnel-like termination with jagged margins. (Plate 26, figs. 3-5.)

Compared with the better-known *V. pellucida*, we have in *elongata* a larger animal relatively to the shell, which is quite incapable of containing the body, and which is itself almost concealed by the overspreading mantle margin.

The shell, which in *V. pellucida* is globular and contains three to four whorls or coils, has in *elongata* scarcely half that number, and is very flat with an insignificant spire, and also possesses a very broad membranous fringe destitute of calcareous stiffening along the lower margin; this feature, which is scarcely perceptible in *pellucida*, being an indication of the progress of the degeneration of the shell. Internally, a difference is shown by the spermatheca, which is an oval vessel with

a small, slender neck placed high on the free oviduct, while in *pellucida* this organ is round with a very bulbous base, and is quite vestibular in position. The great difference, however, lies in the possession by *elongata* of a well-developed dart sac and gland, which are quite the most conspicuous organs, and of which *V. pellucida* does not show a trace. The dart sac contains a hooked, chitinous and permanent dart, which is not dehiscent as in *Helix*, though considered by Simroth to be its homologue; this dart is hollow with a jagged funnel-shaped termination, and is the outlet for the secretions of the gland cells above. Though termed a love-dart it is not by any means certain that it functions in that way. (Plate 26, figs. 4-5.)

The maxilla, or jaw, has not been observed, but there are about ninety rows of teeth on the radula, which differ from those of *pellucida* in the marginals being really unicuspid, though showing indications of the bifurcation which is so distinctly evident in *pellucida*.

In habit, *elongata* is described as being very lively, agile and more hardy than *pellucida*. When the animal is strongly contracted, the head is withdrawn beneath the shield, which extends about two or three mill. beyond the shell-margin. Its favourite resort is said to be the margins of streams, or in woods under dead leaves and moss at the base of trees. The food is probably similar to that of other species, but *post mortem* examination of stomach contents disclosed that both fresh and mouldy leaves of phanerogamic plants and mosses are eaten, as well as small insects and the mycelia of fungi.

The time of appearance is another feature distinguishing *elongata* from *pellucida*, for while the latter can only be obtained in perfection during the winter months, *elongata* has been taken by Mr. Grierson quite adult in September. Dr. Simroth tells me that in Saxony it is found only in the spring-time or in the autumn months.

Only one variety has been noted, which has been named *lusatica* by Jordan. It is found in Silesia, and is of a greener tint and larger size than ordinary, with a more pronounced membranous basal margin. It has also been named var. *major* by Clessin,

Geologically, or rather palæontologically, attention is necessarily restricted to the shell, and Sandberger has recorded

that both our species are found in the Pleistocene beds of Franconia.

The geographical distribution of *V. elongata* shows it to be confined on the Continent to the alpine regions, being recorded for South Germany, Switzerland, Hungary, Transylvania, Tyrol, North Italy, South France, Eastern Pyrenees, Spain and other countries, attaining in many places an altitude of 8,000 feet.

It is to Mr. P. H. Grierson, of Dublin, whose energy and success in aiding in the elucidation of the fauna of Ireland is so well known, that we are indebted for the discovery of this very distinct species, inasmuch as amongst the shells sent for examination and authentication were a number of specimens of this species, which he had found plentifully in September, 1904, and June, 1905, near Collon, in County Louth.

It is to be hoped that as attention is now directed to this species, other localities will soon be found for it in this country, as our greatest fear in bringing this waning form into prominence is the risk of its extermination if the ground be over-collected; as even if other stations be found, it would be a matter of regret if the first known station were destroyed.

Leeds.

EXPLANATION OF PLATE.

- Fig. 1. *Vitrina elongata*. Shell. Magnified four times.
 2. *V. pellucida*. Shell. Twice natural size.
 3. *V. elongata*. Reproductive organs (after Simroth). Magnified.
a.g. albumen gland; *d.g.* dart gland; *d.s.* dart sac; *ov.* oviduct;
ot. ovotestis; *p.* penis; *sp.* spermatheca.
 4. *V. elongata*. Dart sac and gland (after Wiegmann). Highly magnified.
 5. *V. elongata*. "Love Dart" (after Simroth). Highly magnified.

MUSCI AND HEPATICÆ FROM COUNTY
FERMANAGH.

BY DAVID M'ARDLE.

[Collected for the R.I.A. Flora and Fauna Committee.]

THE following appended lists of Mosses and Liverworts are the result of a week's collecting for the R. I. Academy Flora and Fauna Committee in part of the district covered by Mr. Praeger in 1904, and described by him in an excellent article in this Journal—"Among the Fermanagh Hills."¹ I left Dublin on the 22nd of October, 1905, and after a rapid journey reached Enniskillen, where I got some valuable information about the district I wished to collect in, &c., from Mr. T. Plunkett, M.R.I.A., who is well acquainted with the natural history of the county. After a drive of twelve miles along the shore of Lough Erne to Churchhill I found myself comfortably settled in Mr. J. Duffy's farmhouse, which overlooks the lake. I soon struck out for the cliffs to the westward known as Poulaphuca, belonging to the Shean range, which rises to 1,030 feet. The upper portion is well wooded. Here I collected one of our finest mosses, *Neckera crispa*, which grew in large masses on rocks and on decaying timber, and in the crevices of the wet rocks Templeton's pretty *Funaria* showed its bright fruit. *Breutelia arcuata* and masses of the "little tree moss," *Climacium dendroides*, were conspicuous. Among the Hepaticæ I was struck with the dimensions of *Scapania resupinata*, tufts of which measured 6½ inches in length. *Bazzania trilobata* and the tropical *Lepidozia cupressina* and others showed similar exuberance of growth. I paid two visits to probably the most interesting part of the district, Correl Glen. The glen is well wooded with Conifers, Birch, Alder, &c., and well sheltered from the north by extensive fir plantations, and is divided by a stream; large rocks are scattered from the base to the summit, on which mosses and liverworts find a home, and luxuriate in the moist genial atmosphere.

¹ Vol. xiii., p. 232. 1904.

Here I found *Eurhynchium Tcesdalei*, reported to have been collected near Bantry, Co. Cork by Miss Hutchins, and in the Phoenix Park, Dublin by the late Dr. D. Moore, many years ago. I have not heard of its being recorded recently. My best find in this enchanting glen was *Amblystegium Sprucei*, a very beautiful and delicate moss, as far as I am aware new to the Irish flora. It has a distribution rather restricted in England, goes northward to Scotland, and I believe is found in Scandinavia. Stones in the stream were clothed with *Racomitrium aciculare*, conspicuous from a distance as it was bearing the bright capsules. A large form of *Metzgeria furcata* and the curious *Trichocolea tomentella* clothed the rocks; a microscopic examination of *Scapania resupinata* from here brought to light the curious *Venturia bryophyla*, a rare fungus, very minute, in shape like a wheel without the rim. It was growing on the leaves of the *Scapania*. Large patches of Taylor's *Mylia* were conspicuous; the rare *Lejeunea patens* was growing on a moss, *Fissidens adiantoides*. Such exuberance of the moss and hepatic flora is rare to find, and Correl Glen is quite as rich in these plants as the glens of Kerry or Wicklow.

In bad weather I had a day or two along the shore of Lough Erne, and collected some interesting specimens. It was with some degree of satisfaction that I counted 17 additions to District X. in the small collection of 43 Hepaticæ. It will be observed that the absence of some genera so common in other districts and counties is very remarkable. Those marked * in the list are additions to the county, which is included in District X. in the Irish list.¹ The collection of mosses numbers 81 species and seven varieties, and is probably the most complete list yet published from Co. Fermanagh. It will be observed that many of them are very rare. I consulted Mr. H. Dixon, of Northampton, on matters of doubt, and to him I offer my best thanks.

MUSCI.

Sphagnum papillosum, Lindb.—Correl glen.

S. acutifolium, Ehrh.—Correl glen.

Var. **rubellum**, Russ.—Correl glen.

¹ *Proc. R.I. Acad.*, vol. xxiv., sect. B., No. 13.

Tetraphis pellucida, Hedw.—On turf banks, Correl glen.

Polytrichum aloides, Hedw.—On banks, Correl glen.

P. urnligerum, L.—Among rocks, Correl glen.

***P. formosum**, Hedw. *P. attenuatum*, Menzies, in Trans. Linn. Society, vol. iv., p. 72 Moore, Mosses of Ireland, p. 131—Among damp rocks, Correl glen, very scarce. A taller plant than *P. gracile*, Dicks., and often confused with forms of *P. commune*, L.; it usually has the leaves more crowded, and less squarrose when moist, and differs in the narrow border of lamina, with smaller cells, and especially in the much narrower and longer cells of the leaf base; and the beak of the lid of the capsule is much longer. Reported from Kylemore, Co. Galway, which, Dr. Moore states in his work above quoted, is the only place in Ireland he collected it; Powerscourt, Co. Wicklow, Dr. Whitley Stokes, in Turner's "Muscologia Hibernica." I have not heard of the plant being rediscovered in Ireland since the publication of Moore's work in 1873.

P. commune, L.—Marshy places, Correl glen.

Ceratodon purpureus, Brid.—Banks, Correl glen.

Dicranella varia, Schp.—On damp banks, Correl glen.

Campylopus pyriformis, Brid.—Peaty banks, Correl glen.

C. fragilis, B. & S.—Correl glen, fertile.

C. flexuosus, Brid.—In dense tufts, Correl glen.

Dicranodontium longirostre, B. & S.—On decayed wood, Poulaphuca.

D. scoparium, Hedw.—On peaty banks among rocks, Correl glen.

Var. **spadicum**, Boul.—On rocks, Correl glen.

D. majus, Turn.—On rocks, Correl glen.

Leucobryum glaucum, Schp.—On peaty banks, Correl glen.

Fissidens bryoides, Hedw.—Banks, Correl glen.

Var. **intermedius**, Ruthe.—Clay banks, Correl glen. Leaves less acuminate, with shorter and wider points, the inferior lamina not continued to the base, often ceasing half way down the leaf; border narrower, sometimes almost obsolete on the superior and inferior laminae.

F. adiantoides, Hedw.—On rocks, summit of Correl glen.

***F. decipiens**, De Not. *F. rupestris*, Wils. MS. Rabenhorst, Bryothec. Europ., No. 825. Moore, Mosses of Ireland, p. 126.—In the crevices of moist rocks, Correl glen. "The distinctly smaller areolation and the more conspicuous band of marginal paler cells chiefly, and in general easily, characterise this species. It is usually, but not always, distinguishable from *F. adiantoides* by the more slender stems, from *F. taxifolius* by the taller stems and different habitat, and from *F. osmundoides* by the serrate apex of the leaf and small cells."—Dixon. Once collected at Killarney by Dr. D. Moore and G. E. Hunt. I have not heard of its rediscovery in Ireland since.

Grimmia pulvinata, Smith.—On rocks, shore of Lough Erne.

G. patens, B. & S.—On rocks, Correl glen,

- Racomitrium aciculare**, Brid.—On rocks in the river, Correl glen.
On the shore of Lough Erne.
- R. lanuginosum**, Brid.—Correl glen.
- Tortula muralls**, Hedw.—On rocks, shore of Lough Erne.
- Barbula rubella**, Mitt.—On stones, shore of Lough Erne. A very distinct and highly coloured form without fruit. This may prove to be distinct when found fertile.
- B. fallax**, Hedw.—On banks among rocks, Correl glen.
- B. cylindrica**, Schp.—Bank of stream, Correl glen.
- Weissia rupestris**, C.M.—On wet rocks, Poulaphuca. Correl glen.
Shore of Lough Erne.
- W. curvirostris**, C.M.—On rocks, shore of Lough Erne.
- Trichostomum crispulum**, Bruch.—Cliffs at Poulaphuca.
- T. mutabile**, Bruch.—On rocks, Correl glen.
- T. tortuosum**, Dixon.—On rocks Correl glen.
- Cinclid dotus fontinaloides**, P. Beauv.—On stones, shore of Lough Erne.
- Ulota crispa**, Brid.—On Alder trees, shore of Lough Erne. Correl glen. Poulaphuca.
- U. phyllantha**, Brid.—On Alder trees, shore of Lough Erne. Correl glen.
- Orthotrichum affine**, Schrad.—On trees, shore of Lough Erne.
- Splachnum ampullaceum**, L.—Correl glen.
- Funaria Templetoni**, Sm.—Among rocks, river bank, Correl glen. Poulaphuca.
- Bartramia pomiformis**, Hedw.—Amongst rocks, Correl glen.
- Breutelia arcuata**, Schp.—On wet rocks, Poulaphuca.
- Webera carnea**, Schp.—On banks, Correl glen.
- Bryum inclinatum**, Bland.—Correl glen.
- B. pallens**, Sw.—Shore of Lough Erne.
- B. pseudo-triquetrum**, Schwgr.—Wet banks, Correl glen.
- B. capillare**, L.—Crevices of rocks, Poulaphuca. Shore of Lough Erne. Var. approaching **B. obconicum**, Hornsch.—Shores of Lough Erne.
- B. cæspiticium**, L.—Shore of Lough Erne.
- Mnium undulatum**, L.—Shore of Lough Erne. Large form, Correl glen.
- M. punctatum**, L.—Among rocks, Correl glen.
- Neckera crispa**, Hedw.—On rocks, Correl glen; Poulaphuca; very fine specimens.
- N. complanata**, Habn.—On rocks, Poulaphuca. On trees, Correl glen.
- Pterygophyllum lucens**, Brid.—On damp rocks, Correl glen.
- Porotrichum alopecurum**, Mitt.—On rocks, Poulaphuca.
- Thuidium delicatulum**, Mitt.—Damp rocks, Correl glen.
- Climacium dendroides**, W. & M.—Damp banks among rocks, Poulaphuca. Shore of Lough Erne.

- Isothecium myurum**, Brid.—On the trunks of trees, Correl glen.
- Pleuropus sericeus**, Dixon.—On stones, shore of Lough Erne.
- Brachythecium rutabulum**, B. & S.—On rocks by the river, Correl glen. Shore of Lough Erne.
- B. plumosum**, B. & S.—On rocks, Correl glen.
- Eurhynchium piliferum**, B. & S.—Banks among rocks, Poulaphuca.
- E. Swartzii**, Hobk.—Correl glen.
- E. pumilum**, Schp.—On the shore of Lough Erne.
- E. Teesdalei**, Schp.—On stones by the river, Correl glen.
- E. myosuroides**, Schp.—On rocks, Correl glen.
- E. striatum**, B. & S.—On rocks, Correl glen.
- E. rusciforme**, Milde.—On wet rocks, Correl glen.
- Plagiothecium Borrerianum**, Spruce.—On rocks, Correl glen.
- P. undulatum**, B. & S.—Damp banks, Correl glen.
- ***Amblystegium Sprucei**, B. & S. *Leskia Sprucei* Bruch. Dixon and Jameson, Handbook of Brit. Mosses, Tab. 54, m.—Extremely minute, forming small patches of a pale green colour; stems filiform, very delicate, irregularly branched, fragile; leaves distant, erecto-patent, minute, less than a quarter of a line in length, ovate-lanceolate on the stems, lanceolate-acuminate on the branches, all narrowly acuminate, nerveless, margin plane or obsoletely denticulate or sinuate, cells irregularly hexagonal-rhomboid, 2-5 times as long as broad, pellucid, with firm walls, at basal angles slightly wider and subrectangular, but not distinct. Seta very short, capsule minute, erect or sub-erect, hardly curved, obovate, somewhat turbinate, inner peristome without cilia. Diccious. The most minute of our pleurocarpous mosses. On a damp bank among rocks, also growing sparingly on rocks, in Correl glen. So far as I am aware, this has not previously been discovered in Ireland; it is very rare in the North of England, Scotland, and Scandinavia.
- A. filicinum**, De Not.—On rocks, shore of Lough Erne.
 Var. **gracilescens**, Schp.—Very slender, prostrate, of a deep green colour; stems very tomentose, leaves small, very rare. On stones, shore of Lough Erne.
- Hypnum stellatum**, Schreb.—Among wet rocks, Poulaphuca. Correl glen.
- H. fluitans**, L.—Marsh above Poulaphuca.
- H. cupressiforme**, L.—On rocks, shore of Lough Erne. Poulaphuca. Var. **fillforme**, Brid.—On the trunks of trees, Correl glen. Var. **minus**, Wils.—On the trunks of trees, Correl glen.
- H. molluscum**, Hedw.—On rocks, Correl glen. Poulaphuca.
- H. palustre**, L.—Shore of Lough Erne.
- H. cuspidatum**, L.—Poulaphuca. Correl glen.
- H. polygamum**, Schp.—Shore of Lough Erne.
- H. Schreberi**, Willd.—Correl glen.
- H. uncinatum**, Hedw.—On wet rocks, Correl glen.

- Hylocomium splendens**, B. & S.—Poulaphuca. Correl glen.
H. squarrosus, B. & S.—In large masses, Correl glen.
H. triquetrum, B. & S.—Poulaphuca. Correl glen.

HEPATICÆ.

- Frullania Tamarisci**, Linn., Dumort.—On the trunks of trees, Correl glen. On rocks, Poulaphuca.
***F. fragillifolia**, Taylor.—On Alder trees, shore of Lough Erne near Church Hill.
F. dilatata, Linn., Dumort.—On trees, Correl glen.
Lejeunea serpyllifolia, Dicks, Libert.—On the trunks of trees and on stones by the river in Correl glen.
***L. patens**, Lindberg.—On moss-covered trees, shore of Lough Erne. Very fine on *Fissidens adiantoides*, Correl glen.
L. minutissima, Smith.—On the trunks of trees, shore of Lough Erne.
***L. ulicina**, Taylor.—On decayed logs, Correl glen.
***Radula Carringtonii**, Jack.—On damp rocks, shore of Lough Erne, very scarce.
R. complanata, Linn.—On the trunks of trees, Poulaphuca. Correl glen.
 Var. **minor**, M'A.—On trees, Correl glen.
Porella platyphylla, Linn., Lindberg.—On rocks, shore of Lough Erne.
***Trichocolea tomentella**, Ehrhart, Dumort.—Damp banks, Correl glen.
Lepidozia cupressina, Swartz.—On the ledges of rocks, Poulaphuca. Very fine in Correl glen.
L. reptans, Linn., Dumort.—Correl glen. A curious lax form found at Poulaphuca, growing on *Dicranum majus*, was plentiful.
***L. setacea**, Web. Mitt.—On peaty banks, Correl glen.
***L. trichoclados**, C. Müll.—On peaty banks, Correl glen.
***Bazzania trilobata**, Linn., Gr.—On damp rocks, Poulaphuca. Peaty bank, Correl glen.
Kantia Trichomanis, Linn., Gr. & B.—On damp banks among rocks, Correl glen and Poulaphuca.
***K. arguta**, Mont. et Nees, Lindberg.—On damp clay banks among rocks, Poulaphuca.
Cephalozia catenulata, Hüben.—With *Tetraphis pellucida*, Correl glen.
C. bicuspidata, Linn., Dumort.—On damp banks, Poulaphuca. On decayed wood, Correl glen.

- Scapania resupinata**, Linn., Dumort.—On rocks, very fine (6½ inches long), Poulaphuca. Plentiful in Correl glen, with a very minute form. A rare fungus, *Venturia bryophylla*, was growing on the specimens collected in the latter station.
- S. nemorosa**, Linn., Dumort.—On damp banks, Correl glen.
- Diplophyllum albicans**, Linn., Dumort.—Moist bank, Correl glen.
- Lophocolea bidentata**, Linn., Dumort.—On moist banks, Poulaphuca. Correl glen. Shore of Lough Erne.
- ***L. cuspidata**, Linpr.—On decayed wood, Poulaphuca. Correl glen.
- Myllia Taylori**, Hook., Gr. & B.—On moist rocks, very fine, Correl glen.
- ***Pedinophyllum Interruptum**, Nees, Lindb.—Among damp rocks, shore of Lough Erne.
- Plagiochila asplenioides**, Linn., Dumort.—On banks among rocks, Correl glen. Poulaphuca. Shore of Lough Erne.
Var. **minor**, Lindenberg, Plag., p. III.—Shore of Lough Erne.
- P. spinulosa**, Dicks., Dumort.—On rocks, Correl glen. Shore of Lough Erne.
- ***Jungermania turbinata**, Raddi.—On damp rocks, Correl glen. Shore of Lough Erne.
- ***J. bantriensis**, Hooker.—On rocks, Correl glen, very scarce.
- J. ventricosa**, Dicks.—On damp rocks, Correl glen.
- ***J. minuta**, Crantz.—On a peaty bank, Correl glen, very scarce.
- Saccogyna viticulosa**, Linn., Dumort.—On damp banks, Correl glen.
- Pellia epiphylla**, Linn., Lindberg.—On damp rocks, Poulaphuca. Correl glen.
- ***P. calycina**, Taylor.—River bank, Correl glen. Shore of Lough Erne.
- Aneura multifida**, Linn., Dumort.—Wet places, Correl glen.
- A. iatifrons**, Lindberg.—Wet rocks, Poulaphuca.
- Metzgeria furcata**, Linn., Raddi.—On the trunks of trees, Poulaphuca. A curious attenuated form, Correl glen. Proliferous form, on trees, shore of Lough Erne.
- M. conjugata**, Lindberg.—On rocks (fertile), Correl glen.
- Conocephalus conicus**, Neck., Dumort.—Damp rocks, Poulaphuca. Abundant on bank, shore of Lough Erne.

Royal Botanic Gardens, Glasnevin, Dublin.

NESTING OF THE TREE-SPARROW IN COUNTY
DONEGAL.

BY ROBERT PATTERSON, F.L.S., M.R.I.A.

THE *Irish Naturalist* for October, 1906 (p. 221) contains an interesting account by Nevin H. Foster, M.B.O.U., of his discovery of the Tree-Sparrow breeding in Co. Londonderry last summer. After giving a summary of our knowledge of the distribution of this bird in Ireland, Mr. Foster concluded with a prophecy that "a careful scrutiny, more particularly around our coast, would reveal the existence of the species in many other localities." It gives me much pleasure to state that this prophecy has come true, with interesting rapidity, in another part of Ulster. On the 14th June I received a telegram from Mr. J. M. McWilliam, who was staying at a watering-place in Co. Donegal for a few weeks; "Have got Tree-Sparrow's nest with young almost ready to leave." In a letter of June 15th, Mr. McWilliam writes as follows:—"The nest was built in a hole in the garden wall here, about six feet from the ground. When I removed one of the stones, three of the little birds flew out, and there being a very high wind, one of them got over the wall and escaped. We caught the other two in the nest. Another day or two and the young birds would have been gone. It was the note of the old birds that first attracted my attention; quite different from the ordinary sparrows', being much lower and more metallic. I saw the birds on the wall within half-a-dozen yards from me, and, of course, recognised them at once. I watched them coming and going for some time, and when I went to the nest, I saw one of the young birds, which had been at the entrance, running in again, and could see that it was almost ready to leave."

On the 17th June Mr. McWilliam found another pair of Tree-Sparrows in a neighbour's garden, with their young birds just able to fly, and on the following day he caught a bird on a nest which contained four eggs. This nest was also built in a hole in a high wall, about six feet from the ground, and at some distance from either of the other nests. Subsequently, on the 29th June, Mr. McWilliam found a fourth nest

in the same garden where he had found the second brood ; it contained one egg, and was probably the beginning of a second laying. All four nests were built in high stone walls, about six feet from the ground ; the entrance to the nests was small, and they were quite close to the sea, certainly within a hundred yards. I think it wiser not to indicate the exact locality, so that this little colony may not be interfered with by too enthusiastic egg collectors.

I hardly think it possible that these Tree-Sparrows can have been in that district for any length of time, because Mr. McWilliam, who is a close and accurate observer, has stayed in the vicinity for several summers in succession, and although he has kept a careful watch on all the Sparrows he has met, he never suspected the presence of Tree-Sparrows until he discovered the first nest on June 14th.

Undoubtedly it was Mr. Foster's discovery in Co. Derry last year that made Mr. McWilliam pay increased attention to the subject this summer, and I must congratulate the latter gentleman on the success that has attended his investigations. I trust that ornithologists who reside at other parts of the Irish coast will carefully scan all the sparrows in their district, as the Tree-Sparrow is undoubtedly spreading in Ireland, and may turn up at almost any portion of the coast.

Holywood, Co. Down.

OBITUARY.

ALEXANDER SOMERVILLE, B.Sc.

Alexander Somerville, who died at Glasgow on June 5, was one of several British botanists who generously came over to Ireland a few years ago to assist in botanical field-work when "Irish Topographical Botany" was in preparation. The flora of the counties of Leitrim, Cavan, and Monaghan were the subject of his Irish researches, and he added a large number of species to the then meagre lists from these divisions. He was an enthusiastic student of the fauna and flora of Scotland, particularly its Mollusca and Phanerogamia, and took an active part in the scientific life of Glasgow.

R. L. P.

ON RECENT EXTENSIONS OF THE RANGE OF SOME RARE WESTERN PLANTS.

BY R. LLOYD PRAEGER.

LAST year I reported (*I.N.*, xv., 260) the finding of a single fruiting specimen of *Neotinea intacta* by the roadside near Roundstone in Connemara, a spot far distant from the limestone pavements with which this South European orchid has hitherto been associated in Ireland; and I expressed a hope that during the present season further light would be thrown on this interesting and unexpected discovery. I am glad to be able now to report on this matter, and to add some notes on new or recent stations for other members of the interesting northern and southern groups which have made the flora of the West of Ireland famous among students of European plant-geography. At the end of May, Mr. F. J. Hanbury, Mr. W. F. de V. Kane, Mr. Welch, my wife, and myself met at Ballyvaughan, where several days were devoted to botany, plant-photography, and entomology, the first-named section of our work including a study of the Clare stations of *Pinguicula grandiflora* and *Ajuga pyramidalis*. While Mr. Hanbury and Mr. Kane remained to work at Lepidoptera, and Mr. Welch pushed northward to Mallaranny to obtain photographs of *Erica mediterranea* in the station where it attains its greatest luxuriance in Ireland, my wife and I went to Ballyconneely, in the extreme south-west corner of Connemara, to look for *Neotinea*. The botanical result of our trip, so far as they merit publication, can conveniently be arranged under the names of the plants dealt with.

Arabis ciliata, R. Br.—In several places along the northern side of the Ballyconneely peninsula, generally in the crevices of low rocks.

I have previously noted its occurrence on the south side of the peninsula, by Aillebrack Lough.

Cochlearia officinalis, L., var. **alpina** (H. C. Wats.).—On the carn on Carnsefin (1,041 feet), near Black Head, Co. Clare.

Sagina subulata, Presl.—In several spots along the north side of the Ballyconneely peninsula.

Geranium columbinum, L.—With *Neotinea intacta* on rocky knolls on the north side of Ballyconneely peninsula. Very dwarf, one to two inches in height. This is another calcicole plant to be added

to the interesting group which inhabits this curious tract of country, and still another may be mentioned in *Saxifraga tridactylites*, which is frequent in crevices of gneissose rocks in the same locality.

Gentiana verna, L.—Not altogether confined to the limestone. We saw it growing on peaty banks on the overlying shales, amid a calcifuge flora, 700–800 feet elevation, in several spots between Ballyvaughan and Lisdoonvarna.

This plant increases in size by means of slender underground shoots, proceeding from an underground central root-stock, and we found that patches a foot across, with fifty to a hundred flowering stems, consisted thus of a single individual. This fact may account for some of the non-success which often attends the cultivation of this beautiful species.

Euphrasia Salisburgensis, Funk.—Abundant on the limestone throughout the district traversed by us—namely, Ardrahan to Ballyvaughan, and thence south towards Lisdoonvarna, and west round Black Head to Poulsallagh; also on sea sands at Murrough and Ballyvaughan. I have already reported its abundance in south-west Connemara. Among some unnamed Eyebrights collected at Brown Hall, near Ballyshannon, in 1900, I find good specimens of *E. Salisburgensis*; so the known range of this plant now extends from Limerick to Donegal.

Pinguicula grandiflora, Lamk.—We had an opportunity of examining the Lisdoonvarna station for this plant, discovered by the late Prof. Birmingham in 1903 (*J.N.*, xii., 269)—its only British locality outside the counties of Kerry and Cork. About a hundred yards up stream from the pump-house of Lisdoonvarna, a little cliff of dark shale, some 20 feet in height, and so steep as to overhang in places, rises directly from the stream. Its top is fringed with a thicket of native bushes—Oak, Mountain Ash, and Willows—and no introduced plants grow near. But the garden of the doctor's house runs down to the edge of the thicket before mentioned. There is no place in the garden where a plant requiring such special treatment could be grown, no relic of the cultivation of rare plants, nor any record of the sojourn in the house of a doctor of botanical tastes. The plant is quite abundant on the wet cliff, which drips in places, but, in the course of half-an-hour's search, was not seen elsewhere up or down the stream; our search was, however, very hurried. The surrounding country consists of heavy rough pasture land, with here and there a wet rock bluff or bit of marsh in which the plant might grow. On the evidence, I am inclined to admit the plant as native in this station; if this be so, there can be very little doubt that other stations exist in the district. Should future thorough search fail to reveal other stations, possibly our more cautious botanists may think it well to append a dagger to the record, signifying "possibly introduced"; but my inquiries failed to elicit any hint of possible introduction.

Ajuga pyramidalis, L.—The Irish stations for this northern and sub-alpine species (all in Clare) are fully set out in "Cybele" (ed. II.). Ballyryan (locally pronounced *Ballyreen*) is the townland in which Poulsallagh (a cave or gully on the sea-shore) is situated, so the stations reduce to two—the Great Island of Aran (where Dr. Moore found it in 1854 and Mr. Colgan in 1892), and Poulsallagh (F. J. Foot, 1864; Dr. Leitch, 1893; P. B. O'Kelly, 1894). Under Mr. O'Kelly's guidance, we found it in the latter station, which lies eight miles south-west of Black Head, growing on a little limestone bluff by the roadside, a quarter of a mile north of Poulsallagh, and already out of flower.

An unexpected new station turned up on our last evening in Connemara, when I discovered it in some abundance on Bunowen Hill, the Tertiary volcanic neck which forms a conspicuous landmark over all the featureless country lying south of Clifden and west of Roundstone. It grew here in short turf, chiefly round the edges of rocks, and had its headquarters half-way up the south-east side of the hill, about 100 feet elevation.

Neotinea intacta, Reich.—The ground all about the place where my wife found one specimen last year, between Dog's Bay and Roundstone was again very closely grazed, even the abundant *Orchis mascula* being almost entirely eaten down, and we failed to find further specimens, though no doubt such exist. We had better luck on the peninsula south of Dog's Bay, where the sheep had spared one specimen. As the interesting calcicole group (including *Arabis ciliata* and *Euphrasia Salisburgensis*) which grows at Dog's Bay, occurs also on the wild peninsula west of Ballyconneely (as reported last year), we searched this latter place, and found three stations for the *Neotinea*, in spite of very close grazing—a good colony threequarters of a mile north of Lough Anaserd, a second colony a quarter of a mile south-west of the first, and a single plant at the sand-invaded village of Silverhill, far to the south-west. The first and third stations are close to calcareous sea sands, but the second lies inland on light peaty soil.

Carex pseudo-cyperus, L.—Roadside ditch near Bunowen Castle, W. Galway.

National Library, Dublin.

NOTES ON IRISH HYMENOPTERA.

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

ACULEATA.

IN looking over my small collection of Aculeates, I found several that I had neglected to record, and others that required determination; the latter I sent to Mr. E. Saunders, F.R.S., who very kindly examined and named them for me. The following are the species referred to:—

Formica fusca, Latr.—Armagh; Carlingford.

Lasius flavus, De Geer.—Greenore.

Myrmica rubra, L.

Race, **lævinodis**.—Armagh; Scotstown, Co. Monaghan.

Race, **ruginodis**.—Coolmore, Co. Donegal; Scotstown, Co. Monaghan; Armagh; Carlingford; Edentubber, Co. Louth.

Race, **scabrinodis**.—Armagh.

These three ants are widely distributed through the country, being our commonest species, but, curiously enough, I cannot find any record of them from North Donegal, Derry, or Antrim, though I think we may assume that they occur there.

Pompilius plumbeus, F.—Enniscrone, Co. Sligo,

P. nigerrimus, Scop. (*niger*, F.).—Rosses Point, } All were taken
Co Sligo, } on sandhills.

P. gibbus, F.—Newcastle, Co. Down.

Salius fuscus, L.—Tanderagee and Poyntzpass.

The four last-mentioned species are very active insects, appearing in sunshine, and hiding when the sun becomes obscured by cloud; they provision their nests with spiders, which they sting, so as to paralyse them. *S. fuscus* can give quite a sharp sting, as I found when I caught one in my hand this spring.

Tachytes pectinipes, L.—Female, Newcastle. Mr. Saunders states that “the species of *Tachytes*, according to Continental authorities, prey on the larvæ of Orthoptera, and Smith has taken *T. pectinipes* at Weybridge, with a small species of grasshopper. Shuckhard, on the other hand, says he has frequently caught it with a small, sandy-coloured caterpillar.”

Mellinus arvensis, L.—Tynan, Co. Armagh.

Oxybelus uniglumis, L.—Newcastle, on the sandhills.

Odynerus parietum, L.—Armagh.

O. parletinus, L.—Rosses Point, Armagh, Poyntzpass, and Wexford.

The two last species are solitary wasps; they nest in any suitable cavity, and make their cells of mud, and provision them with caterpillars. They are slender, yellow-and-black insects, and need to be handled with care, as they can give a severe sting.

† The Hymenoptera Aculeata of the British Islands, p. 80.

Sphécodes gibbus, L.—Poyntzpass.

S. subquadratus, Smith.—Poyntzpass.

Halictus rubicundus, Christ.—Armagh, Loughgall, Poyntzpass; Loughbrickland. Co. Down.

H. cylindricus, F.—Armagh; Richhill, Co. Armagh.

H. albipes, Kirby.—Loughgall.

The species of *Sphécodes* and *Halictus* are solitary bees; the females hibernate, and in the spring each makes a burrow in a bank or other suitable place, makes her cells, and lays her eggs; they are often found in large colonies, but each nest is separate.

Andrena albicans, Kirby.—Loughadian, Co. Down.

A. rosæ, Panz.—Poyntzpass

A. cineraria, L.—Poyntzpass.

A. Gwynana, Kirby.—Armagh.

A. lapponica, Zett.—Poyntzpass.

A. fucata, Smith.—Armagh.

The species of *Andrena* are subject to the attacks of two parasites—*Stylops*, which enters the bee in the larval state and causes various distortions of the insect, and the larva of *Meloë*, or the Oil Beetle, which in its early stages is a small six-legged, yellow, or rarely black grub, which, when a bee visits the flower on which it has placed itself, clings to the bee, and is thus conveyed to its nest, where it devours the eggs of the bee, and then subsists on the food provided by the bee for its own larvæ.¹ *A. cineraria* is the earliest of these bees to appear in the spring; it is conspicuous by its white pubescence, and may be seen settling on roads or footpaths in the sunshine. *A. lapponica*, Zett, has not, as far as I know, been previously recorded from Ireland; in fact, it is a recent addition to the British list, having been brought forward by Mr. E. Saunders on specimens taken in Kent.² It has since been taken in Scotland, North Wales, and several localities in England.³

Nomada alternata, Kirby.—Armagh, Tanderagee, Poyntzpass.

N. ruficornis, L.—Armagh.

N. borealis, Zett.—Armagh, Poyntzpass.

These little bees are wasp-like in colouring in most species. They belong to the inquiline (or cuckoo) genera, of which there are several among this section, but, unlike most of these genera, *Nomada* does not resemble its hosts, which, nevertheless, never seem to molest it.

Megachile centuncularis, L.—Armagh.

Bombus venustus, Smith.—Armagh.

B. agrorum, F.—Coolmore, Armagh, Poyntzpass.

B. hortorum, L.—Armagh.

B. lapidarius, L.—Coolmore, Armagh, Poyntzpass.

¹ Fowler, British Coleoptera, V., 94.

² *Ent. Mo. Mag.*, xxxv., 1899, p. 262.

³ *Ent. Mo. Mag.*, xlii., 1906, p. 202.

ICHNEUMONOIDEA.

Since my last records¹ I have picked up a few more examples of these interesting insects. I am indebted to Mr. Claude Morley, F.E.S., for kind assistance in determining these captures. Most of these were taken in moss, in which the females hibernate.

ICHNEUMONIDÆ.

Ichneumon latrator, F.—Summer Hill, Co. Fermanagh, and Poyntzpass. Var. **means**, Gr.—Summer Hill and Poyntzpass.

I. subquadratus, Thoms.—Summer Hill.

I. terminatorius, Grav.—Edentubber, Co. Louth.

I. extensorius, L.—Edentubber and Poyntzpass.

I. gracilentus, Wesm.—Summer Hill.

I. albiger, Wesm.—Summer Hill and Poyntzpass.

I. insidiosus, Wesm.—Summer Hill.

Phæogenes planifrons, Wesm.—Poyntzpass.

P. infimus, Wesm.—Edentubber.

P. rusticatus, Wesm.—Poyntzpass.

Centeterus opprimator, Grav.—Poyntzpass.

Microcryptus galactinus, Grav.—Poyntzpass. Mr. Morley tells me that this is the first female of this species that he has seen. I took it in moss.

M. nigroclinctus, Grav.—Summer Hill and Poyntzpass.

Cryptus tuberculatus, Grav.—Poyntzpass.

Pimpla turlionellæ, L.—Rosses Point, Co. Sligo.

P. oculatoria, F.—Poyntzpass. I took this on gorse in one of my fields in April last.

BRACONIDÆ.

Cœllinus gracilis, Hal.—Enniscrone, Co. Sligo, on the sandhills.

These parasitic Hymenoptera (Ichneumonidæ and Braconidæ) are very interesting, and afford a wide field for observation. They are very numerous, and their life-histories are well worth careful study. We often hear of the good work accomplished by various insectivorous birds, but it is small in comparison with that accomplished by these Hymenoptera. Nor do they confine their attacks to insects, but also assail spiders—e.g., *Pimpla oculatoria*, mentioned above, which Mr. Morley told me was doubtless busy attacking spiders, of which there were a number on the gorse bushes where I took it. In some cases the larvæ feed within the egg-sac, in others they cling round the prothorax of the

¹ *Irish Naturalist*, xiii., 1904, p.255

mature spider. They are handsome, and many of them conspicuous, insects—many are red and black, others yellow and black, and of elegant shape. They are particularly attached to the flowers of umbelliferous plants, but are found in various situations, and are not difficult to capture.

Any person desirous of studying these interesting creatures will find Mr. Morley's admirable work, "British Ichneumons," of the greatest assistance.

Poyntzpass.

IRISH SOCIETIES.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 18.—EXCURSION TO JOBSTOWN.—Members and visitors to the number of twenty took the 2.45 Terenure steam tram to Mount Seskin road. The party, under the conductorship of F. O'B. Ellison, M.D. (*Hon. Sec.*), then ascended by Lugmore Glen and descended into Glensmole by the Slade of Ballymaice, above Bohernabreena Bridge. The extreme harshness of the spring weather had produced an adverse effect on the flora, but the following rather uncommon plants were recorded:—*Geum rivale*, *Botrychium Lunaria*, *Ophioglossum vulgatum*. From Bohernabreena the party returned to tea at Tallaght. After tea a meeting was held, W. F. Gunn in the chair, and Miss Shaw and R. Drury were elected members of the Club. The 8.15 tram was taken back to town.

JUNE 8.—EXCURSION TO PORTRANE.—Members and visitors, to the number of twenty-three, left Amiens-street by the 10.45 train for Donabate. On this excursion the usual rule of one conductor was departed from, as it was felt that the peninsula of Portrane offered such scope for work that one conductor could not do justice to the district. The following were therefore appointed to lead the different sections:—Geology, J. de W. Hinch; Botany, W. B. Bruce; Marine Zoology, J. B. Butler, B.A. On arrival the party made their way to the sea shore near the coastguard station, botanizing along the ditches and drainage cuttings, which yielded a good collection of moisture-loving plants. On arrival at the sea the party broke up into three sections, and, in spite of the heavy rain that fell during most of the day, worked steadily until four o'clock. The geologists obtained many good specimens of graptolites and corals from the shales and limestone, and noted the occurrence of strongly glaciated rock-surfaces at various points along the coast and inland near the Asylum. At four o'clock the members adjourned to the Asylum for tea, and afterwards returned to town by the 6.10 train.

JUNE 29.—EXCURSION TO LUCAN AND LEIXLIP.—The excursion which the Committee had decided to hold on this date to the canal between Clonsilla and Lucan had to be abandoned owing to the cleaning of the canal in the early weeks of June, which resulted in the almost complete destruction of the interesting water vegetation of this locality. The Committee decided to change the place of excursion to Lucan, and a small party left Park Gate at 2.30 p.m. by the electric tram. On arrival at Lucan Miss M. C. Knowles, the botanical conductor, led the party along the south bank of the Liffey, pointing out the rarer woodland plants and grasses which flourish here. The members arrived at five o'clock at Leixlip, where members had tea, and then the walk to the Salmon Leap was resumed. The party returned to town at eight o'clock from Lucan. In connection with the excursion two rare plants were found which will be reported in a future number of the *Irish Naturalist*.

BELFAST NATURALISTS' FIELD CLUB.

MAY 25.—The first excursion of the forty-fifth year took place to Roughan Park, Co. Tyrone. Twenty-six members and friends attended, went by the 8 o'clock train to Coalisland, and walked to Roughan Park, where they were hospitably entertained by Mr. W. G. Robinson. After inspecting the old castle and the lake, the walk was continued into Stewartstown, where tea was provided, and the 4.45 train brought the party back to Belfast.

Several plants noted should be mentioned, such as the White Mustard (*Brassica alba*), the Dusky Crane's-bill (*Geranium phaeum*), the Greater Celandine (*Chelidonium majus*), and the Soapwort (*Saponaria officinalis*). About the shores of Roughan Lough, among other interesting plants observed were the Bird Cherry (*Prunus Padus*) and *Arenaria trinervia*. Of the cryptograms many fine specimens of the common species of ferns were observed, including some nice varieties of *Scolopendrium vulgare*, and good collections of mosses were obtained, among which special mention should be made of *Fontinalis antipyretica*, var. *giganteum*, found growing in a roadside well, and *Orthotrichum disphanum* on old elder bushes. The ornithological members reported having noted thirty-five species of birds, not a bad list considering the dull unfavourable day. The list included nine species of our spring migrants, as well as the Great Crested Grebe, which was seen on Roughan Lake, and breeds there. It has not been recorded as a breeding species in County Tyrone before.

JUNE 15.—Half-day excursion to Island Mahee.—One hundred and ten members and friends attended. Going by train to Comber, and driving to Island Mahee, the journey was broken by stops at several places of interest. After thoroughly exploring the island, the party was driven to Ringneill, where Mr. D. E. Lowry entertained them to

tea. A business meeting was held outside, when a vote of congratulation to the President, on his election into the Linnean Society, was passed. Belfast was reached shortly after 8 o'clock.

Time did not permit of much exploration, nevertheless the botanists reported having noted a few interesting, and by no means plentiful plants, among them being *Geranium striatum*. The Henbane was obtained at Comber. The ornithologists reported having noted 29 species of birds.

JUNE 29.—Sixty-one members and friends joined the excursion to Slemish, going by the 9.15 train, and driving up the valley of the Braid from Ballymena. A halt of an hour's duration at Skerry allowed the party to visit the remains of the church on the hill, when the drive was continued to the base of the mountain. Fully one-half of the party climbed to the summit, from which there was a magnificent view. Remounting the brakes, the next stopping place was Crebilly House, where the members were entertained to tea by Mr. John Dinsmore. Five new members were elected at the business meeting, and after exploring the demesne, the return journey was made to Ballymena, which was left at 7.36.

Slemish is 1,437 feet in height, and, as an isolated neck of Tertiary dolerite, is the most notable eruptive mass in Co. Antrim. Some of the rarer orchids known to occur were observed in plenty, such as *Gymnadenia albida* and *G. conopsea*. *Lastrea amula* was also noted at Skerry. *Ceterach officinarum* was observed growing profusely on one of the bridges passed over during the day, and at a hitherto unrecorded locality. In the Crebilly demesne *Lathræa squamaria*, *Anchusa sempervirens*, and *Epipactis latifolia* were obtained. One member picked up on Slemish a specimen of *Helix hortensis*, which is a new county record for Antrim.

DUBLIN MARINE BIOLOGY COMMITTEE.

On Saturday, 13th July, the first excursion of the Dublin Marine Biology Committee took place. The Committee met at 9.30 a.m. at Kingstown, and sailed in Captain Saunder's trawler to the east of the Burford Bank. They shot a trawl in 13½ fathoms, and towed for an hour, making for Ireland's Eye. The remainder of the time was spent dredging off the Bailey Light and off the Mugglins. The dredging off Howth did not yield much, owing to the large amount of Corporation rubbish deposited by the *Eblana*, but much valuable material was got in the trawl.

NOTES.

BOTANY.

Poa nemoralis in Co. Antrim.

Notes on the occurrence of *Poa nemoralis* in Down and Antrim have not been infrequent in recent years. Nevertheless, I venture to record it from a new locality in Co. Antrim, namely, woods in Muckamore Abbey demesne. On June 8, accompanied by three fellow-members of the Belfast Naturalists' Field Club, I came across a fine patch of *Poa nemoralis* in one of the old plantations running along the southern boundary of the demesne near Oldstone. Later on, the same grass was met with in plenty over a considerable area in the plantation on the south side of Muckamore Glen. Our special mission, I may add, on the occasion was to search for *Cephalanthera ensifolia*, recorded from "Woods at Muckamore," by Whittle, in 1835, and not seen since. We were not successful. We noted *Epipactis latifolia* and *Neottia Nidus-avis*. On a subsequent date I searched the woods on the north side of the glen, but without detecting the missing orchid. On this latter occasion I obtained at one place *Briza media*, which has not hitherto been noted from this locality.

W. J. C. TOMLINSON.

Belfast.

ZOOLOGY.

Woodlice in Co. Carlow.

Towards the end of June I had the good luck to come across some specimens of *Armadillidium pulchellum*, Brandt. amongst a heap of stones on the banks of the River Slaney, near Kilcarrig bridge, in this county. I took only seven specimens in all—one by itself and the other six all together. This pretty little animal has only once previously been found in Ireland, having been recorded from Ballymote, Co. Sligo in 1901, by Dr. Scharff, and was at that time new to the British Isles. Since then it has been found in two or three places in England, but has not been met with again in Ireland. Dr. Scharff described and figured this species in the *Irish Naturalist* for May, 1901, from the specimens he took in Sligo. He gave the size of a full grown specimen as 5 mm., but he points out to me that my specimens, which he has been kind enough to examine, are larger, being 6 mm. in length.

I have also to record another station for *Trichoniscus vividus*, Koch, having lately found it in my own plantations here. This is some eight miles from Borris, where Dr. Scharff took it, and eleven miles from the place on the banks of the Slaney River where I took it, as recorded in the *I.N.*, vol. xv., p. 42, and is, I think, the most northerly point at which it has yet been found.

DENIS R. PACK-BERESFORD.

Fenagh House, Bagenalstown.

Helix hortensis in Co. Antrim.

During the Belfast Naturalists' Field Club excursion to Slemish Mountain, in June last, J. L. S. Jackson picked up a shell which I saw at once was *H. hortensis*, a species for which we have no proper record in Co. Antrim. It is true that William Thompson recorded it from Portrush sandhills, but the older naturalists did not distinguish between white-lipped *H. nemoralis* and the true *H. hortensis*, and Thompson's own notes* show that the Portrush record was an error of determination on his part. I have searched every corner of the sandhills and cliff areas there for the past fifteen years, and never saw a trace of *H. hortensis*, though white-lipped *H. nemoralis* are to be found in fair numbers on one particular area of the dunes. The habitat is not a suitable one for the other species, much too exposed and dry. The nearest places to Slemish from which undoubted specimens of this very local Irish mollusc have been obtained are, banks of the river at Newtown Stewart, Co. Tyrone, and Downpatrick, Co. Down. Though a common and very widely distributed species in England and Scotland, it is very local in Ireland, all the localities being in the eastern counties, except one very local colony in the north-west at Portsalon. *H. hortensis* lives in much damper localities than *H. nemoralis*, in Ireland favouring old graveyards with their rank vegetation and moist shade; and when rain comes after a dry spell of weather may be seen climbing to the top of the tallest hedges, or all over the gravestones when the habitat is a graveyard. The shell is smaller, thinner, and the epidermis and lines of growth finer than in *H. nemoralis*. I have never seen an Irish specimen with a black or brown lip, though they are sometimes found in England. Owing to the number of mistakes that have been made in the past in recording white-lipped *H. nemoralis* for this species, I had the "love dart" dissected out by G. W. Jackson, Manchester Museum, to confirm the identification.

R. WELCH.

Belfast.

* Nat. History of Ireland, vol. 4.

REVIEW.

ANOTHER SCHOOL BOTANY.

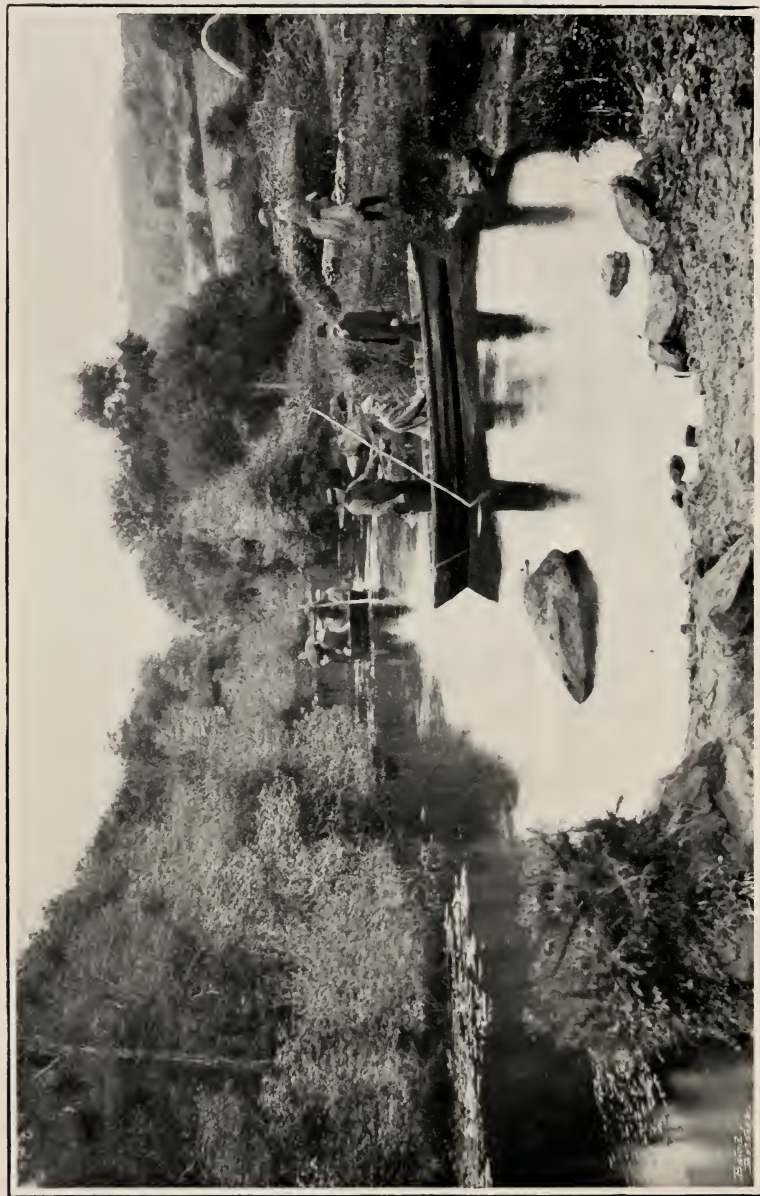
Elementary Botany. Studies in Plant Life. With over 350 Illustrations. By J. ADAMS, M.A. Dublin and Belfast: Fallon & Co.

The addition of a new elementary text-book in any of the branches of science to the, usually, long list of already existing ones, invariably leads one to look out for some special reason for its appearance. This the author in the present case supplies at the opening of his preface, where he states that "the book is an attempt to describe the outstanding features of the structure and life of plants in plain language."

Whether this is to be regarded as a really sufficient justification may of course be doubted, but the author has certainly succeeded in his desire to avoid undue use of technical terms. His descriptions are usually accurate, clear, and brief; in some cases, perhaps, one would have desired a somewhat fuller treatment, but probably the limits of size of the book exercised a restraining influence. For students engaged in "getting up" the subject, and who find the ordinary elementary text-book wearying, the present book may be confidently recommended. Although, however, the book is included in "The School and College Series," we have grave doubts as to whether this class of text-book is really wanted in our schools, into which it is desirable that the more educational experimental methods of teaching should be introduced, even in natural history subjects.

The ground covered is the familiar one, but it is happily widened by the inclusion of two chapters, entitled "Manner of Life and Relation to Surroundings" and "Plant Habitats" respectively. These, perhaps, justify the second title of the book, although by far the greater part of it is taken up with structural and classificatory descriptions. The real *life* of the plant receives the scanty attention which is usual in books of this kind. Respiration, for instance, is mentioned only in the chapter on the leaf, but even there its experimental proof is suggested as being best carried out on germinating seeds! There is a good chapter on "Flowerless Plants," and a useful one on "Poisonous Plants," which contains short and succinct descriptions of all our poisonous plants, with indications in many cases as to the sort of habitat in which each is likely to be found. These, and the accompanying figures, should be of considerable help in studying plants of this nature. Exception might be taken to the unqualified description of a wood-vessel as "a continuous tube" (p. 31) or pipe, and the comparison of an annular vessel to a barrel with its hoops is scarcely a happy one. The numerous illustrations, drawn by Mr. Dennehy, are clear, but Fig. 324 of the "Blue Mould" is scarcely accurate. The book has a flimsy cover, and is bound in an exasperating fashion, which does not permit of its being opened flat.

G. H. P.



STARTING TO EXPLORE THE GEARAGH.

R. Welch, Photo.

IRISH FIELD CLUB UNION.

REPORT OF THE
FIFTH TRIENNIAL CONFERENCE AND EXCURSION,
HELD AT CORK, JULY 11TH TO 16TH, 1907.

I.—GENERAL ACCOUNT.

BY R. LLOYD PRAEGER,

Hon. Secretary, Irish Field Club Union.

FOR the second time, the Field Clubs met for their Triennial Conference in the Province of Munster, the previous occasion being in 1898, when Kenmare was selected as the rendezvous. It was considered that Cork would make an especially useful centre for work, lying as it does on the borderland between the mountainous region of the south-west, with its Lusitanian types of animal and plant life, and the drier, more fertile and lower eastern tract, with a different and distinct fauna and flora. Furthermore, it was recognised that the Cork district, though associated with the names of many distinguished naturalists, was still almost a *terra incognita* as regards a detailed knowledge of various important groups of animals and plants. This being so, it is a matter for regret that the party which met at Cork on July 11 was the smallest which has, since the foundation of the Union, assembled for a triennial field meeting. The chief cause of this was without doubt the unprecedentedly wet and cold weather which prevailed throughout the spring and right up to the date of the meeting, and which made the prospect of long days' work in the open, driving and steamer excursions, and picnic luncheons, seem pre-ordained to failure. The event only proved that these members of little faith in "Field Club weather" were at fault, for the weather cleared on the day before the party assembled, and a light drizzle on the morning of the day that Lough Allua was visited was the only rain that fell during the period

of the excursion. There was also, among the working members of the party, an unusual disproportion as regards the groups of animals or plants in which they were mainly interested; and so, although the proportion of collectors was not much below the average, the reports which fill the succeeding pages do not cover nearly so wide a field as on some former occasions. The subject of conchology was more influentially represented than at any previous Conference, but other equally important and larger groups were not touched; while the whole of cryptogamic botany was without a representative. But in spite of this curtailment of the field of observations, plenty of good work was done, as the succeeding reports will show, and some very interesting discoveries were made. When to this is added the perfect weather, and the beauty and interest of the various places visited, it is not to be wondered at that many of the members voted the Cork Conference to be one of the most successful and interesting that has yet been held under the auspices of the Union.

For the first time (excepting the Dublin Conference of 1901, which was entirely a town meeting) the Union met in the home of one of its constituent clubs. Members of the Cork Naturalists' Field Club furnished valuable aid in the arrangements for the Conference, and took part in the meetings and excursions; and it is to be hoped that the stimulus caused by the meeting may aid natural history work in the south.

THURSDAY, JULY 11.

The Belfast party, to the number of about 30, were the first to start for Cork, leaving Great Victoria Street at 7.30, and they accomplished a record run to Cork of seven hours and ten minutes. Arriving at Amiens Street at 10.37, they were met by the Conductor (Mr. Praeger) and hurried across to a special train in waiting, which, running round the loop-line, drew up in front of the big engine of the Killarney express at Kingsbridge one minute before starting time. Two minutes later the whistle sounded, and before greetings with the Dublin contingent had been exchanged in the corridor carriage reserved for the party, Cloudalkin and its round

tower were passed. The programme contained a description of the geological and geographical aspects of the journey, and the Wicklow highlands, Slieve Bloom, Devil's Bit, the Galtees, and the folds that have created the ridges and valleys of County Cork, were watched for and studied in succession from the train as it rushed southward. By three o'clock all were housed in the Hotel Metropole, which was the headquarters in Cork. The Limerick contingent had already arrived, and the completed party numbered forty-seven; to which, on each day, were added a small number of members of the Cork Club, bringing up the average number on the excursions to fifty-one.

The afternoon was devoted to seeing the city of Cork, the main feature being a visit to Saint Finbarre's Cathedral, where they were received by the Dean (Very Rev. C. S. Bruce, D.D.), who conducted the members through the beautiful building and pointed out the features of interest. The zoologists devoted the afternoon to collecting, mainly about Ballyphehane and the River Lee; while a small geological contingent made a dash for Crosshaven, where the pre-glacial raised beach was studied.

FIELD CLUB CONFERENCE.

At 8 o'clock p.m., in the Council Chamber of the Municipal Buildings (by kind permission of the Lord Mayor), the usual formal meeting in connection with the Conference was held. The chair was occupied by Robert Patterson, F.L.S., M.R.I.A., President of the Senior (Belfast) Club, who was supported by Thomas Farrington, M.A., F.I.C., President of the Cork Club.

The CHAIRMAN having declared the meeting open,

THOMAS FARRINGTON, M.A., President of the local club, welcomed the affiliated clubs to Cork, and hoped that the effect of the meetings and excursions would be an increased interest in local natural history studies.

J. L. COPEMAN (Cork) stated that the Lord Mayor regretted his inability to attend, owing to a slight accident which confined him to his room.

JOHN W. TAYLOR, F.L.S. (Leeds), then read a paper on "*Vitrina elongata* in Ireland: an addition to the Fauna of the British Islands," which was published with a plate in the last (August) issue of the *Irish Naturalist*.

R. WELCH, M.R.I.A. (Belfast), discussed the distributional problems which had been dealt with in the paper, and went on to speak of the value of the local work that might be done by members during the ensuing week.

R. STANDEN (Manchester Museum) spoke on the importance of the discovery of *Vitrina elongata*, and the significance of its occurrence.

J. N. MILNE also spoke on Mr. Taylor's paper.

The CHAIRMAN conveyed to Mr. Taylor the thanks of the meeting for his important communication.

R. LLOYD PRAEGER, B.E., M.R.I.A. (Hon. Sec. Irish Field Club Union), raised the question as to whether the decreased attendance at the triennial conferences justified their continuance. Since the first conference, held in 1895 at Galway, and attended by 100 members, the numbers had fallen, till at Cork they had only half that number, and the proportion of working members attending the meetings had decreased even more. These conferences involved much work and considerable financial responsibility, and it was for members to suggest a cause for the decreased attendance, and to say whether any change should be made.

W. H. GALLWAY (Hon. Sec. B.N.F.C.) attributed the decreased attendance largely to the extreme inclemency of the preceding weather, and hoped the meetings would be continued as at present.

R. WELCH (Belfast) suggested that by limiting the maximum number it might be possible to visit interesting places where there was not accommodation for very large parties, which would attract a larger number of workers.

J. DE W. HINCH (Hon. Sec. D.N.F.C.) thought that perhaps Field Clubs had outlived their use, and that the younger naturalists now acquired knowledge in other ways. He would try to limit the attendance of non-workers.

F. BALFOUR BROWNE, M.A. (Larne Marine Biological Station) was not in favour of any curtailment of the number of members attending the meetings if it could be avoided.



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SIR WALTER RALEIGH'S HOUSE, YOUGHAL.

[Lawrence, Photo.]

W. DENISON ROEBUCK, F.L.S. (Leeds) detailed his experiences of large excursions as ex-Secretary of the Yorkshire Naturalists' Union, and made some suggestions.

J. W. TAYLOR (Leeds) considered that the organisation of the Irish conferences was excellent.

R. LLOYD PRAEGER replied to some of the observations that had been offered.

THOMAS FARRINGTON, M.A., read a short communication relative to the function of the "balancers" of the common House Fly, stating that he had found the movements of these organs most active when the fly was engaged in laying eggs, and doubting whether their main function was connected with flight.

F. BALFOUR BROWNE stated that experiment had shown that the removal of the balancers rendered flight difficult or impossible, and that the balancers also assist respiration.

The SECRETARY made some formal announcements.

The CHAIRMAN offered a prize for the best find in any branch of natural history made during the excursion.

The proceedings terminated.

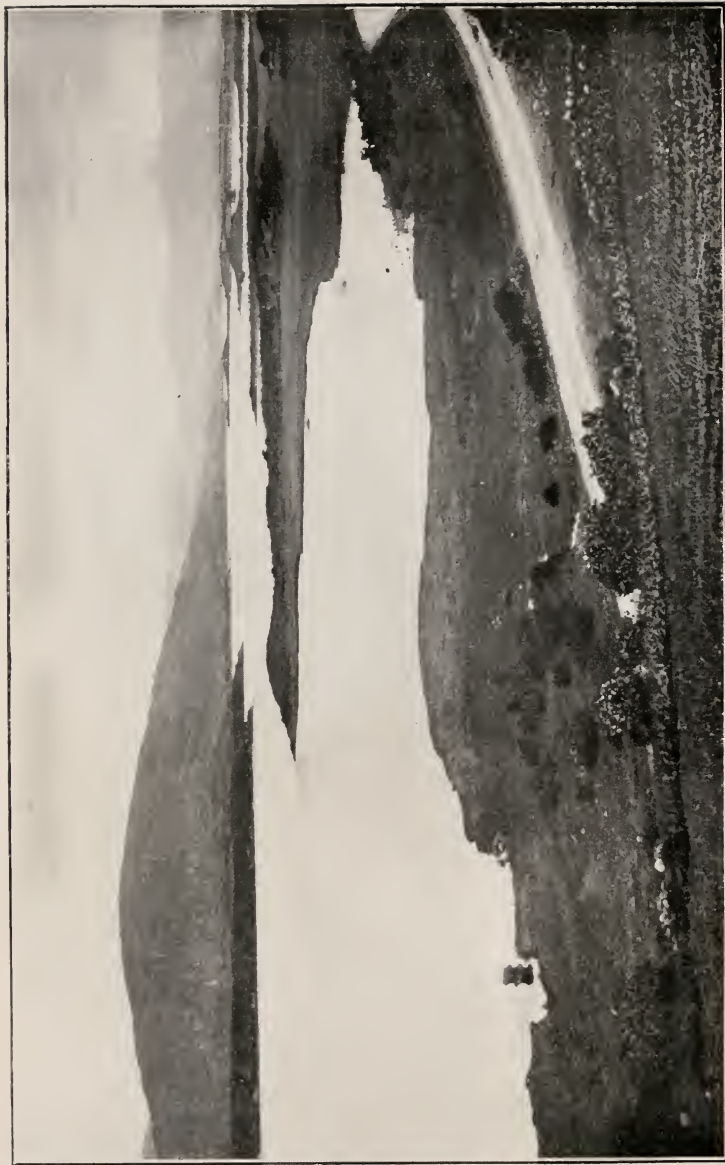
FRIDAY, JULY 12.

Joined by some local members, the party took the 9.50 train to Youghal. At the station they were met by Dr. Charles Ronayne, M.D., who kindly acted as archæological conductor for the day. The majority of the party proceeded through the town under his guidance, visiting Sir Walter Raleigh's house (Myrtle Grove), St. Mary's collegiate church, and the Clock Gate. The naturalists made for the extensive marshes lying behind the beach to the south of the town, which proved good collecting ground for both zoologists and botanists—one of the most interesting finds being the rare shrimp *Neomysis vulgaris*, found in bog-holes of quite fresh water far from present tidal influence. Some members, geologically inclined, crossed the Blackwater and explored Whiting Bay, whence they brought back fine specimens of the Horned Poppy (*Glaucium flavum*). Lunch was ready at 1.0 in a breezy field at Clay Castle. In the afternoon the marshes were further

explored, and a party of conchologists drove up the river to the woods of Glendine, which proved first-rate collecting ground. The bulk of the party drove off to Ardmore, under Dr Ronayne's guidance, and thoroughly examined the highly interesting antiquities of that charming spot. All re-assembled at the Devonshire Arms Hotel for dinner at 7.0, and the 8.30 train brought them back to Cork at the conclusion of a successful and pleasant day.

SATURDAY, JULY 13.

On this day a portion of West Cork was explored, and a drizzling rain that fell lightly during the morning in no wise interfered with work, but on the contrary seemed in keeping with the surroundings of the moist hilly country that lies on the borders of Kerry. A special tram took the members across the city in time for the 9.15 train to Macroom, where brakes and cars were in readiness, and after a two-mile drive the first halt of the day was called at the edge of the Gearagh. This is a unique and interesting place. The River Lee, flowing through a flat valley, branches into a number of clear, swift streams, which keep dividing and joining, forming a maze of water and of wooded islands, where a primitive fauna and flora prevail. The islands are clothed mainly with Oak, Ash, Birch, Holly, Willow, and Bird Cherry, with an undergrowth consisting largely of Irish Spurge and huge Royal Ferns, 6 to 8 feet in height. The place is preserved, and teems with Woodcock and Wild Duck. Three large flat-bottomed boats, each manned by two men armed with long poles, were in readiness, and in these the party were conveyed in sections down stream through the mazy waterways to the bridge on the Dunmanway road. The abundance and luxuriance of the vegetation all around—overhead, on the banks, and in the clear swift water—and the sense of mystery produced by the strange labyrinth, combined to render the visit to the Gearagh one of the interesting and delightful episodes of a delightful week. A party of zoologists landing on one of the islands, did some good collecting, while others ranged up and down the banks of the outer stream. At 12.30



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LOUGH ALLUA, LOOKING WEST.

J. Lawrence, Photo.

the whistle sounded, and all mounted the vehicles *en route* for Lough Allua. A very picturesque road led up the valley, across a high heathery ridge and down through Inchigeela to the lake, which is justly famed for its beauty. Near the upper end, among a clump of tall fir-trees on the edge of the water, lunch was waiting, and seldom has the Union camped in a more picturesque spot. Several hours were then available for exploration and collecting. A united and determined attempt was made to discover the famous Spotted Slug, *Geomalacus maculosus*, on the rocky hill-sides. But the ground was very dry, and though the habitat was quite similar to those which this mollusc inhabits at Glengarriff and further west, no trace of it could be found. The abundance of the London Pride and the Great Butterwort reminded many of the members of the Kenmare district, visited by the Union nine years earlier. At 5.15 a start was made for home. The clouds had lifted, and the views were beautiful as the heathery ridge was again crossed. A punctual arrival at Macroom allowed of a cup of tea at Williams' Hotel before the 7.35 train left for Cork, where a special tram was waiting to convey the party to the hotel for a late dinner.

SUNDAY, JULY 14.

This was as usual a *dies non*, but the more energetic members were early astir and off in various directions. The furthest point reached was Clonakilty, where a little geological study was carried out on the pre-glacial raised beach. Zoologists chiefly favoured the River Lee, and the woods around Blarney and Carrigrohane. Blarney Castle, and that remarkable wilderness the Rock Close (kindly thrown open to the members by Sir George Colthurst) were largely patronized, and Lord Barrymore's kind permission to visit Fota, with its rich botanical collections, was also availed of by many. A few others had the privilege of examining the very fine collection of plants and shrubs which Mr. R. H. Beamish has got together at his house near Queenstown Junction.

MONDAY, JULY 15.

A special steamer was in waiting at St. Patrick's bridge, Cork, and started down the sunlit river at 9.15. Blackrock and Monkstown were passed, and rounding the old "Black Prince" a detour was made to Crookhaven. Thence back across the harbour and up the beautiful East Passage, one of the old sea-filled river-gorges of the earlier period of valley-making. The round gave members an excellent idea of the physical geography of the country around Cork, with its Old Red Sandstone ridges with narrow cross-valleys, and its wider lower stretches of limestone. Finally the steamer stopped at Aghada, and a walk up the hill behind the village was succeeded by luncheon. Then the party divided. About half mounted brakes and drove to Cloyne, where the round tower and old cathedral, with its fine statue of Berkeley and monument to Brinkley, were visited. The return was made through the beautiful grounds of Castle Mary, where the fine cromleac was examined; and thence through the Rostellan grounds to Aghada. The other section of the party proceeded on foot to the adjoining grounds of Rostellan Castle, where the zoologists collected and observed along the enclosed inlet on the southern side, and the tidal inlet on the northern side. On the foreshore at the latter place, the submerged cromleac of Rostellan, which is half covered at high tide, excited special interest, and was carefully examined, measured, and photographed—apparently the first time that this unique relic has been properly surveyed. On the way back the party were met by Mr. C. J. Engledew, J.P., who kindly showed some of the interesting features of Rostellan Castle. A hurried return to Aghada was necessary to allow the party to catch the 6.40 steamer, which conveyed them to Monkstown, whence rail was taken to Cork.

TUESDAY, JULY 16.

The last day of the conference dawned as fine as those preceding it, and much hotter. The 9 o'clock train was taken to Kinsale, and the round of this quaint and beautifully situated town was made under the leadership of F. R. Rohu,



To face p. 260.]

QUEENSTOWN HARBOUR.
H. M. Battleship "Howe" in foreground.

[Lawrence, Photo.]



To face p. 261.]

KINSALE FROM SCILLY.

[Lawrence, Photo.

Hon. Sec. Cork Nat. Field Club. At the ancient church of St. Multose the members were met by the rector (Rev. Dr. Pearson), who pointed out the features of interest in the building. Afterwards the quays and some of the old houses were visited, and a move was made down the river, where, near the ruined hotel, lunch was prepared in a field commanding a glorious view of the town and harbour. In the afternoon, during which the heat was almost tropical, members scattered in various directions. The conchologists took train to Farrangalway, and collected in that neighbourhood. Others, on the kind invitation of Dr. Dunne, were rowed across the river to "the island," where they examined the ancient fortifications; or sailed down the harbour to its mouth. Others, again, returned to the town to further examine its interesting old-world houses and streets, or to purchase specimens of the earthenware pitchers (made at Youghal), which at Kinsale replace the more wide-spread and less picturesque tinned can. Some ornithologists and geologists had started on cars for the Old Head of Kinsale on arrival in the morning, and these presently returned with glowing accounts of the scenery and teeming bird-life of that great headland. At 5.30 a return was made by special train, and a rapid run was broken only by a stop at Farrangalway to pick up the conchologists. Cork was reached at 6.20. After dinner a final meeting was held in the Assembly Rooms, the attendance including a number of members of the Cork Club. An exhibition was given of some of the specimens, zoological and botanical, which had been collected during the week, and these were reinforced by various local natural history objects contributed by Cork members; but owing to the non-representation among the party of various large branches of scientific work, the exhibition was not of so varied a character as has been usual on previous similar occasions.

The President of the Belfast Club (Robert Patterson) having taken the chair, a vote of thanks to the conductor and to the local committee was passed, on the motion of J. W. Taylor, F.L.S., seconded by R. Standen, and supported by W. Denison Roebuck, Mrs. Bernal, Mrs. Riggs Miller, and Robert Walsh. Thomas Farrington, M.A., President of the Cork Club, and R. Lloyd Praeger replied.

The Chairman announced that the prize which he had offered for the best find made on the excursion was awarded to F. Balfour Browne, M.A., for his discovery of a species of *Mysis* (*Neomysis vulgaris*) at Youghal, and for the re-finding of the rare water-beetle *Bidessus minutissimus* in the River Lee.

WEDNESDAY, JULY 17.

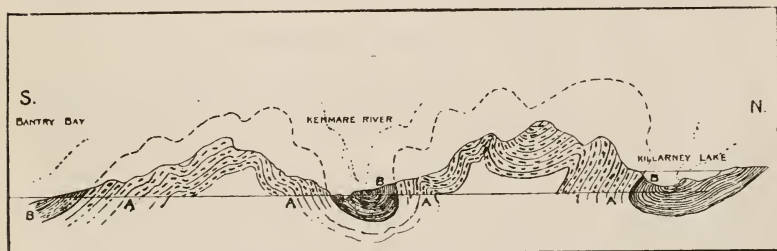
On this day the party broke up, and while many returned northward by the morning and afternoon trains, others carried out further work in the south. J. W. Taylor and W. D. Roebuck went on to Killarney for a couple of days; and A. W. Stelfox and J. N. Milne, following by a different route, did some very valuable collecting in the same district, the results of which appear in the succeeding pages. R. Welch, R. Standen, and others devoted the day to exploring and photographing the Mammoth Cave near Doneraile, where they had the advantage of the assistance and guidance of R. J. Ussher.

GEOLOGY.

BY J. DE W. HINCH.

THE geological history and structure of Cork is dominated by two great Palæozoic systems—the Old Red Sandstone and the Carboniferous Limestone. Other deposits both before and after play a small part, but it is these rock-systems and the transformations they have undergone which give to Cork its present configuration. The earliest formation is represented by a small area of much cleaved and contorted grit and slate of Lower Silurian Age which occurs on the southern slope of the Galtee Mountains. This small patch is succeeded unconformably by the barren purple sandstones of the Lower Old Red, and these in their turn give place to the yellow and green

slates and sandstones of the Upper portion of the same system, the fossils of which point to the belief that they were formed in lakes of fresh-water origin. The Old Red is followed conformably by a series of deposits of the Carboniferous system, grits, shales, slates, and a strong development of limestone, all apparently conformable, and all yielding a large number of marine fossils. With the close of the Carboniferous times came the wide-spread and intense earth movements known as Hercynian, which threw the existing strata into a series of east-and-west folds over a large portion of West and Central Europe; these earth movements also affecting Ireland, throwing the sandstones and limestones into a series of east-and-west folds which to this day dominate the structure of Southern Ireland. With the cessation of the earth movements commenced an era of denudation which ended in the land forming



SECTION FROM BANTRY BAY TO KILLARNEY.

A. Old Red Sandstone. B. Carboniferous Limestone preserved in synclinals.

a plain (possibly of marine denudation) sloping from north to south, and on this plain the primary drainage would cut from north to south across sandstone, shale and limestone for some time without distinction; so that when differential erosion commenced to work faster (by chemical solution) on limestone than on the harder sandstone, some at least of the original north and south channels would be sufficiently advanced to dominate whatever lateral west-and-east drainage-lines subsequent erosion might develop. This subsequent erosion has produced two effects—first, the formation of those east-and-west valleys in the limestone, bounded by east-and-west uplands of sandstone, which are so characteristic of the South of Ireland; and, consequently, of a series of rivers which flow

from west to east over the greater portion of their course and then turn abruptly from north to south when the primitive north-and-south channels cutting across the sandstone are reached. The most remarkable example of this curious river system is the course of the Blackwater, which rises in the Kerry mountains, and after a west to east flow of 70 miles in the limestone valley running north of the Mangerton axis, turns at Cappoquin suddenly at right angles to its former course and reaches the sea at Youghal through a primitive channel across the sandstone ridge of Drum. The same principle (first worked out by Jukes in 1862) governs the courses of most of the rivers of the South of Ireland. In late Tertiary times, after erosion had wrought deeply, the land sank, submerging the mouths of many of the river valleys and producing those striking sea-inlets of which Passage East and Passage West and the strait connecting Cork Harbour with the Atlantic afford excellent examples.

The Glacial deposits of the district surrounding the city of Cork have recently been mapped by the Geological Survey, and during the progress of this work a most interesting discovery was made of a pre-Glacial raised beach. This beach (which has been worked out by Messrs. Wright & Muff, of the Geological Survey), has been traced from Baltimore to Carnsore Point, and presents the following features:—A rock shelf usually about twelve feet above sea level, and in places extending seawards up to fifty feet from the base of the cliff. On this rock shelf and in the angle formed by the pre-Glacial cliffs occur pebbles and sand often to a depth of several feet. Over these marine deposits comes a thick layer of "head," proving that an elevation of the land had taken place, as the "head" is recognized as rock-rubble formed by sub-aerial waste during severe climatic conditions. The "head" is covered by Boulder-clay of Cork type, and is in its turn covered by an upper "head." This beach, as the most important geological discovery in Ireland for a number of years, was studied with great keenness by those members of the Conference interested in geology. Every opportunity was taken to visit the most representative sections, and Clonakilty, Simon's Cove, Ballinglanna, The Old Head of Kinsale, Church Bay, Passage East, Youghal Bay and Whiting Bay were

among those sections visited. At Clonakilty and the Old Head the rock platform was seen as a distinct feature on the shore line ; at Church Bay the whole succession occurred in one section, and at Youghal the marly Boulder-clay of the "Irish Sea glacier" was seen covering the "head" and overlain by the Boulder-clay of the "inland ice." A steady search for shells or shell fragments in the raised beach gravels was made at all the localities visited, but produced no result.

The Glacial deposits are strictly local, the Boulder-clay (with the exception of the marly Boulder-clay of the "Irish Sea" ice) being derived from the Old Red and Carboniferous rocks. The stratified sands and gravels attains considerable depths in the valleys, and has aided in places in influencing post-Glacial drainage.

SUBMERGED CROMLEAC AT ROSTELLAN.

In post-Glacial times submergence again took place to nearly pre-Glacial level, and in connection with this submergence an interesting piece of evidence came under the notice of some of the members of the Conference. On the excursion to Aghada the conductor of the Conference led a small party to Saleen Creek to investigate an alleged submerged cromleac reported by the Geological Survey in that place. The cromleac, which stands in the slob about 30 feet from the southern shore of the estuary, was photographed by R. Welch, M.R.I.A. (see plates) and it was decided that further evidence should be collected in order to estimate its value as an indication of recent geological submergence.

The cromleac is formed of three upright limestone slabs, with a fourth as capping stone. The uprights are in height as follows :—North side stone, 5 feet 4 inches, South side stone, 4 feet 6 inches, West side stone, 5 feet 8 inches, and for between two and three feet the uprights are covered with a growth of seaweed. For the archæology of the cromleac the reader should refer to Mr. Welch's paper in the present number, where he will find the matter dealt with in considerable detail.

There can be no doubt as to the geological value of the cromleac. At a number of places on the south coast of Ireland there are features which point to a recent submergence. Submerged peat occurs at Rosscarbery, Youghal, Dungarvan, Ardmore, etc., and has been cut for fuel when favourable opportunities occurred. In Youghal Bay tree stumps *in situ* have been laid bare at low tides; at Haulbowline Island, in Cork Harbour, during excavations for Government works, tree stumps below sea level are also reported; and Mr. R. J. Ussher has described a submarine crannoge on peat under

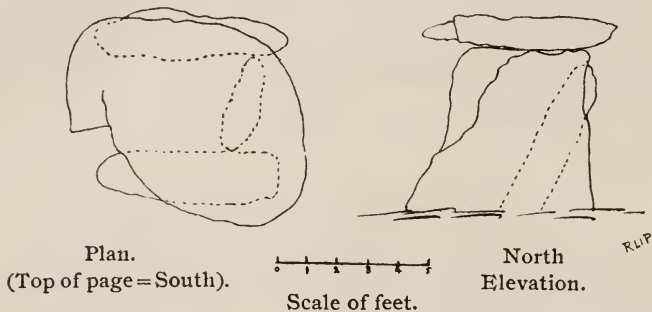
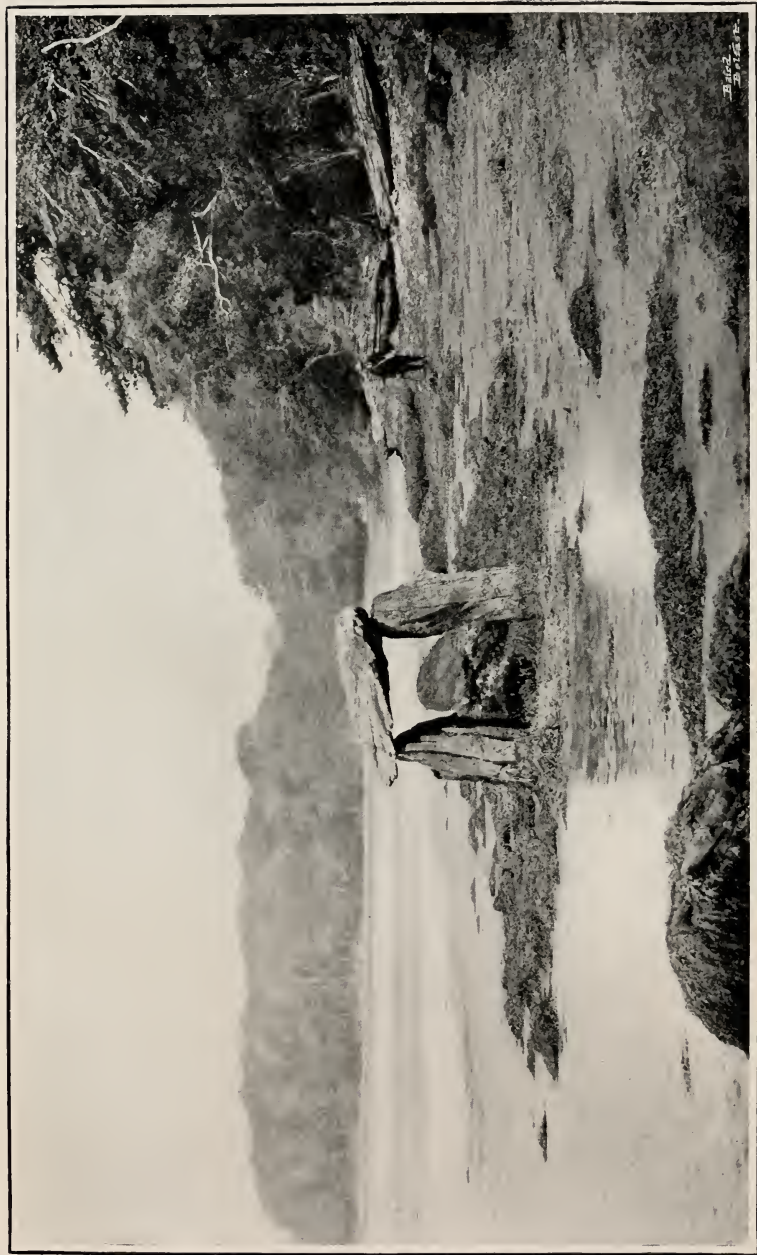


Fig. 1. Sketches of the Submerged Cromleac, Rostellan.

high water mark at Ardmore. The cromleac at Saleen Creek is an important additional piece of evidence concerning this submergence, for there can be no doubt that the uprights are in their original position, and these are draped in seaweed half-way up. It also gives an approximate geological date to the submergence, for as the cromleac would be not earlier than Neolithic in age, the depression of the land must have taken place later than this, and this points to a prolonged elevation of southern Ireland from pre-Glacial times until a very recent geological date.



THE SUBMERGED CROMLEAC, ROSTELLAN, FROM THE WEST.

R. Welch, Photo.

To face p. 266.

FURTHER NOTE ON THE ROSTELLAN CROMLEAC.

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

OWING to its strange position between tides, which makes it an object of high geological interest, and the fact that it was not marked on any map, our visit to this fine memorial was looked forward to with great interest, especially by those of the party who study archæological matters as well as geology. This interest was heightened when I found that there exists no accurate published account of the cromleac, and that, while it was known to an earlier generation of Cork archæologists, it is practically unknown to the present generation. There is no mention of it in Crofton Croker's "Researches in the South of Ireland," in either edition of Windele's "Notices of the City of Cork and its Vicinity," nor in either edition of Smith's "History of the County and City of Cork." It seemed incredible that such an important memorial could have been overlooked by such keen old workers as Crofton Croker and Windele. Yet the former evidently did not know of its existence, and it was only after some search Mr. Hinch and I came on proof that Windele knew of the memorial in his later years, for, in his MSS. (Supplementary Vol. 2, Library of Royal Irish Academy), on page 665, he gives—"Rostellan April 8, 1860—With R. Brash to Rostellan to inspect the restored Cromleac. Met Rev. G. A. Bolster at Dunkettle Station. This ancient remain stands on the shore of the Saleen Creek, in the Rostellan demesne, and facing Jamesbrook (R. W. Goold Adams's) [sic]. Its existence was unknown until Dr. Wise discovered it, the uprights erect but the table stone fallen. With excellent taste he caused the latter to be re-erected, and it now presents an interesting object to the view from different points of approach. Its site is at present washed by every tide, showing that since its erection the sea has encroached on the land here. Dr. Wise intends exploring the enclosed space, but I think it is now too late. This should have been done before the tabular stone was raised." He follows with dimensions and a very good pen-and-ink sketch.

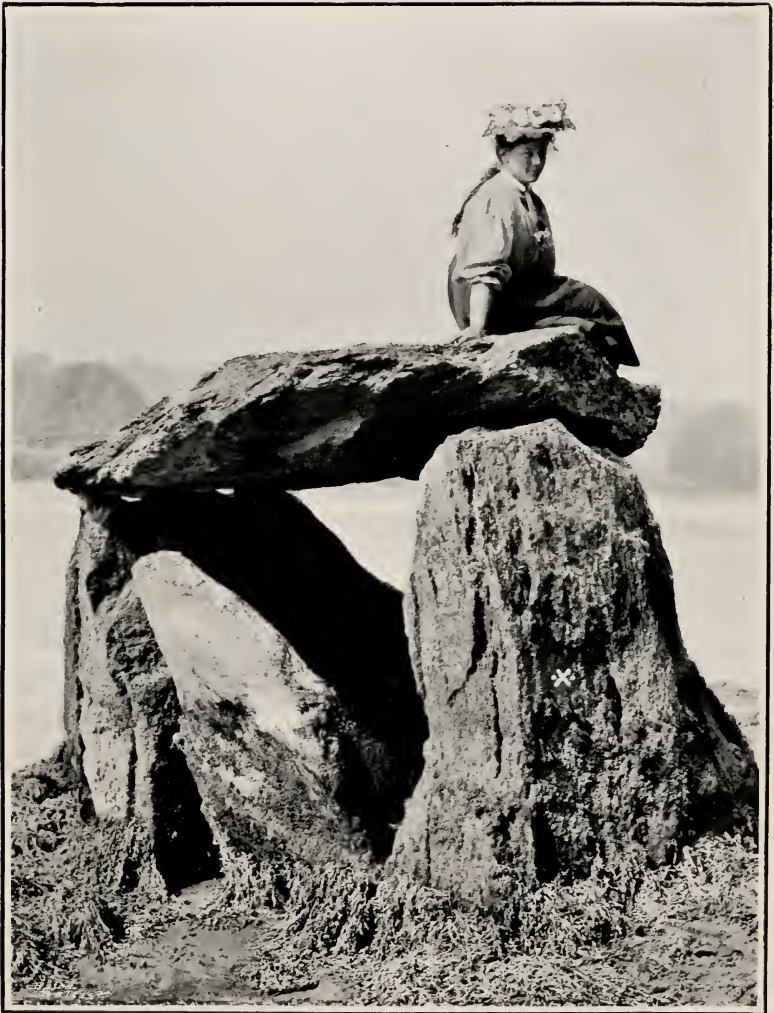
Borlase, in his book on "The Dolmens of Ireland," vol. i., p. 16, states that the cromleac was "thrown down" but was "restored" by Dr. Wise. As Borlase evidently got on the track of the memorial from Windele's MSS. notes, this seems anything but accurate. Windele says nothing of being "thrown down." He reproduces Windele's sketch, and gives some of his measurements.

In the *Journal of the Cork Historical and Archæological Society* for August, 1894, p. 163, Mr. James Coleman writes on "Prehistoric Remains in East Cork" contained in a scarce pamphlet, "Vestiges and Relics of Remarkable Irishmen in the Vicinity of Youghal, of the Primeval or Pagan Period," by Edward Fitzgerald, of Youghal. (Youghal, John Lindsay, 1858). Describing the sepulchral remains, Fitzgerald mentions that "at a place called Carrigmosteen in the slob at Rostellan is a very good specimen, the top stone or covering flag of which is gone, but the rough chest of stones remain minus one end." He goes on to mention numbers of other prehistoric remains destroyed in the Youghal district. Was it this pamphlet of Fitzgerald's that called the attention of Dr. Wise to the cromleac? It looks like it, and it was published two years before the date on which Windele went with Brash to see the cromleac with its cap stone restored. Would that Ireland in the past century had produced more restorers of the Dr. Wise type!

There is also mention in volume ii. of Gibson's "History of Cork" (1861) of the cromleac.

This, as may be seen by the plates, is a good example of a true cromleac—a free standing ancient memorial composed of one large stone supported by two or more others. The real interest, however, is more of a geological nature than archæological, owing to its partial submergence at each tide. Such cromleacs are usually found well above tide level, many of them on comparatively high ground; and it is extremely unlikely that the site was at the present level with regard to the sea, when a primitive race selected it for the erection of an important sepulchral monument—as we know these cromleacs were.

Mrs. W. H. Johnson (who was a member of the party at Rostellan) stated that she had visited the cromleac some years



THE SUBMERGED CROMLEAC, ROSTELLAN,
FROM THE SOUTH-WEST.

R. Welch, Photo.

The cross shows high-water mark.

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previously, and that there was then portion of a stone circle (three stones, which have since disappeared), and she was then informed that the circle was complete within the memory of persons then living.

The following measurements are from the Windele MSS., and, with the photographs and sketches, constitute the first accurate published description of the cromleac.

DIMENSIONS.

Horizontal or table stone.—Length, 5.6; breadth, 5.7; thickness, 1.6.

Uprights, 3.

South side stone.—Height, 5.4; breadth, 4.8; thickness, 1.3.

„ 6.11; „ 1.6.

North side stone, 4.6; „ 4.3; } „ 1.6.

„ 7.0. }

Head stone (west), 5.8 „ 3.5.

Enclosed area, 2 feet 5 inches (square).

For a height of $2\frac{1}{2}$ feet above the surface of the mud the uprights are covered with a growth of seaweed.

VERTEBRATA.

BY ROBERT PATTERSON, F.L.S., AND NEVIN H. FOSTER, M.B.O.U.

THE observations in this Kingdom were almost exclusively confined to the class Aves; the only Mammals observed being the Rat, the Hare, the Rabbit, and a few Bats; but numerous specimens of Frogs and Newts were seen; and at Inchigeela a Lizard, *Lacerta vivipara* (our only Irish reptile), was captured. This animal was exhibited at the conversazione in the Assembly Rooms on the last evening of the Conference and evoked considerable interest among the members présent.

The Birds observed each day were carefully noted, and the day's lists varied from 14 species, seen on the first afternoon in Cork city, to 47 species observed on two of the Conference days. Altogether the following 75 species were recorded during the six days:—

Mistle-Thrush.	Sand-Martin.	Pheasant.
Song-Thrush.	Greenfinch.	Landrail.
Blackbird.	House-Sparrow.	Moor-hen. ⁴
Wheatear.	Chaffinch.	Coot.
Stonechat.	Linnet.	Ringed Plover.
Redbreast.	Lesser Redpoll.	Lapwing.
Whitethroat.	Corn-Bunting.	Oyster-catcher.
Golden-crested Wren.	Yellow Bunting.	Snipe.
Chiffchaff.	Reed-Bunting.	Dunlin.
Willow-Wren.	Starling.	Common Sandpiper.
Sedge-Warbler.	Magpie.	Redshank.
Hedge-Sparrow.	Jackdaw.	Curlew.
Dipper.	Hooded Crow.	Common Tern.
Long-tailed Tit.	Rook.	Black-headed Gull.
Great Tit.	Sky-Lark.	Common Gull.
Coal-Tit.	Swift.	Herring-Gull.
Blue Tit.	Kingfisher.	Lesser Black-backed Gull.
Wren.	Sparrow-Hawk.	Great Black-backed Gull.
Tree-Creeper.	Kestrel.	Kittiwake.
Pied Wagtail.	Cormorant.	Razorbill.
Grey Wagtail.	Shag.	Guillemot.
Meadow-Pipit.	Heron.	Puffin.
Rock-Pipit.	Mute Swan.	Little Grebe.
Spotted Flycatcher.	Sheld-Duck.	
Swallow.	Mallard.	
House-Martin.	Ring-Dove.	

None of these species are additional to the birds already known in the county, but we may be permitted to remark that the time the Conference is held is about the very worst season for ornithological observation, and we would suggest that in future the meeting should be held early in June instead of mid-July.

The most interesting observation was that of a large breeding colony of birds on the cliff-face and stacks of the western side of the Old Head of Kinsale. Here the rocks and the sea around were literally covered with birds, and constant streams of parent birds flew from the rocks to the sea, returning again with food for their young. This colony consisted of a considerable number of Herring-Gulls, whose nests were, as a rule, on the higher ledges of the cliffs; the lower ledges and crevices being tenanted by Shags. Numerous Kittiwakes occupied suitable situations in the fissures of the cliff, and a Great Black-backed Gull, with an immature bird of the same

species, was seen perched on a small rock-stack. Large numbers of Puffins had their nests in the sloping banks above the cliffs, and the ledges below were crowded with Razorbills and Guillemots, the latter far outnumbering the former species. On the east side of the head was also a small nesting colony of Herring-Gulls, consisting of about a dozen pairs, and in a marshy spot some distance inland a flock of Common Terns was noted. As this flock contained immature, as well as mature birds, their breeding place was probably not far distant.

Lough Allua proved disappointing. Here everything pointed to a suitable place for many species, but after careful examination the only birds visible to us were one Common Sandpiper, one Moor-hen, and a female Mallard with two ducklings.

The following notes refer to some of the more interesting observations :—

- Cinclus aquaticus.** DIPPER.—Only once seen, on the River Lee near Blarney.
- Anthus obscurus.** ROCK-PIBIT.—Seen at Youghal and at Kinsale, but not observed in Cork Harbour.
- Cotile riparia.** SAND-MARTIN.—A large nesting colony in the sand cliffs at Youghal.
- Linota rufescens.** LESSER REDPOLI.—Only seen at Inchigeela.
- Emberiza millaria.** CORN-BUNTING.—This bird we had expected would be common, but a few only were observed at Kinsale and Blarney.
- E. citrinella.** YELLOW BUNTING.—Probably more birds of this species seen than of any other passerine bird.
- Corvus cornix.** HOODED CROW.—This species was very common, and was observed not only by the shore and in the wilder districts, but also in the highly cultivated tracts.
- Alcedo isplda.** KINGFISHER.—One seen on the River Lee near Macroom.
- Phalacrocorax carbo.** CORMORANT.—Common in Cork Harbour, and at Youghal and Kinsale. One bird observed feeding close to St. Patrick's Bridge in the centre of Cork City.
- Cygnus olor.** MUTE SWAN.—On the lake at Rostellan eleven of these birds were noted in company with numerous Moor-hens, Coots, and Little Grebes.
- Tadorna cornuta.** SHELD-DUCK.—Three pairs seen at Youghal, one pair with ducklings in the down, the second pair with young almost fully grown, and the third pair without progeny. Several pairs and their broods were also seen at Rostellan.

Tringa alpina. DUNLIN.—Several of these birds in the black breasts of the breeding plumage were observed at Youghal. These we did not expect to see, as this species is not known to breed in Ireland further south than Co. Wicklow.

Totanus callidris. REDSHANK.—Very numerous on the mud flats of the Blackwater estuary, both young and mature birds. This is remarkable, as this species is not known to breed in the counties of Kerry, Cork, or Waterford, and the observation elicits the remark from Mr. R. J. Ussher, "I wonder how far off their breeding-ground is."

Numenius arquata. CURLEW.—Very numerous on the mud-flats at Youghal. We noted that, on the rise of the tide, about a hundred of these birds settled on a grass meadow by the side of the River Blackwater, and permitted us to watch them at unusually close quarters.

Larus ridibundus. BLACK-HEADED GULL.—By far the most numerous of the *Laridæ* seen. The mature birds had still the dark-brown hoods of the breeding plumage, while at the same time most of our northern birds' heads were almost entirely white. This species is not known to breed either in Cork or Waterford, but it may have been overlooked, as undoubtedly some of the birds observed were birds of the year.

L. canus. COMMON GULL.—A few of this species were seen in Cork Harbour and at Kinsale, but although in mature plumage they may have been non-breeding birds, as the so-called Common Gull is only known to breed in Ireland in the counties of Kerry, Galway, Mayo, and Donegal.

The "pellets" of some birds were found by different members. These have been kindly examined for us by Mr. R. Standen, of Manchester, who reports as follows:—

"BIG GREY PELLETS.—This is evidently from Long-eared Owl, and contains an almost perfect set of bones of Skylark, with body feathers and undigested coating of gizzard of doubtless the same bird; also teeth of Long-tailed Field Mouse, but no bones of same.

"SMALL WHITE PELLETS.—This is composed almost entirely of fragments of Boletus, with numerous elytra of *Cis boleti*, a beetle which swarms when it does occur, and very probably the fungus was eaten on account of it. Also fragments of *Helix caperata*, chiefly columellæ, and several parts of shell.

"FOUR SMALL BROWN PELLETS.—The larger of these contained the sternum and thigh bone of a Frog, and, like the rest, was composed of husks of an oat-like grass, various small seeds, and one contained the elytron of an *Aphodius*. Also fragments of *Helix caperata*, *Pterostichus* sp., *Otiiorhynchus* sp., small crustacean (Wood-louse sp.), and much digested frog bones."

LAND AND FRESHWATER MOLLUSCA.

BY R. WELCH, M.R.I.A., AND A. W. STELFOX.

THE fact that we are at present engaged in completing a census of the land and freshwater Molluscs of Ireland, made a visit to the Cork district of special interest to us. In old lists, the county of Cork was taken as one, and in the Conchological Society's census it is divided, by the River Lee and the western shore of Cork Harbour, into North and South Cork (Watson's Botanical Divisions), while in Mr. Praeger's division of Ireland, which we will follow in this paper, Cork is divided into three vice-counties—West, Mid, and East Cork. This fact made it very difficult to decide in which vice-county many of the old records should go, though we were able to settle some by the aid of Mr. R. A. Phillips of Cork, whose list, published in the *Journal of the Cork Historical and Archæological Society*, September, 1904, was of the greatest importance to us. There being many blanks for some of the divisions, we were glad to take advantage of the Conference excursions, which enabled us to collect in all of the vice-counties of Cork, as well as in Waterford. We were fortunate in having the assistance of such old and experienced workers as Messrs. J. W. Taylor, F.L.S., and W. Denison Roebuck, F.L.S., of Leeds, R. Standen of Manchester, and J. N. Milne of Belfast, while Mr. R. A. Phillip stwice joined our party. Much help was also lent us by Mrs. Praeger, Messrs. Hinch, W. H. Patterson, R. Patterson, Gallway, Balfour Browne, Jackson, and Rankin. The area visited was more like that surveyed during the Kenmare Conference of 1898 than that of Galway in 1895, or Sligo in 1904. It covered, however, a much larger field than any of these, and with the exception of coast sand-dunes, provided more variety of ground. The only excursion on which we found suitable habitats for the xerophiles was that to Youghal, and even there this was not typical and was restricted in area. As against this, we had a great variety of habitats for the freshwater species, as the marshes at Youghal and Ballyphehane, also the River Lee at Carrigrohane and The Gearagh. Practically all our collecting was on the Carboniferous slates, grits, and shales, or the slates

and sandstones of the Old Red Sandstone. The only exception to this was in the immediate neighbourhood of Cork city, where the Carboniferous limestone forms the valley of the Lee. Suitable habitats for characteristic northern species we found more plentiful than we would have expected in a highly cultivated southern county such as Cork, but the rough woods along the Blackwater near Youghal, at Lough Allua, and especially those facing north across the north inlet at Rostellan demesne, provided just the ground that *Helix lamellata*, *H. fusca*, *Hy. excavata*, and *Acme lineata* are usually found on. Some small species from these woods, which would otherwise have escaped observation in a hurried visit, were collected by Mr. Standen—to whom we owe our best thanks—from moss shakings. This method of collecting is indispensable where a quick survey of the ground is required. One of our main objects was to study the larger Hyalininæ, as so much confusion has arisen through mistakes in the identification, in the British Isles generally, of *Hy. draparnaudi*, *Hy. glabra*, and *Hy. helvetica*; and in Ireland between the first mentioned and the large forms of *Hy. cellaria*. Like the former Conference weeks, the weather during this was all against the collector of mollusca, being hot and dry most of the time. Owing to this, all chance of finding *Geomalacus* in the west of the county was hopeless. This was a great disappointment to us, as at Inchigeela and Lough Allua there were large areas of rocky habitats, in no way differing from those in which the slug is usually found, except, of course, that they are further from the sea. Thanks to Messrs. Taylor and Standen many doubtful points that arose during the collecting were settled on the spot, while Mr. Roebuck's experience in the identification of the slugs and their varieties was most valuable, enabling the daily lists to be completed in the field. As Messrs. Taylor and Roebuck found collecting in Ireland so different from that they were accustomed to in England, we thought that it would add greatly to the interest of the report if they would give us a few notes on the subject, which they have kindly done as follows:—

“The malacologists at the Cork Conference were not favoured during the excursions with suitable climatological



LEAVING CORK FOR AGHADA.

R. E. Hadden, Photo.



IN THE GEARAGH.

R. E. Hadden, Photo.

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conditions for fully studying the mollusca and more especially the slugs, and although collecting results were comparable in quantity to what would be got in favourable localities in the north of England, yet probably, owing to the warmth of the weather and the dryness of the ground, we did not find land-shells in the immense numbers in which they undoubtedly occur in some parts of Ireland, but to which abundance we in England are almost strangers.

One feature that strikes the English collector in the south of Ireland is the scarcity, and almost absence of *Helix rotundata*, a species which in the north of England is ubiquitous and found beneath almost every stone.

The total absence of Clausiliæ, except for the occasional occurrence of *C. bidentata*, was also very noticeable, while the abundance of *Hyalinia excavata* among luxuriant undergrowth in company with other woodland species, was to us very remarkable, as in Yorkshire it is almost confined to barren and inhospitable ground, mostly on the Coal-measures, and usually only with *Hyalinia alliaria* and *Helix rotundata* as companions.

That the district examined during the Conference is a comparatively primitive one, as regards its molluscan fauna, was shown by the presence at Aghada of a fine adult *Arion ater* which distinctly and clearly retained the juvenile or primitive character of dark lateral banding on the body, a feature which, moreover, is comparatively common in Ireland, and also to an extent characteristic of the species in the Iberic peninsula.

This distinction is strengthened by the great abundance on the rocky slopes at Lough Allua of the var. *fuliginosa* of *Arion subfuscus*, a form first described as Portuguese, and which has also been very appropriately dedicated to the enthusiastic naturalist Mr. R. A. Phillips of Cork.

These somewhat primitive elements in the fauna were still further emphasized by the capture in the fir wood at the same place by Mr. Roebuck of a fine adult example of *Limax cinereoniger* var. *vera*, which is the very first Irish record of this form, and only the second instance of its occurrence in the whole of the British Isles.

Several Milaces, which were found during the Conference gathering, offered field for discussion as to their specific

allocation. One fine specimen from the burial-ground at Old Aghada was spotted very much like examples of *Milax (Amalia) marginatus* of Draparnaud, received some time ago from the Continent, and it is not unlikely that a careful anatomical examination of this specimen would have established the presence of a third species of *Milax* in Ireland.

A number of smaller *Milaces* found at Blarney which, from the activity of their movements and the aqueous nature of their slime, bore a very strong resemblance to *Milax gagates*, were however referable to *Milax Sowerbyi* sub-var. *insolita*, in which form the mucus is not nearly so tenacious as in the typical form of the species, which, when found adult in its usual garden habitats, feels, as so well expressed by Mr. Welch, like a half dried-up lump of fat.

Among the testaceous species, one remarked that at Carrigrohane the small *Hyalinia contracta* occurred in company with the larger form *Hyalinia crystallina*. Though from lack of demonstration of structural divergence these two forms are classified together in this country, yet abroad they are (and probably truly) regarded as distinct, the differential characters being the smaller shell, the closer and more compact coiling of the whorls, and the more minute umbilicus.

At the same place, fine and undoubted specimens of *Hyalinia lucida* were found, as well as examples of the large and more elevated form of *Hyalinia cellaria* which has so often been mistaken for it, and constitutes a connecting link or intermediate form between *H. lucida* and *H. cellaria*, and is evidence that here we are amidst a more primitive group in which the intermediate or intergrading forms have not yet been eliminated.

The great abundance of retreating and decadent species was also very noticeable, the comparative profusion and apparently wide dispersal of *Succinea oblonga* being a remarkable feature of the fauna to English collectors, who, until the recent discovery in Westmoreland and its re-discovery at Braunton Burrows, regarded this species as one almost impossible to collect in England in a living state.

The presence in abundance of *Hyalinia excavata*, *Helix lamellata*, *Pupa anglica*, and other so-called northern forms in

this extreme southern section of Ireland, was also of great interest, as showing that the retreat of the weaker species may be in any direction in which greater freedom from competition is assured, or may be expressed as following the line of least resistance.

The prevalence of albine varieties either of shell or animal in *Agriolimax agrestis*, *Arion ater*, *Hyalinia cellaria*, *Hy. alliaria*, *Hy. pura*, *Hy. radiatula*, *Hy. excavata*, *Helix rufescens*, and *Acme lineata*, in some cases in considerable numbers, and to the exclusion of the pigmented typical forms, was also a remarkably noteworthy fact, for, according to some authorities, the prevalence of the albine or semi-albine state, which is a pathological phenomenon, is an indication that the species so affected is approaching the limit of its area of distribution either vertically or horizontally.

The fauna, as far as our limited time allowed us to examine it, has for its salient features the prevalence of species not existent in England, or whose presence there is more or less restricted to special regions or confined to widely separated and discontinuous areas."

For ease of reference, we give here the localities, and their county divisions, mentioned in the list of species.

3. CORK WEST.—The Gearagh, Lough Allua, Gouganebarra, Ballinspittal, Courtmacsherry, and Simon's Cove.

4. CORK MID.—Carrigrohane, Blarney, Ballyphehane, Kinsale, Farrangalway, Lough of Cork, and Cork City.

5. CORK EAST.—Youghal, Aghada, Rostellan, and Doneraile.

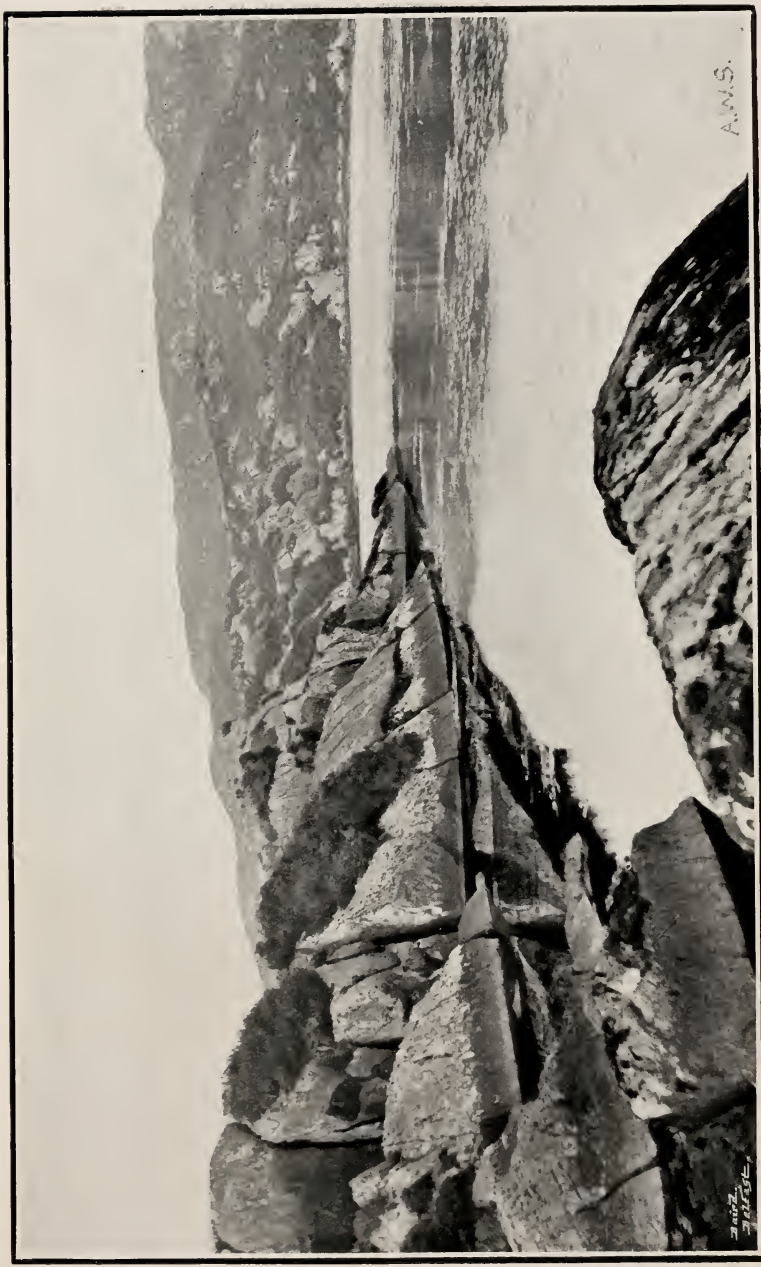
6. WATERFORD.—Ardsallagh, Glendine.

In the following list of species, Dr. Scharff's nomenclature, as in *I. N.*, vol. I., 1892, is again adopted for reasons already given in the Sligo report (*I. N.*, Sept., 1904, p. 185.)

LIST OF SPECIES.

Vitrina pellucida, Müll.—Did not seem as common as in the north, and was only taken alive at Gouganebarra. Dead shells were found sparingly at Youghal and Rostellan.

- Hyalinia cellaria**, Müll.—Generally distributed throughout the district — Ballyphehane, Glendine, Ardsallagh, Carrigrohane, Blarney, Aghada, and Rostellan. All specimens taken were of a large highly-polished form, with dark-blue animals, and therefore not typical *Hyalinia cellaria*, Müll.
- Hy. Draparnaudi**, Beck.—Sparingly around old buildings, as the church at Youghal (W. H. Patterson), and that at Aghada. Also taken at Carrigrohane (Milne) and Ballyphehane.
- Hy. sp. ?**—A very polished species belonging to this genus, having a highish spire and a narrow umbilicus, was taken in several localities. As it did not seem to us to be referable to either *Hy. cellaria* or *Hy. Draparnaudi*, we sent the specimens to Mr. A. S. Kennard, F.G.S., who has been making a special study of this group, both recent and fossil, and we give below an extract from his letter. "This species is represented from Ballinspittal, Youghal, and Carrigrohane, and I am unable to identify it with any recorded British species. It is near to *Vitrea Rogersi*, B. B. W., but it is certainly not that form; neither is it *V. helvetica*, Blum., of which I possess an original specimen. It is possible that it is *V. subglabra*, Bourg. I have not seen this species, but, judging from the figure, it is very near to the Irish shell. Mr. J. W. Taylor, however, considers *V. subglabra* as a synonym of *V. lucida*, Drap. (*Hyalinia Draparnaudi*, Beck.), but the Irish shell is certainly not the latter species. Under these circumstances, it is perhaps better to list for the present as *Vitrea sp. ?*" It is possible that this is the shell which has been listed from various Irish localities under the names of *Hyalinia glabra* and *Hy. helvetica*.
- Hy. allaria**, Miller.—Frequent, but nowhere common. The var. *viridula* was found oftener than the type. Ballyphehane, Glendine, Blarney (var. *viridula*), Rostellan, Kinsale, Ballinspittal, and Gouganebarra (var. *viridula*).
- Hy. nitidula**, Drap.—Occurred, but not commonly, in all the old wooded areas. The var. *helmi* was seen only at Ballyphehane (Standen). The type was found at Ardsallagh, Rostellan, and Gouganebarra.
- Hy. pura**, Alder.—Rather rarer than any of the preceding species of the genus, Ardsallagh (var. *nitidosa*, and type), and The Gearagh being the only two localities in which it was recorded.
- Hy. radiatula**, Alder.—Like the last species, this was not common, but both the type and var. *viridescens-alba* were taken at Glendine, The Gearagh, Lough Allua, Carrigrohane, Rostellan, and Ballinspittal.
- Hy. crystallina**, Müll.—Generally distributed and common—Glendine, The Gearagh, Lough Allua, Blarney (var. *contracta*), Ballinspittal, and Gouganebarra. This shell showed great variation, and two very distinct forms were noted—a small type, and a much larger and more expanded form. The colour of the latter seemed



LOUGH NAGARRIVA, THE HOME OF PISIDIUM HIBERNICUM.

A. W. Stelfox, Photo.

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to be a more opaque green than the common form, which is usually very glossy, and reminded one more of the dull colour of *Hy. pura*. This large form was taken very abundantly in company with *Hy. nitida* and *Succinea oblonga* at Carrigrohane.

- Hy. fulva**, Müll.—Well distributed, but only a few individuals found in each locality—Ballyphehaue, Glendine, Lough Allua, Carrigrohane, and Kinsale.
- Hy. excavata**, Bean.—The type and var. *vitrina* of this local shell were common in the damper parts of some of the old native woods as at Glendine and the shore of Lough Allua. In the former locality the var. *vitrina* only was noted, while at Lough Allua the type was much the commoner form.
- Hy. nitida**, Müll.—Very common at Carrigrohane (a large pale form), and found in most marshy places visited—Glendine Castle, Lough Allua, Ballinspittal, and Kinsale.
- Arion ater**, L.—Many colour forms of this common slug were noted, ranging from the almost albino var. *succinea* to the jet-black type. The following varieties are recorded on Mr. Roebuck's authority:—Var. *succinea* at Cork and Aghada, *brunnea* at Youghal, *plumbea* at Glendine, and *castanea* at Farrangalway and Lough Allua. At Farrangalway, near Kinsale, ten specimens were taken under one stone by Mr. Roebuck, all of different shades of colour, and none typical. Many specimens were taken which had fuscous bands on their backs. Mr. Taylor considers this a survival of a primitive characteristic.
- A. subfuscus**, Drap.—Common throughout the district—Ballyphehaue, Youghal, The Gearagh, Blarney, Rostellan, Ballinspittal, Courtmacsherry (Hinch), Farrangalway, and Gouganebarra. Var. *fuliginosa*, a Portuguese form, was taken at Lough Allua by Mr. Roebuck.
- A. hortensis**, Fér.—Not nearly so common as the last species, but was noted in nearly all localities.
- A. circumscriptus**, Johnst.—Somewhat local, but occurred at Glendine, Carrigrohane, Blarney, Rostellan, and Ballinspittal.
- A. intermedius**, Normand.—Did not appear common, except in the old woods, but was observed at Glendine, The Gearagh, and Gouganebarra.
- Limax maximus**, L.—This variable species was noted on the following excursions:—Glendine, Ardsallagh, Rostellan, Kinsale, Simon's Cove (Hinch), and Gouganebarra. Var. *bifasciata* at Glendine, and var. *cellarius* at Kinsale.
- L. cinereo-niger**, Wolf.—Mr. Roebuck took a fine example of this species in the fir wood at Lough Allua. It was not a typical specimen, having four bands, and referable to var. *vera*—an extremely rare form—this being the first Irish record.
- L. flavus**, L.—Apparently rather local, and was only seen at Glendine Castle and under logs near Aghada.

- Limax marginatus**, Müll.—The commonest species of the genus, and, although the weather was so hot and dry, it was taken in nearly every locality visited.
- Agriolimax agrestis**, L.—Very common everywhere. The white form was taken at Carrigrohane (Standen), and on the extreme point of the Old Head of Kinsale (R. Patterson).
- A. lævis**, Müll.—Common at Ballyphehane, The Gearagh, Lough Allua, Blarney, and Simon's Cove (Hinch).
- Amalia Sowerbyi**, Fér.—Typical specimens were taken at Youghal (Balfour Browne), Ardsallagh, Carrigrohane, Ballinspittal, and in Cork City. At Upper Aghada a large specimen was taken, very much like *Amalia marginatus*. Drap., a species hitherto only found on the Continent. (See Messrs. Taylor and Roebuck's notes in the introduction.)
- A. gagates**, Drap.—Much the same range as the last species—Blarney (var. *plumbea*), Glendine Castle (R. Patterson), Rostellan and Kinsale.
- Hellix pygmæa**, Drap.—Occurred in moss shakings from Glendine and Lough Allua (Standen), and was taken under stones, with *Succinea oblonga*, at The Gearagh.
- H. rotundata**, Müll.—Common in all localities visited.
- H. rupestris**, Drap.—Evidently well distributed throughout the county—Ballyphehane, Youghal, Ardsallagh, The Gearagh, Aghada church, and Doneraile.
- H. pulchella**, Müll.—Exceedingly scarce, and only taken at Youghal, Blarney, and in moss on a bridge at The Gearagh. The var. *costata* was not noted anywhere.
- H. aculeata**, Müll.—Not abundant anywhere—Lough Allua, Blarney, and in moss shakings from Rostellan (Standen).
- H. lamellata**, Jeff.—Fairly common in moss shakings from the old woods at Glendine and Lough Allua, but was not found in Mid or East Cork, where it no doubt occurs.
- H. hispida**, L.—Not as common as the next species, but generally distributed—Glendine Castle, Ardsallagh, Carrigrohane, Blarney, Rostellan, Farrangalway, and Gouganebarra.
- H. rufescens**, Penn.—The type common everywhere, and the var. *rubens* in most localities.
- H. fusca**, Mont.—Rare, and was only taken in East Cork and Waterford. Dead shells among Luzula at Glendine, and a few living examples on Iris, with *Succinea putris*, in the marsh at Rostellan.
- H. virgata**, Da Costa.—Only seen on the small stretch of sand west of Youghal and near Youghal bridge, in which localities it was very plentiful.
- H. intersecta**, Poir.—Well distributed, but nowhere common. Ballyphehane, Youghal, Ardsallagh, Carrigrohane, and Rostellan.
- H. ericetorum**, Müll.—Found in one spot only—on a roadside bank one mile south-west of Youghal railway station.

- Helix acuta**, Müll.—On the sands south of Youghal this species was fairly abundant, most of the specimens being var. *strigata*, but was not seen elsewhere.
- H. nemoralis**, L.—Not abundant, but generally distributed. Some very nicely marked specimens were taken at Aghada church and also at Ardsallagh. Several very thin examples were taken by Mrs. Praeger at Lough Allua, which were practically var. *tenuis*, and this form was also noted at Keim-an-eigh, above Gouganebarra.
- H. aspersa**, Müll.—Very common on old walls and similar situations. The predominating form was var. *flammea*, and many specimens were almost entirely black.
- Cochlicopa lubrica**, Müll.—Almost everywhere in the damper situations.
- Pupa anglica**, Fér.—This shell, though rare and local, was taken in the woods at Glendine, Blarney, and Rostellan, and also in the marsh at Ballinspittal. Most of the specimens taken were of a pale colour and not typical.
- P. cylindracea**, Da Costa.—Common in all suitable localities.
- P. muscorum**, Müll.—Two specimens were taken on the wall of the railway bridge at Youghal. This was the only record for this species, though it is probably common on the sandy area south of that town.
- Vertigo edentula**, Drap.—Occurred in moss shakings from Glendine, Lough Allua, and Rostellan.
- V. pygmæa**, Drap.—Like all the other Vertigos, this species was not found at all plentifully—Ballypnehane, Youghal, in moss shakings from Glendine (Standen), and at Ardsallagh.
- V. substriata**, Jeff.—Taken by Mr. Standen in moss shakings from Glendine.
- V. anti-vertigo**, Drap.—A few specimens were taken at each of the following localities:—The Gearagh, Lough Allua, Carrigrohane, Ballinspittal, and Farrangalway.
- Balea perversa**, L.—Generally distributed but not common anywhere—Glendine Castle, Youghal church, Ardsallagh, Blarney, Rostellan, and Gouganebarra.
- Clausilia bidentata**, Ström.—Very common in all parts of the county visited.
- Succinea putris**, L.—At Ballypnehane, The Gearagh, Carrigrohane, Blarney, Rostellan, Ballinspittal, and Farrangalway, this species was both large and plentiful. Most specimens taken were very dark in colour.
- S. elegans**, Risso.—Not found so commonly as the last species, but fine specimens were to be had at Ballypnehane, Youghal, Carrigrohane, Rostellan, and Farrangalway.
- S. oblonga**, Drap.—This rare and local shell was found to be fairly common under stones at The Gearagh (Phillips) and sparingly by the River Lee at Carrigrohane. Most of the specimens collected were fully grown, and those from Carrigrohane were exceptionally large.

Carychium minimum, Müll.—Common in all likely habitats.

Melampus bidentatus, Mont.—This brackish-water shell occurred very abundantly at Rostellan.

Limnæa auricularia, L.—Two specimens were taken by Mr. F. Balfour Browne in the marsh west of Youghal, constituting our only record for this somewhat local shell.

L. peregra, Müll.—Young shells taken everywhere, and a few fine adults were found in a roadside pool near Rostellan. This species was noted at Gouganebarra Lough.

L. palustris, Müll.—This species, like the last, was found abundantly everywhere. A slender form was taken, with the type, in the marsh at Ballyphehane, which it is possible may have been the shell recorded by the late Dr. Jeffreys as *L. glabra*, Müll. It may be as well to give here the history of that record from the late Mr. W. Thompson's Catalogue of the land and fresh-water Mollusca of Ireland, reprinted from *Ann. & Mag. Nat. Hist.*, Sept., 1840. "*Linnaeus glaber*, Gray.—I have not seen any Irish specimens of this *Limnaeus*, which is thus noticed in the supplement to Mr. Jeffreys' paper in the Linnean Transactions, vol. 16, p. 520:—"Ireland, Rev. James Bulwer." On inquiry of Mr. Bulwer, he stated that the shell so noticed was considered by him but a variety of *L. palustris*. By a letter from Mr. Jeffreys dated June 8, 1840, I learn that '*L. elongatus* was mentioned as Irish on the authority of the late Dr. Goodall, who stated that he had received specimens from Mr. Bulwer.' Mr. Jeffreys adds, 'I have, however, two or three undoubted specimens among a collection of Irish shells, which I purchased about three months ago from Mr. John Humphreys of Cork—the tray which contained them was labelled Cork.' From Mr. Humphreys I learn that he had not identified the species, but that the note of locality appended to the shells alluded to by Mr. Jeffreys was strictly correct." Thus it will be seen that Dr. Jeffreys recorded this *L. glabra*—firstly, on the authority of Dr. Goodall, and without seeing the specimens for himself; secondly, from specimens taken from a collection which had been kept in open trays—both of which would now be considered untrustworthy data for a record of a species not hitherto found in Ireland.

L. truncatula, Müll.—Common at Ballyphehane, Ardsallagh, The Gearagh, Carrigrohane, Ballinspittal, and Lough of Cork.

Physa fontinalis, L.—Neither this nor the next species occurred commonly, but specimens were taken at Ballyphehane, Youghal, The Gearagh, Carrigrohane, and Blarney.

Aplexa hypnorum, L.—Distinctly rare, and only found at Ballyphehane and in the marshes at Youghal.

Planorbis marginatus, Drap.—Rare at Youghal (Balfour Browne), but common in draius running into the lake at Rostellan.

P. spirorbis, L.—A small form was common at Ballyphehane, Youghal, Carrigrohane, and Rostellan.

- Planorbis contortus**, L.—Common in the River Lee at The Gearagh and also at Carrigrohane. Sparingly also at Blarney Castle.
- P. albus**, Müll.—Taken sparingly at The Gearagh and in Lough Allua, but was common at Carrigrohane and in the Lough of Cork.
- P. crista**, L.—Common in a small pond near Youghal bridge, Carrigrohane, and Lough of Cork. Most of the specimens taken by us were var. *nautilus*.
- P. fontanus**, Lightfoot.—Fairly common at Carrigrohane, in a pond in the Rock Close at Blarney, and in the Lough of Cork.
- Ancylus fluviatilis**, Müll.—Occurred abundantly in the Lee at Carrigrohane. Also found at Lough Allua, Kinsale, and Gouganebarra.
- Acme lineata**, Drap.—Rather large specimens (all var. *alba*) were found fairly commonly in the woods at Rostellan, while the type only was taken in moss shakings from Glendine (Standen).
- Bythinia tentaculata**, L.—Apparently not common, and was only noted at Lough Allua (lake rejectamenta), and in Rostellan Lake.
- Hydrobia ulvæ**, Penn.—In company with *Melampus bidentatus* at Rostellan, and with the next species at Glendine Castle (River Blackwater).
- H. Jenkinsi**, Smith.—Exceedingly common in the marshes at Youghal and in the drains running into Rostellan Lake. Also seen in the Blackwater at Glendine Castle. In a drain at Rostellan surrounded by trees a very small, slender form, with deep sutures, was taken, which from the free lip was certainly fully grown.
- Valvata piscinalis**, Müll.—This species was taken in the neighbourhood of Cork and Rostellan, but not elsewhere.
- V. cristata**, Müll.—Like *V. piscinalis* and *Bythinia tentaculata*, this usually common species was quite scarce, and was only taken at Youghal (Balfour Browne), Blarney Castle, and in the Lough of Cork.
- Sphærium corneum**, L.—A few large dead shells collected on the shore of Blarney Lake (Milne) were our only record for this species.
- Pisidium pulchellum**, Jenyns.—This handsome little bivalve was taken at Youghal.
- P. fontinale**, C. Pfr.—Lough of Cork.
- P. millium**, Held.—Carrigrohane and Ballinspittal.
- P. obtusale**, C. Pfr.—Ballyphehane Bog.
- P. pusillum**, Gmel.—Ballyphehane, Carrigrohane, Lough Allua, and Rostellan.
- Unio margaritifer**, L.—The Pearl Mussel has been taken by Mr. Phillips in the Rivers Lee and Blackwater, as well as some of their tributaries.

The above list contains 81 species, which is larger than that of any previous Conference.

COUNTY LISTS.

3. CORK WEST.

<i>Vitrina pellucida.</i>	<i>Agriolimax lævis.</i>	<i>Succinea putris.</i>
<i>Hyalinia cellaria.</i>	<i>Amalia Sowerbyi.</i>	<i>elegans.</i>
<i>sp. ?</i>	<i>gagates.</i>	<i>oblonga.</i>
<i>alliaria.</i>	<i>Helix pygmæa.</i>	<i>Carychium minimum.</i>
<i>nitidula.</i>	<i>rotundata.</i>	<i>Limnæa peregra.</i>
<i>pura.</i>	<i>rupestris.</i>	<i>palustris.</i>
<i>radiatula.</i>	<i>pulchella.</i>	<i>truncatula.</i>
<i>crystallina.</i>	<i>aculeata.</i>	<i>Physa fontinalis.</i>
<i>fulva.</i>	<i>lamellata.</i>	<i>Planorbis albus.</i>
<i>nitida.</i>	<i>hispidula.</i>	<i>crista.</i>
<i>excavata.</i>	<i>rufescens.</i>	<i>spirorbis.</i>
<i>Arion ater.</i>	<i>nemoralis.</i>	<i>contortus.</i>
<i>subfuscus.</i>	<i>aspersa.</i>	<i>Ancylus fluviatilis.</i>
<i>hortensis.</i>	<i>Cochlicopa lubrica.</i>	<i>Acme lineata.</i>
<i>circumscriptus.</i>	<i>Pupa anglica.</i>	<i>Bythinia tentaculata.</i>
<i>intermedius.</i>	<i>cylindræa.</i>	<i>Valvata cristata.</i>
<i>Limax maximus.</i>	<i>Vertigo edentula.</i>	<i>Pisidium pusillum.</i>
<i>cinereo-niger.</i>	<i>antivertigo.</i>	<i>milium.</i>
<i>marginatus.</i>	<i>Balea perversa.</i>	<i>hibernicum.</i>
<i>Agriolim axagrestis.</i>	<i>Clausilia bidentata.</i>	<i>Unio margaritifer.</i>

4. CORK MID.

<i>Hyalinia cellaria.</i>	<i>Amalia gagates.</i>	<i>Carychium minimum.</i>
<i>Draparnaudi.</i>	<i>Helix rotundata.</i>	<i>Limnæa peregra.</i>
<i>sp. ?</i>	<i>rupestris.</i>	<i>palustris.</i>
<i>alliaria.</i>	<i>pulchella.</i>	<i>truncatula.</i>
<i>nitidula.</i>	<i>aculeata.</i>	<i>Physa fontinalis.</i>
<i>pura.</i>	<i>hispidula.</i>	<i>Aplexa hypuorum.</i>
<i>radiatula.</i>	<i>rufescens.</i>	<i>Planorbis albus.</i>
<i>crystallina.</i>	<i>intersecta.</i>	<i>crista.</i>
<i>fulva.</i>	<i>nemoralis.</i>	<i>spirorbis.</i>
<i>nitida.</i>	<i>aspersa.</i>	<i>contortus.</i>
<i>Arion ater.</i>	<i>Cochlicopa lubrica.</i>	<i>fontanus.</i>
<i>subfuscus.</i>	<i>Pupa anglica.</i>	<i>Ancylus fluviatilis.</i>
<i>hortensis.</i>	<i>cylindræa.</i>	<i>Valvata piscinalis.</i>
<i>circumscriptus.</i>	<i>Vertigo antivertigo.</i>	<i>cristata.</i>
<i>intermedius.</i>	<i>pygmæa.</i>	<i>Sphærium corneum.</i>
<i>Limax maximus.</i>	<i>Balea perversa.</i>	<i>Pisidium fontinale.</i>
<i>marginatus.</i>	<i>Clausilia bidentata.</i>	<i>pusillum.</i>
<i>Agriolimax agrestis.</i>	<i>Succinea putris.</i>	<i>obtusale.</i>
<i>lævis.</i>	<i>elegans.</i>	<i>milium.</i>
<i>Amalia Sowerbyi.</i>	<i>oblonga.</i>	<i>Unio margaritifer.</i>

5. CORK EAST.

Vitrina pellucida.	Helix rotundata.	Succinea elegans.
Hyalinia cellaria.	rupestris.	Carychium minimum.
Draparnaudi.	pulchella.	Melampus bidentatus.
sp. ?	hispidula.	Limnæa auricularia.
alliaria.	rufescens.	peregra.
nitidula.	fusca.	palustris.
pura.	virgata.	truncatula.
radiatula.	intersecta.	Physa fontinalis.
crystallina.	ericetorum.	Aplexa hypnorum.
fulva.	acuta.	Planorbis marginatus.
excavata	nemoralis.	albus.
Arion ater.	aspersa.	crista.
subfuscus.	Cochlicopa lubrica.	spirorbis.
hortensis.	Pupa anglica.	Acme lineata.
circumscriptus.	cylindracea.	Bythinia tentaculata.
Limax maximus.	muscorum.	Hydrobia ulvæ.
flavus.	Vertigo edentula.	Jenkinsi.
marginatus.	pygmæa.	Valvata piscinalis.
Agriolimax agrestis.	antivertigo.	cristata.
lævis.	Balea perversa.	Pisidium fontinale.
Amalia Sowerbyi.	Clausilia bidentata.	pulchellum.
gagates.	Succinea putris.	pusillum.

6. WATERFORD.

Hyalinia cellaria.	Limax flavus.	Helix aspersa.
sp. ?	marginatus.	Cochlicopa lubrica.
alliaria.	Agriolimax agrestis.	Pupa anglica.
nitidula.	Amalia Sowerbyi.	cylindracea.
pura.	gagates.	Vertigo pygmæa.
radiatula	Helix pygmæa.	edentula.
crystallina.	rotundata.	substriata.
fulva.	rupestris.	Balea perversa.
excavata.	lamellata.	Clausilia bidentata
nitida.	intersecta.	Carychium minimum.
Arion ater.	hispidula.	Limnæa truncatula.
hortensis.	rufescens.	Acme lineata.
circumscriptus.	fusca.	Hydrobia ulvæ.
intermedius.	nemoralis.	Jenkinsi.
Limax maximus.		

The following species, which have been recorded for Cork by Phillips and others, were not met with during the Conference week. The capital letters following a species indicate the division of Co. Cork in which it has been found. Where

these are absent, it signifies that the record is an old one and the locality not known. Doubtful records are queried.

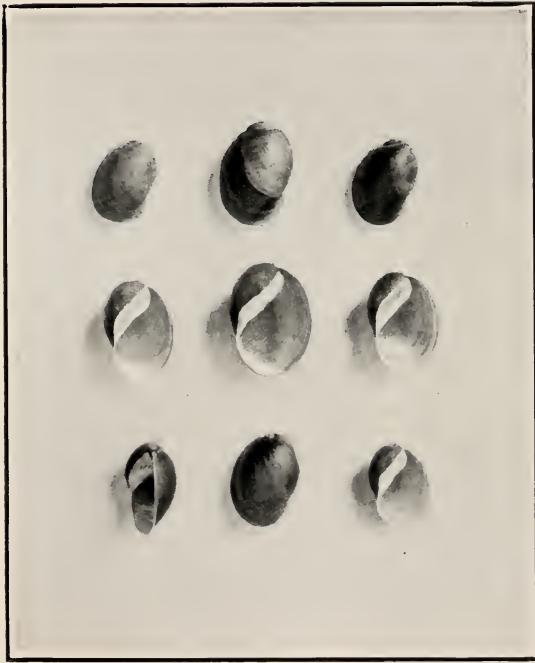
? <i>Hyalinia helvetica</i> , Blum.—W. & E.	<i>Planorbis carinatus</i> , Müll.—
<i>Geomalacus maculosus</i> , Allman.—W.	M. & E.
<i>Testacella haliotidea</i> , F. Big.—E.	? <i>P. vortex</i> , L.
<i>Helix sericea</i> , Drap.—E.	? <i>P. glaber</i> , Jeff.
<i>Cœcilianella acicula</i> , Müll.—E.	<i>Neritina fluviatilis</i> , L.—E.
<i>Vertigo angustior</i> , Jeff.	<i>Sphærium lacustre</i> , Müll.—
<i>Alexia denticulata</i> , Mont.—E.	M. & E.
? <i>Limnæa glabra</i> , Müll.	<i>Pisidium nitidum</i> , Jenyns.—M.
<i>L. stagnalis</i> , L.—E.	<i>P. annicum</i> , Müll.—E.

FURTHER NOTES ON THE LAND AND FRESHWATER MOLLUSCA OF CORK WEST AND KERRY.

BY A. W. STELFOX AND J. N. MILNE.

AFTER the Cork Conference was over a few days were spent by us at Glengarriff and Killarney. Our principal aim was to reach the only known habitats for *Limnæa involuta* and *Pisidium hibernicum*. The former is found in the now well-known lake on Cromaglaun Mountain, above the Upper Lake at Killarney. The latter species has only been taken by Dr. Scharff, who describes the habitat as "A small mountain tarn known by the name of Lough Nagarriva, about 1,200 feet above Glengarriff in the County Cork."¹ Lough Nagarriva is one of three small lakes three miles north-by-east of Glengarriff and close to the summit of Barraboy Mountain. Lough Nagarriva is just over the Kerry border, while the other two—Lough Namaddra and the third and smallest tarn, which bears no name on the Ordnance map—are both in County Cork. Lough Nagarriva must be two or three acres in area, and Lough Namaddra about one to one and a half; both are shallow and peaty, but contain plenty of food plants and several forms of animal life besides the mollusca. After close on a five hours' climb we reached the unnamed tarn—which lies some 150 feet higher than the other two—and in this we found plenty of *Pisidium hibernicum*, all however were young specimens. Descending to Lough Nagarriva we again found

¹ *I.N.* 1895, p. 335.



LIMNÆA SP. ? XI $\frac{1}{4}$,
FROM LOUGH NAGARRIVA, CO. KERRY.

R. Welch, Photo.

To face p. 286.

this *Pisidium* plentiful, and a few fairly large specimens were taken, though none reached the dimensions of Dr. Scharff's examples. In this lough we found a very thin species of *Limnæa*, resembling *L. involuta* in texture and size, only even more delicate and perhaps a little larger than that species is usually met with. The shell practically consists of epidermis, and like *L. involuta* is beautifully and regularly striated in the line of growth. The intortion of the spire is not quite so pronounced, though in some of the specimens taken, this is distinctly sunk. The animal in both colour and markings is very similar to *L. involuta* and *L. peregra*, but when in motion its habits show some striking peculiarities. It moves very rapidly and carries its shell in a jaunty fashion, often pausing to twist the shell quickly from side to side, as if trying to shake off some imaginary enemy. (See Messrs. Chaster and Collier on *L. involuta*, *I.N.*, Sept., 1898) In both its carriage and manner this mollusc is like a member of the *Physa* group, as besides its rapid and peculiar movements, the body is much further extended from the shell than in any other *Limnæa* we have seen, with the exception of the animal in *L. involuta*. It is probably this latter fact that led our early conchologists to place *L. involuta* under the genus *Amphipeplea*. Unfortunately time has not permitted Mr. J. W. Jackson, of Manchester, to investigate the anatomy of this *Limnæa*, but we give below the opinion of three of our most eminent conchologists, based on the external characters of the shell. Dr. Scharff considers that though closely allied to *L. involuta* it may be a distinct species. Mr. J. W. Taylor is inclined to believe that it is nearer to *L. Burnetti*, while Mr. A. S. Kennard puts it down as true *L. involuta*. With the last identification we are inclined to agree, but it is better to wait until the animals have been dissected before coming to any definite conclusion. On our homeward tramp we paid a short visit to Lough Namaddra and again we found *Pisidium hibernicum* common, but there was no trace of the *Limnæa*, though it may occur, as in Lough Nagarriva we only noticed it in one corner of the tarn and might easily have overlooked it, had not the finding of a dead specimen warned us to keep our eyes open. We give below a list, which comprises a few species not recorded in Mr. Standen's report on the Kenmare Conference of 1898, and also new localities for already recorded

species. Species not recorded in Mr. Standen's list, in *I.N.*, Sept., 1898, are shown thus †.

†**Hyalinia Draparnaudi**, Beck.—One specimen from Muckross Abbey, identified by Mr. A. S. Kennard.

†**Hy. sp. ?**—This species, which has been referred to in the Cork portion of the report, was taken at Muckross.

Hy. excavata, Bean.—The var. *vitrina*, as well as the type, was common in the woods at Glengarriff and on Torc Mountain.

†**Limax cinereo-niger**, Wolf.—A specimen with fuscous bands, somewhat like that recorded from Lough Allua, was taken near the Torc waterfall.

Helix fusca, Mont.—With the next species at Killarney.

H. sericea, Drap. (*H. granulata*, Alder).—This pretty little shell was extremely common along the southern bank of the road leading to the Lake View Hotel at Killarney, living on Iris and other tall plants in the damper situations. This shell has not been properly recorded from the north of Ireland,¹ and is very local even in the south.

Pupa anglica, Fér.—This shell was also found in the habitat mentioned above, and in company with *Helix fusca* and *H. sericea*.

Vertigo pygmæa, Drap.—With *Pupa anglica*.

Limnæa involuta, Harvey.—Several full-grown specimens in the Crincaum Lough, where egg masses were observed in great quantity on the submerged stones.

†**L. sp. ?**—Fairly common in Lough Nagarriva.

Physa fontinalis, L.—In one of the upper lakes in the Gap of Dunloe.

Planorbis spirorbis, L.—Common in marsh behind the Lake View Hotel at Killarney.

P. contortus, L.—In the Gap of Dunloe, with *Physa fontinalis* and *Ancylus fluviatilis*.

†**P. crista**, L.—The var. *nautilus* was taken with *P. spirorbis* and the next species near the Lake View Hotel.

†**P. fontanus**, Lightf.—Common in the last-mentioned locality.

†**Sphærlum corneum**, L.—In the rejectamenta from the Lower Lake at Killarney.

†**Pisidium hibernicum**, West.—Common in the three small tarns above Glengarriff, mentioned in the introduction.

†**Unio margaritifera**, L.—A dead specimen was picked up at the mouth of the River Blackwater, near Parknasilla. (A. W. S., 1899).

It may be as well to mention the county divisions in which the above localities are situated:—Gap of Dunloe, Lough Nagarriva, and Parknasilla are in Kerry South; the Killarney records and Torc Woods, including Lough Crincaum, are in Kerry North; while Glengarriff, Lough Namaddra, and its small neighbour, are in Cork West.

¹ See Thompson's Nat. Hist. of Ireland, vol. iv.



LOUGH CRINCAUM, THE HOME OF LIMNEA INVOLUTA.

A. W. Steffen, Photo.

DIPTERA.

BY J. N. HALBERT.

THE two-winged flies recorded here were all collected by Mr. R. Standen. Most of the species are common, but at least two, *Dialineura anilis* and *Platystoma germinationis*, are not indicated as having occurred in Ireland in a carefully marked catalogue of Irish flies compiled by Colonel Yerbury. I am indebted to Prof. G. H. Carpenter for assistance in the determination of the more critical species.

- Bibio marci**, L.—Blarney.
B. Johannis, L.—Blarney.
B. clavipes, Mg.—Blarney.
Chloromyia formosa, Scop.—Youghal.
Tabanus sudeticus, Zlr.—Youghal.
Chrysops cæcutiens, L.—Rostellan.
Dialineura anilis, L.—Blarney.
Scenopinus fenestralis, L.—Rostellan.
Hilara maura, F.—Rostellan.
Leucozona lucorum, L.—Rostellan.
Ischyrosyrphus glaucius, L.—Rostellan.
Syrphus vitripennis, Mg.—Rostellan.
S. luniger, Mg.—Blarney.
Volucella pellucens, L.—Rostellan.
Xylotasegnis, L.—Rostellan.
Scatophaga stercoraria, L.—Youghal and Rostellan.
Platystoma germinationis, F.—Blarney.
Opomyza germinationis, L.—Youghal.
Nemopoda cylindrica, Fab.—Youghal.

NEUROPTERA

BY J. N. HALBERT.

PANORPIDÆ.

THE discovery by Mr. R. Standen of a species of *Panorpa* in County Cork is one of the most satisfactory results of the Field Club Conference, as up to the present time no representatives of this interesting family have been recorded as

occurring in this country. The species found by Mr. Standen is:—

Panorpa germanica, L.—One male taken at Youghal. One female, at Blarney. The male specimen belongs to the form with unspotted wings, beautifully figured by Curtis in his *British Entomology*, xv., plate 696, while in the female the spots are joined to form narrow bands, like those of *P. commionis*.

It is very remarkable that these peculiar insects should have been so long overlooked in Ireland. It is likely, however, that they will prove to be of very limited range in this country, as is the case with many insects of wide distribution in Great Britain. The flies are commonly known to entomologists as "Scorpion Flies," on account of the curious shape of the body which, in the male, is curved upwards and carries a forceps-like structure at the end.

Panorpa germanica is common in Northern and Central Europe, occurring in woods and hedges during the summer months. The flies and their larvæ are carnivorous, the former are said to feed largely on Diptera.

TERRESTRIAL COLEOPTERA.

BY J. N. HALBERT.

THE land beetles recorded in the following list were collected by a few Field Club members who were good enough to devote part of their spare time to this work. I have specially to thank Messrs. F. Balfour Browne, J. N. Milne, R. Patterson, A. Stelfox, R. Standen, and others. The aquatic species have been investigated by Mr. F. Balfour Browne, who publishes a separate report on this interesting group.

Amongst the land beetles there are unfortunately no additional Irish species to record. On the other hand, a number of the species recorded here (at least sixteen) are new to the County Cork list, a result to be expected, bearing in mind the desultory nature of the collecting that has hitherto been done in this the largest of our Irish counties. At least four of the species are previously unrecorded from the province of Munster.

The rarer species captured include the ground beetle *Carabus clathratus*; it had already been found in the extreme western part of the county, and the present record helps to bridge a gap in the known southern range of this fine species. In the Cromaglaun woods A. W. Stelfox found *Pyropterus affinis*, a species whose Irish range seems strictly limited to the Kerry woodlands. It will be remembered that the re-discovery of this handsome insect was one of the objects, successfully accomplished, of the Kenmare Conference of nine years ago.

The collection also contains numerous examples of both the black and the brown forms of *Silpha subrotundata*, all clearly referable to this characteristic Irish variety.

In cases where no definite locality is mentioned Cork district must be understood. All of these unlocalized species are widely distributed in Ireland, and judging by their frequency in the collection, they are common in the Cork district.

LIST OF SPECIES.

- Cychrus rostratus**, L.—Gouganebarra.
Carabus nemoralis, Müll.—Youghal.
C. clathratus, L.—Found running on sphagnum on Ballinspittal bog by Mr. Standen.
C. granulatus, L.
Nebria brevicollis, F.
Elaphrus cupreus, Duft.—Rostellan, Youghal, &c.
Badister bipustulatus, F.
Stenolophus vespertinus, Panz.—Found at Youghal by Mr. Balfour Browne.
Bradycellus distinctus, Dej.—Youghal.
Harpalus ruficornis, F.
H. æneus, F.
H. latus, L.
Pterostichus madidus, F.
P. nigrita, F.
P. vernalis, Gyll.
P. striola, F.—Youghal, &c.
Amara fulva, Dej.—Youghal.
A. familiaris, Duft.—Youghal.
Calathus cisteloides, Panz.
C. mollis, Marsh.—Youghal.
C. melanocephala, L.

- Pristonychus terricola**, Herbst.—Taken by Mr. Patterson.
- Anchomenus angusticollis**, F.—Youghal.
- A. dorsalis**, Müll.—Aghada.
- A. marginatus**, L.—Rostellan.
- A. parumpunctatus**, F.—Lough Allua.
- A. viduus**, Panz., var. **mœstus**, Duft.—Ballinspittal.
- A. gracilis**, Gyll.—Ballinspittal.
- A. piceus**, L.—Ballyphehane Bog.
- Bembidium æneum**, Germ.—Youghal. A small form.
- B. assimile**, Gyll.—Youghal.
- B. lampros**, Herbst.—Youghal.
- B. punctulatum**, Drap.—Carrigrohane.
- B. varium**, Ol.—Youghal.
- Trechus minutus**, F., var. **obtusus**, Er.
- Megasterna boletophagum**, Marsh.—Loughrulton.
- Tachyporus hypnorum**, F.—Aghada.
- Tachinus rufipes**, L.—Ballinspittal.
- Quedius fuliginosus**, Grav.
- Q. molochinus**, Grav.
- Q. picipes**, Mann.—Youghal.
- Creophilus maxillosus**, L.—Youghal.
- Staphylinus erythropterus**, L.
- Ocyopus olens**, Müll
- O. ater**, Grav.—Youghal, Aghada, and Ballinspittal.
- Philonthus addendus**, Sharp.—Youghal.
- P. umbratilis**, Grav.—Youghal.
- Xantholinus glabratus**, Grav.—Youghal.
- Pæderus riparius**, L.—Specimens of this pretty species were found at Youghal. It is an addition to the Cork records.
- Stenus junco**, F.
- S. speculator**, Er.—Aghada.
- S. pallitarsis**, Steph.—Ballinspittal.
- S. similis**, Herbst.—Youghal.
- Omallum riparium**, Thoms.—Youghal.
- Silpha atrata**, L., var. **subrotundata**, Steph.—Youghal Aghada, &c.
- Hister cadaverinus**, Hoff.—Aghada.
- Scaphisoma agaricinum**, L.—Glendine near Youghal, in moss siftings, not previously recorded from Munster.
- Coccinella xi-punctata**, L.—Youghal.
- Rhizobius litura**, F.—Youghal.
- Coccidula rufa**, Herbst.
- Mycetæa hirta**, Marsh.—Glendine near Youghal.
- Epuræa æstiva**, L.—Youghal.
- Antherophagus pallens**, Gyll.—Aghada. Not previously recorded from Munster.
- Geotrupes sylvaticus**, Panz.—Youghal, &c.

- Serica brunnea*, L.—Youghal.
Agriotes obscurus, L.
Corymbites quercus, Gyll.—Near Lough Allua.
Dascillus cervinus, L.—Blarney.
Pyropterus affinis, Payk.—A specimen of this extremely local species was found by Mr. Stelfox in the Cromaglaun woods.
Telephorus bicolor, F.—Aghada and Inchigeela.
T. flavilabris, Fall.—Inchigeela, &c., a form with the thorax and femora largely suffused with black.
T. thoracicus, Ol.—Inchigeela.
Rhagonycha fulva, Scop.
Cis nitidus, Herbst.—In moss siftings from Glendine near Youghal. Not previously recorded from Munster.
*Donacia versicolore*a, Brahm.—Carrigrohane.
D. thalassina, Germ.—Lough Crincaun.
D. discolor, Panz.—Near Lough Allua.
Lamprosoma concolor, Sturm.—Youghal.
Chrysomela varians, Schall.—Youghal, green variety.
Phædon tumidulus, Germ.
P. cochleariæ, F.
Hydrothessa marginella, L. }
Prasocuris junci, Brahm. } Youghal.
P. phellandrii, L. }
Lochmæa suturalis, Thoms.—Near Lough Allua.
Phyllotreta undulata, Kuts.—Youghal.
Sphæroderma testaceum, F.
Crepidodera transversa, Marsh.
Plectroscelis concinna, Marsh.—Aghada.
Cassida equestris, F.—Youghal.
Lagria hirta, L.—Youghal.
Nacerdes melanura, Schmidt.
Apion subulatum, Kirby.—Aghada.
A. hæmatodes, Kirby.—Ballinspittal.
A. apricans, Herbst.
A. dichroum, Bedel.
A. eruli, Kirby. } Aghada.
A. loti, Kirby. }
Otiorrhynchus ligneus, Ol.—Youghal.
O. picipes, F.
O. sulcatus, F.
Strophosomus coryli, F.
Liophilæus nubilus, F.—Aghada, Blarney.
Phyllobius viridiæris, Laich.—Aghada.
Hypera variabilis, Herbst. } Youghal.
H. nigrirostris, F. }
Eriirrhinus acridulus, L.
Cœliodes lividus, L.
Ceuthorrhynchus contractus, Marsh.

AQUATIC COLEOPTERA.

BY FRANK BALFOUR BROWNE, M.A., F.R.S.E., F.Z.S.

IN the present paper I am dealing with the Hydradephaga (not including the Gyrinidæ) and with the Hydrophilidæ or Palpicornia (not including the sub-family Sphæridiinæ, except the genus *Cyclonotum*). The Gyrinidæ require a method of collecting different from that required for the other water-beetles, and the Sphæridiinæ, except the genus *Cyclonotum*, are more commonly found out of the water than in it.

The list of water-beetles of County Cork given by Messrs. Johnson and Halbert in the "Beetles of Ireland" (*Proc. R.I.A.*, ser. iii., vol. vi., 1901) includes only 29 species of Hydradephaga and 9 species of Hydrophilidæ, and in giving these totals I have assumed that the 14 Hydradephaga and 8 Hydrophilidæ, described as "Common—Ulster, Leinster, Munster, Connaught"—are to be included in the list for the county.

During the five days of the Conference I found all except five of the water-beetles included in the list, and discovered other 19 Hydradephaga and 16 Hydrophilidæ, one of the former and three of the latter being new Irish records.

It was of course impossible in such a short visit to do sufficient work to enable one to decide whether there is any definite distribution east and west in the county, as has been observed in the case of plants, but as a contribution to future work on the subject I have followed Praeger (*I.N.*, vol. v., p. 29, 1896) in his divisions into East, Mid, and West Cork. The result of grouping the species according as they occurred in the East, Mid, or West divisions apparently shows a somewhat different fauna in each division; but it must be borne in mind that water-beetles can be divided up into groups according to the nature of their habitat. Without going into detail,



K. Welch, Photo.

THE EAST PASSAGE, CORK HARBOUR,
a submerged river-gorge through an Old Red Sandstone anticline.

To face p. 294.

it is sufficient for my present purpose to mention four wide groups which are easily recognisable :—

1. Salt marsh or brackish water species ;
2. Fresh-water marsh species—inhabitants of ditches, drains, and ponds containing *Lemna*, *Callitriche* etc. ;
3. Peat-moss species ;
4. Running-water species.

There are of course many species which are more or less cosmopolitan, but there are very few, if any, which are equally common in all four kinds of habitat, although there are also very few, if any, which are exclusively confined to one of the four habitats.

Such species, for instance, as *Agabus conspersus*, Marsh., *Philhydrus maritimus*, Thoms., and *Octhebius marinus*, Payk., are typical salt marsh species ; *Hydroporus pictus*, F., and *vittula*, Er., *Ilybius ater*, De G., and many others, are typical of stagnant ditches and ponds ; while *Hydroporus Gyllenhalii*, Schiöde, *tristis*, Payk., and *obscurus*, Sturm, *Agabus affinis*, Payk., and *Ilybius ænescens*, Thoms., are peat-moss species ; and *Haliphus fluviatilis*, Aubé, *Deronectes depressus*, F., and *xii-pustulatus*, F., *Brychius elevatus*, Panz., and *Platambus maculatus*, L., are examples of the denizens of clear-running streams.

Of the five or six localities visited during the Conference there was a peat-moss at Lough Allua (W. Cork) ; salt marsh at Youghal (E.) and Kinsale (Mid), and clear-running water at Carrigrohane (Mid), and the Gearagh, Macroom (W.) ; while what I have included as freshwater marsh was worked at Ballyphehane, Carrigrohane, Kinsale, and Farrangalway (Mid), Youghal and Rostellan (East), and I am inclined to think that the distribution observed depends chiefly, if not entirely, upon habitat.

With a total of only 42 collections it is useless to give the percentage of occurrences of each species in the different habitats, because the division between these is not nearly so clear in reality as it appears on paper, so that one or two collections included in the wrong category would, in such a small total, greatly affect the results. Also, as I have said, very few species, if any, are confined to one habitat, so that in a small

total these "visitors" would also greatly affect the results. As an instance, I have described the West Cork records as including only peat-moss and running-water habitats, yet *Hydroporus palustris*, L., actually occurred in four out of eight (50 per cent.) of the collections made in that district, it being neither a member of the peat-moss association nor of the running-water association.

With regard to the four species new to the Irish list—*Agabus conspersus*, Marsh., was quite common in the brackish part of the Youghal marsh, and it also occurred at Kinsale. It is therefore undoubtedly a native. The other three species, *Cymbiodyta ovalis*, Thoms., *Helochares punctatus*, Sharp, and *Helophorus affinis*, Marsh., were only represented by a single specimen in each case, and I am not inclined, upon the record of a single specimen, to consider them as Irish species.

A single specimen of another species, *Hydroporus celatus*, Clark., previously recorded in Ireland only from Derry, occurred at Kinsale. The Britannic distribution of this species is somewhat curious, and I think that, in England at least, the records are largely those of single specimens. It has apparently occurred in Cornwall and Devon, Sussex and Surrey, Essex, Cambridge and Leicester, Lancashire, Yorkshire and Northumberland. In Wales the only record is for Carnarvon.

The Scottish records are for Kirkcudbright, Edinburgh, Perth, Aberdeen, Shetland, Arran, and Dumbarton. I found it fairly commonly at about 1,000 feet elevation in the latter county, but the Arran record rests on a single specimen which I took last year on Goatfell. These mountain specimens differ from the Kinsale one in being considerably smaller, and they approach *Hydroporus monticola*, Sharp, in shape. The Kinsale specimen, however, agrees with Surrey, Sussex, and Cambridge specimens which I have seen. I have to thank Dr. Sharp for confirming my identification of this specimen.

The whole question as to how one is to decide which species are denizens and which are chance visitors is a very difficult one in studying the geographical distribution of any group, but it is, perhaps, one which might be settled by an exchange of views among those interested in the subject, and it is certainly one upon which there should be a general understanding.

The following is a list of the species observed in the three divisions of the county :—

An asterisk (*) denotes a new record for the county.

—	West Cork.	Mid Cork.	East Cork.	—
Hydradephaga.				
Brychius elevatus, Panz.	×			Macroom. One specimen only, but from its recorded distribution it is probably fairly common.
Haliplus confinis, Steph.			×	Youghal.
* „ flavicollis, Sturm.		×		Common at Carrigrohane, R. Lee and backwater.
„ fulvus, F.	×			Recorded by Messrs. Johnson and Halbert as "common." Only 2 or 3 specimens occurred at Macroom.
„ ruficollis, De G.	×	×	×	
„ fluviatilis, Aubé.		×		
„ lineatocollis, Marsh.		×	×	R. Lee, Carrigrohane.
Noterus sparsus, Marsh.			×	Youghal.
*Laccophilus interruptus, Panz.		×		Several specimens, R. Lee and backwater, Carrigrohane.
„ obscurus.		×	×	
Bidessus minutissimus, Germ		×		Carrigrohane, R. Lee. Originally taken by Mr. Clear in this river about 1846, although for some reason not obvious it was later (1869) suggested that Mr. Clear's specimens were of continental origin. The re-discovery of the species in the River Lee is therefore interesting. I took 5 specimens in 4 hauls of the net at one particular place.
*Hyphydrus ovatus, L.		×		R. Lee, backwater Carrigrohane. Common.
Coelambus v-lineatus, Zett.		×		R. Lee, Carrigrohane, abundant in backwater.
„ inæqualis, F.	×	×	×	
* „ impressopunctatus, Sch.			×	Youghal.
Deronectes depressus, F.	×	×		Macroom; L. Allua; R. Lee, Carrigrohane.
„ xii-pustulatus, F.	×	×		Macroom; R. Lee, Carrigrohane.

	West Cork.	Mid Cork.	East Cork	
Hydroporus pictus, F.	×	×	×	Macroom ; Inchigeela ; R. Lee, Carrigrohane ; Rostellan.
„ septentrionalis, Gyll.		×		R. Lee, Carrigrohane.
„ lineatus, F.		×		Backwater, R Lee, Carrigrohane.
*Hydroporus tristis, Payk.	×			Inchigeela, several.
* „ umbrosus, Gyll.		×		Ballyphehane Bog, several.
* „ angustatus, Sturm.			×	One specimen only. Previous records from Donegal, Antrim and Armagh. In Great Britain probably more common in the south than in the north.
* „ Gyllenhalii, Schiöd.	×			Inchigeela.
* „ vittula, Er.		×	×	Ballyphehane Bog ; backwater R. Lee, Carrigrohane ; Youghal.
„ palustris, L.	×	×	×	
„ erythrocephalus, L.	×	×	×	
* „ celatus, Clark.		×		One specimen, Kinsale.
* „ memnonius, Nic.			×	Youghal.
* „ obscurus, Sturm.	×			Inchigeela, common.
* „ nigrita, F.	×			One or two specimens.
* „ discretus, Fairm.		×	×	Ballyphehane Bog ; Kinsale ; Rostellan.
„ pubescens, Gyll.	×	×	×	Youghal, scarce.
* „ planus, F.			×	
* „ lituratus, F.		×	×	Occurred in 28% of the collections in these two divisions. Seems to be a fairly common species in Ireland.
Agabus paludosus, F.		×	×	Ballyphehane Bog ; Kinsale ; Farrangalway.
* „ unguicularis, Thoms.		×		Several specimens, Ballyphehane Bog.
* „ conspersus, Marsh.		×	×	Kinsale, several ; Youghal, common.
„ Sturmii, Gyll.	×	×		
„ bipustulatus, L.	×	×	×	
Ilybius fuliginosus, F.		×	×	
* „ ater, De G.			×	Ballyphehane, one specimen only.
* „ ænescens, Thoms	×			Previous records, Dublin and Waterford. A commoner species in Ireland than these records indicate.
Colymbetes fuscus, L.		×		Ballyphehane Bog.
Dytiscus punctulatus, F.		×		Kinsale.



IN THE PINE-WOOD AT LOUGH ALLUA.

R. Welch, Photo.

	West Cork.	Mid Cork.	East Cork.	
Hydrophilidae.				
Hydrobius fuscipes L.		×	×	Messrs. Johnson & Halbert apparently include records for this species? under <i>fuscipes</i> .
„ picicrus, Thoms.		×	×	
*Phillydrus testaceus, F.			×	Youghal, one specimen only. Previous records Armagh, Roscommon and Wexford.
* „ maritimus, Thoms.		×	×	Kinsale; Youghal—common in both localities.
„ melanocephalus, Ol.			×	Youghal, a few specimens.
* „ coarctatus, Gredl.			×	Youghal, a few specimens.
„ minutus, F.	×			Inchigeela, one specimen only.
*Cymbiodyta ovalis, Thoms.		×		Ballypnehane Bog, one specimen only.
*Enochrus bicolor, Gyll.			×	Youghal, several.
Anaccena globulus, Payk.		×	×	
* „ limbata, F.		×	×	Occurred in many more collections than did <i>A. globulus</i> .
*Helochares punctatus, Sharp.	×			Inchigeela, one specimen only.
*Laccobius nigriceps, Thoms.	×	×		Inchigeela; Ballypnehane Bog; and Carrigrohane, R. Lee
* „ alutaceus, Thoms.		×	×	Ballypnehane; Kinsale and Farrangalway; Youghal. Previous records Ulster and Leinster only.
* „ minutus, L.	×			One specimen only, Inchigeela.
Limnebius truncatellus, Thoms.		×	×	
Helophorus aquaticus, L.			×	Youghal and Rostellan.
„ æneipennis, Thoms.	×	×	×	
* „ affinis, Marsh.			×	Youghal, one specimen only.
„ brevipalpis, Bedel.		×	×	
*Othebius margipallens, Latr.			×	Youghal, one specimen only.
* „ marinus, Payk.		×	×	Kinsale and Youghal, common.
* „ pygmæus, F.			×	Youghal and Rostellan.
* „ punctatus, Steph.		×		Kinsale.
Hydræna riparia, Kug.		×		
* „ gracilis, Germ.		×		R. Lee, Carrigrohane; and Farrangalway.
* „ pulchella, Germ.		×		R. Lee, Carrigrohane. Several in one collection.
Cyclonotum orbiculare, F.			×	Youghal and Rostellan.

ODONATA.

BY FRANK BALFOUR BROWNE, M.A., F.R.S.E., F.Z.S.

THE following list of the dragonflies observed during the visit of the Union may be of some interest, as I believe so far no local list has been published. The observations were made in the course of work upon the water-beetles, so that the list has no pretensions to being complete. In some of the localities visited, as Youghal, The Gearagh, Macroom, and L. Allua, peat moss looked very promising, and I was struck with the great abundance of nymphs, especially of the Libellulid group, in each of these localities.

—	West.	Mid.	East.
<i>Sympetrum striolatum</i> (Charp.), .	×	×	×
<i>Libellula quadrimaculata</i> , L., . .	×		
<i>Calopteryx splendens</i> (Harr.), . .	×		
<i>Lestes sponsa</i> (Hansen), . . .	×		⊙
<i>Pyrrhosoma nymphula</i> (Sulz.), .	×	×	×
<i>Ischnura elegans</i> (Lind.), . . .	×	×	×
<i>Agrion pulchellum</i> (Lind.), . .	×		×
„ <i>puella</i> (L.),	×		
<i>Enallagma cyathigerum</i> (Charp.), .	×		
⊙ = nymph only.			

At Youghal *S. striolatum* was just hatching out and was not very common, the specimens caught being very recently emerged. This species was fairly common at Kinsale, and also occurred at Inchigeela. One specimen of *L. quadrimaculata* was brought to me at The Gearagh, Macroom, and I saw a few specimens on the peat moss, Inchigeela. *C. splendens* was quite common in the marshy ground at The Gearagh,

Macroom, a place rich in dragonflies, as all the Zygopterids in the list, except *Lestes sponsa*, occurred there, and for the most part were quite common. Time did not allow me to observe whether *A. pulchellum* or *puella* was the dominant species, as I only took two or three specimens of each; but after my experience in Norfolk I should expect one to be common and the other scarce. *I. elegans* was common everywhere just as it was in the Broads district of Norfolk. I did not see a single *Æschnid* in any of the localities, nor did I find any nymphs of the genus.

SCHIZOPODA.

BY W. RANKIN.

MR. F. Balfour Browne gave me some specimens of *Neomysis vulgaris* and *Palæmonetes varians* which he took from a bog-hole in which they occur in considerable quantities at Youghal, Co. Cork. The bog-hole is over two miles from the sea, and is not in any way connected with it. A member of the Cork Field Club informed me that it is over three years since portion of this bog was covered by an exceptionally high tide during a storm. At present there is no trace of salt perceptible, and all the other fauna and flora are distinctly fresh water.

I found both these species common in brackish water in marshes at Aghada and Kinsale.

Neomysis vulgaris was discovered by Vaughan Thompson in the Lee estuary up to Cork and the Cove, and William Thompson recorded it from Belfast Lough, but there do not appear to be Irish specimens either in the National Museum or at the Fisheries Office. According to Canon A. M. Norman it occurs all round the British coasts in brackish water. Abroad it has a very wide distribution around the European Atlantic shores, in the White Sea and in the Mediterranean.

ISOPODA.

BY NEVIN H. FOSTER, M.B.O.U.

OF the 17 species of Terrestrial Isopods or Woodlice which have been recorded as found in Ireland, 8 species were noted during the Conference week. A list is appended showing the localities and divisions of Cork County in which they were obtained. The County divisions are those defined by Mr. R. L. Praeger ("Irish Topographical Botany," 1901).

I have to thank Messrs. Browne, Milne, W. H. Patterson, Robert Patterson, Welch and Praeger for handing me specimens of this group collected by them; R. Welch for valuable field notes; and also Dr. Scharff, who kindly examined all the specimens obtained and confirmed the identification.

Ligia oceanica (Linné).—By the shore of the River Blackwater near Youghal, Cork East. Specimens observed were all of small size, the largest only measuring 22 mm. in length. It was by no means plentiful, and in some likely-looking habitats it was not seen at all.

Trichoniscus pusillus (Brandt).—Near Cork City, Cork Mid; Youghal, Cork East; Lough Allua, Cork West. Common under damp leaves or moss in woods and under stones in marshy ground.

Oniscus asellus (Linné).—Near Kinsale, Cork Mid; Youghal and Rostellan, Cork East; Inchigeela, Cork West. Abundant everywhere. Much more varied in colour than in the North or West; many specimens noted of a light and some of a bright red colour, while at Kinsale several were bright yellow.

Philoscla muscorum (Scopoli).—Kinsale, Cork Mid; Youghal, Cork East; Inchigeela, Cork West. Though this species varies very much in colour in Cork, the specimens as a rule are brighter here than in the north; some from the glen at Kinsale were almost scarlet.

Platyarthrus Hoffmannseggli (Brandt).—In ant's nest near Cork City, Cork Mid. This species had previously been recorded in Ireland from Cork West, Waterford, Carlow, and Dublin; while in England its range appears to be restricted to the southern counties, and in Scotland it has only been discovered in two localities.

Porcellio scaber (Latreille).—Youghal, Cork East; Inchigeela and Old Head of Kinsale, Cork West.

Metoponorthus cingendus (Kinahan).—Youghal and Rostellan, Cork East; Inchigeela, Cork West.

Armadillidium vulgare (Latreille).—Youghal and Rostellan, Cork East; Old Head of Kinsale, Cork West.

The marine Isopod *Spharoma serratum* (Fabr.) was taken near Youghal, Cork East. This species is frequently found in brackish pools.



ROYAL FERN, *OSMUNDA RECALIS*,
growing 5 feet high at Lough Allua.

R. Wäch, Photo.

ACARINA.

BY J. N. HALBERT.

THE water mites here recorded were collected by Mr. F. Balfour Browne in two separate gatherings, one made in the Rostellan district, East Cork, and the other at Carrigrohane, a place on the River Lee, about three miles above Cork.

The collection comprises thirteen species, omitting two or three species of *Eulais* and *Lebertia*, which have not been thoroughly examined. *Gnaphiscus setosus*, Koen., is an addition to the known Hydrachnid fauna of the Britannic area. It seems to be an uncommon mite, as it has been recorded from only a few places in central Europe, and from Norway.

HYDRACHNIDÆ.

- Eulais infundibulifera***, Koen. (*bifurca*, Piersig).—Carrigrohane.
Diplodontus despiciens (Müll.).—Rostellan.
Arrhenurus cylindratus, Piersig.—Several specimens, both of the green and yellow varieties, from Carrigrohane and Rostellan.
A. ornatus, George.—Carrigrohane.
Torrenticola anomala (C. L. Koch).—Carrigrohane.
Gnaphiscus setosus, Koen.—One specimen at Carrigrohane. Not previously recorded from the British Isles.
Limnesia histrionica (Herm.).—Carrigrohane.
L. Koenikei, Piersig.—Carrigrohane and Rostellan.
Atractides spinipes, C. L. Koch.—Carrigrohane.
Hygrobates reticulatus (P. Kram.).—Rostellan.
H. longipalpis (Herm.).—Carrigrohane and Rostellan.
Pionopsis lutescens (Herm.).—Rostellan.
Piona nodata (Müll.).—Rostellan.

BOTANY.

BY R. LLOYD PRÆGER.

THE regrettable absence of botanists at Cork has been already alluded to. Cryptogamic botany was not represented in any branch, and with the exception of Mr. R. A. Phillips, who was present on two excursions, phanerogamic botany was represented only by the conductor, whose duties as such occupied him fully.

A good many of the characteristic plants of the places visited were seen by the members, for instance :—About Cork City—*Senecio squalidus*; *Centranthus ruber* and *Sedum album* in abundance. At Youghal—*Glaucium luteum*, *Erodium moschatum*, *Salvia Verbenaca*, *Convolvulus Soldanella*. At the Gearagh—*Elatine hexandra* and a curious submerged form of *Ranunculus Flammula*; also *Carex vesicaria*, an addition to the flora of West Cork, detected by Mr. Phillips. At Lough Allua—*Saxifraga umbrosa* and *Pinguicula grandiflora* in abundance on the hills; *Lobelia Dortmanna* in the lake; while R. Welch photographed a fine group of *Osmunda regalis*, five to six feet in height, as seen in the plate. At Aghada a fine *Scolopendrium vulgare*, var. *crispum*, was obtained, and hard by at Saleen creek great abundance of *Atriplex portulacoides* was noted.

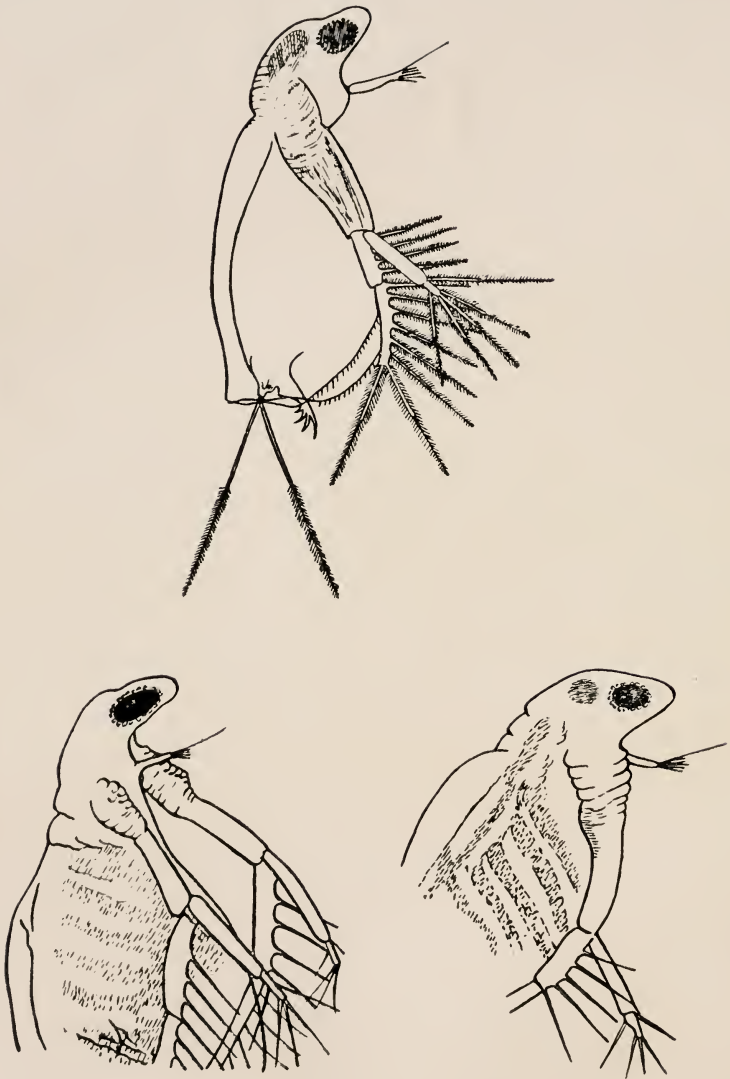
Some curious excrescences were noted by the conchologists on pine trees in the woods close to the lake at Blarney, and R. Standen took a specimen home with him for special examination. Mr. Murray of Manchester Museum and he made a section, and from a careful examination state that it seems to have been caused by a fungus *Æcidium elatinum*, which attacks the young branches chiefly, but produces globular or barrel-shaped swellings on stems and branches of all ages and on all parts of the trees. They are particularly common on the Silver Fir, *Abies pectinata*. These swellings are allied to the "Witch's brooms" of the Birch, Larch, &c.

As a preventive measure all "Witch's brooms" should be cut off before spore-formation takes place (in June and July), and all stems with canker-wounds should be removed during forest thinning. Prof. Weiss, D.Sc., believes that infection takes place on twigs which have just emerged from the bud.

PREHISTORIC ARCHÆOLOGY. 90

It is worthy of note that on the foreshore at Aghada, W. H. Patterson picked up a well-formed flint-flake of a moderate size, with the characteristic bulb of percussion and triangular section.





DIAPHANOSOMA BRACHYURA var. NASUTA.

Specimens showing variation in form of head-process.

To face page 305.]

ADDITIONAL RECORDS OF FRESH-WATER ENTOMOSTRACA IN IRELAND

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

[PLATE 41.]

SINCE the publication of my list of Irish fresh-water Cladocera¹ a valuable catalogue of the Irish Crustacea Ostracoda² (including marine species), compiled by the Rev. Canon Norman, has appeared. Mr. Scourfield's Synopsis of British Fresh-water Entomostraca³ also contains several notices of Irish localities.

The following list will complete these records to date, including some unpublished captures of species belonging to the groups of Ostracoda and Copepoda. The difficulty of identifying dead specimens of the rarer species of Copepoda hinders much advance in our knowledge of their distribution in Ireland, since the student of this group requires to bring his apparatus with him, as well as books of reference, when he undertakes a research at any distance from home.

CLADOCERA.

Diaphanosoma brachyura, Liévin, var. nov. **nasuta**. In a note to my former list I referred to the discovery of a remarkable form of this species which I took in L. Mask. I have since been favoured with a letter from Canon Norman mentioning that he finds in his collection specimens of this new variety taken in Loch Awe. Mr. Scourfield also has sent me identical examples from Loch Tarff. So that its distribution extends to Scotland. A variety has been described by Prof. G. O. Sars from Norway, which he named var. *productifrons*, which presents a modified approach to var. *nasuta*, the ocular part of the head being unusually prominent. But he informs me (*in litt.*) that the form now described is quite new to him.

DESCRIPTION.—The upper third of the cephalic region is narrowed, and projects forward at an angle obtuse to the direction of the long axis

¹ *Irish Nat.*, vol. xii., p. 210.

² *Ib.*, vol. xiv., p. 137.

³ *Journ. Quekett Micros. Club*, 1903 and 1904.

of the body, and forms a process rounded at the apex, and containing the eye. In the majority of examples the eye, conforming to the shape of this extension, takes a more or less oval contour. The first antennæ, including their terminal setæ, generally exceed in length the projection of the eye-bearing process. The distance intervening between the point of insertion of the second antennæ and the rim of the eye about equals the length forward thence to the apex of the process.

In no other characters can I perceive any structural divergence from the type. The variety is plentiful in L. Mask, and apparently supplants the type, though individuals vary somewhat in the development of the process (see Plate 41). In L. Corrib, which is only separated by an isthmus of three miles broad from L. Mask, I have taken a few examples also.

Holopedium gibberum, Zaddach.—One specimen taken in L. Keel, I. of Achill.

Daphnia hyalina, var. **lacustris**, Sars.—L. Corrib.

Ceriodaphnia pulchella, Sars.—L. Gur, Co. Limerick.

Bosmina longirostris, O. F. Müller.—L. Gur, Limerick. Corresponds to fig. 7, Pl. xxxi., Lilljeborg's Clad. Sueciæ.

Var. **cornuta**, Jurine.—Three near Rams' I., Lough Neagh.

Bosmina obtusirostris, Sars., var. **lacustris**.—L. Erne, near Devenish I. L. Neagh, abundant in the northern portion. The specimens here were generally characterised by very long rostra, being from a half to three-fourths the length of the ventral margin of the test. In some these are sharply curved inwards. One, however, with very long straight rostra, had the tips reflexed in the reverse direction. The characters of the specimens generally may be indicated as follows:—1 Eyes larger than is usual in this species. 2. The forehead generally with a prominence in front of the eye. 3. The region of the head not striate as in Lilljeborg's description of the variety. 4 The examples are like figs. 3 and 4, Pl. xxxvi., Lillj. Clad. Suec., but with considerably longer rostra. Date of capture, 7th November.

Lathonura rectirostris, O. F. Müller.—Bog pools near Creagh, L. Mask; numerous in pools at Ardee bog. This species, rare in Great Britain, seems very widely distributed in Ireland, especially in shallow marsh pools, with sparse tufts of small species of *Carex* or aquatic grasses.

Acantholeberis curvirostris, O. F. Müller.—Very abundant in bog pools in Castle Archdale demesne, Fermanagh.

Lynceus quadrangularis, O. F. Müller.—L. Corrib; The Rosses, Sligo.

L. affinis, Leydig.—Not rare in L. Mask.

L. rusticus, Scott.—Bog pools near L. Mask.

L. costatus, Sars.—L. Mask; L. Gur, Co. Limerick; Glencar, Co. Sligo; Ardee.

L. guttatus, Sars.—L. Mask; Glencar, Co. Sligo.

Lynceus rostratus, Koch.—This, which is a rare species in England, I have taken in L. Mask, Glencar several, Ardee bog, and in some numbers in L. Bresk, near Castle Archdale, Fermanagh.

Leptorhynchus falcatus, Sars.—A rare species, not hitherto recorded from Ireland. L. Bresk, near Castle Archdale, Fermanagh, two specimens.

Alonella exigua, Lillj.—Glencar, Sligo.

A. nana, Baird.—Ardee bog, not rare.

Peratacantha truncata, O. F. Müller.—The Rosses, Sligo, abundant; Ardee bog; Glencar, Sligo, one example with the ventral half of test duplicated, reminding one of the test structure of *Monospilus dispar*.

Pleuroxus trigonellus, O. F. Müller.—The Rosses, Sligo, abundant.

Chydorus ovalis, Kurz.—Glencar, Sligo. One in the maxillæ of a specimen of *Niphargus Kochianus* dredged from the depths of L. Mask.

Monospilus dispar, Sars.—Upper L. Erne, near Belleisle, two.

Anchistropus emarginatus, Sars.—A few specimens near Belleisle, Upper L. Erne; and two on the shores of Lower L. Erne, near Castle Archdale.

Bythotrephes longimanus, Lillj.—L. Neagh.

In L. Corrib I have met with a very large form of this species, with the caudal spine curved similarly to that of the small var. *arcticus* of Lilljeborg; and setose at its extremity.

The L. Erne record of this species in my list was quoted from Dr. Creighton. It should be deleted, as I have only found *B. Cederstromii* in L. Erne, and the latter species was not detected in Great Britain when Dr. Creighton compiled his list.

OSTRACODA.

Gypria exsculpta, Fisch.—Drumreaske, Monaghan.

Gyciocypris lævis, O. F. Müller.—Drumreaske; L. Corrib.

Herpetocypris reptans, Baird.—L. Corrib.

Cypridopsis picta, Straus.—Two from L. Mask.

Candona stagnalls, G. O. Sars.—L. Conn, one.

Limnocythere-inopinata, Baird.—Glencar, Co. Sligo; L. Mask.

COPEPODA.

CYCLOPIDÆ.

Cyclops strenuus, Fisch.—Ballinahinch, Connemara L. Mask, L. Corrib, L. Neagh, very abundant.

C. bicuspidatus, Claus.—Cornacassa, Monaghan.

C. viridis, Jurine.—Killyhoman, near Aughnacloy.

Var. **gligas**—L. Neagh, abundant; Drumreaske, Monaghan; L. Unshin and pools near L. Columbkille, Ballyshannon (Creighton).

C. fuscus, Jurine (*coronatus*, (Claus *signatus*, Koch).—Drumreaske, Monaghan.

- Cyclops albidus**, Jurine (*annulicornis*, Koch).—Clifden; The Rosses, Co. Sligo; Rossmore, Monaghan.
- C. serrulatus**, Fisch.—Clifden and Kylemore; Rossmore, Cornacassa, Bragan, Co. Monaghan; L. Erne, L. Mask.
Var. **varius**—The Rosses, Sligo.
- C. prasinus**, Fisch.—Rossmore, Monaghan.
- C. flmbriatus**, Fisch.—Rossmore, Cornacassa, Bragan, in Co. Monaghan.

HARPACTIDÆ.

- Canthocamptus staphylinus**, Jurine.—Drumreaske.
- C. sp.** (?)—Ballinahinch, Connemara; Rossmore and Cornacassa, Monaghan.

CALANIDÆ.

Diaptomus laticeps, G. O. Sars.—This handsome species was described and figured by Sars¹ as inhabiting several mountain lakes in Norway. Lilljeborg gives Jemtland as a Swedish habitat. Schmeil refers to it as related to the *D. salinus*, Daday, group of Diaptomus, but does not include it in the German list of Copepoda.² Mr. T. Scott mentions *D. Wierzejskii*, a nearly allied species, as inhabiting several lakes in Scotland. But apparently until I discovered it in L. Mask, *D. laticeps*, Sars (*non de Guerne* and Richard), was not known as indigenous to the British Isles. The Rev. Canon Norman kindly identified my first capture, and I have since carefully compared several specimens with the descriptions and figures given by Sars and Schmeil, and find the characters unmistakable. It is very abundant in the plankton both of L. Mask and L. Corrib, and its prussian blue colour makes it very conspicuous in the plankton, and a beautiful object under the microscope. I also have met with a single specimen in shallow lakelets at The Rosses, in the west of Co. Sligo. We have here an additional link to the Scandinavian fresh-water fauna.

Diaptomus gracilis, Sars.—Common in the lakes of Connemara; Lisdoonvarna lake, Co. Clare; Glencar, Sligo; Rossmore and Drumreaske, Monaghan; and very abundant in L. Neagh, L. Erne, L. Mask, L. Corrib, L. Ree, &c.

BRANCHIURA.

Argulus foliaceus, L.—L. Arrow, abundant; L. Neagh, not rare; Drumreaske, Monaghan; L. Oughter.

Drumreaske, Monaghan.

¹ "Account of the Crustacea of Norway," p. 90, Pl. lxi.

² "Deutschlands freilebende Süßwasser Copepoden." Dr. Otto Schmeil. iii. Teil, p. 174, taf. xiv., figs. 1-2.

NOTE ON ROSA HIBERNICA.¹

BY JAMES BRITTEN, F.L.S.

IN the *Index Kewensis* the publication of *Rosa hibernica* is given as "Sm. Engl. Fl. ii. 393" [394] (1824). This is odd in view of the numerous earlier references given for the plant in the *English Flora*—Engl. Bot. t. 2196 (1810), Smith's *Compendium*, ed. 2, 78 (1816), Woods in *Trans. Linn. Soc.* xii. 222 (1817), and Lindley's *Monograph*, 82 (1820); to which may be added Ait. Hort. Kew. ed. 2, iii. 261 (1811), and Smith in Rees's *Cyclopædia* (1814-15). The name is usually attributed to Smith, who in his first publication of it in *Engl. Bot.* says:—

"Discovered many years ago in the county of Down, about Belfast harbour, where it grows abundantly, by our often-mentioned friend John Templeton, Esq., who consequently found himself entitled to the reward of 50*l.* so liberally offered by the patrons of botany at Dublin for the discovery of a new Irish plant. We adopt the name by which Mr. Templeton has communicated wild specimens to us, for the singularity of the anecdote, and that we may not rob him or his countrymen of a particle of their honours."

From the above quotation it is clear that the name was suggested by Templeton, but it seems to have been generally overlooked that he actually published it, with a full description and an excellent figure, in vol. iii. of the *Transactions of the Dublin Society*, pp. 162-164, where he says: "As it has not been before described, I may perhaps be allowed to give it the name of *Rosa Hibernica*." The authors of the *Cybele Hibernica* seems to have overlooked this sentence, for (p. 119), they give "*R. hibernica* Smith" as the name of the plant, and say;—"First published in the *Dub. Soc. Trans.* iii. p. 162 (1802) [1803] and afterwards named *R. hibernica* by Smith in 1810."

¹ Reprinted by permission from *Journal of Botany*, August, 1907.

The "reward of £50" is more correctly stated in the *Cybele* to have been "five guineas, Irish currency"; the entry in the *Dublin Transactions* (iv. 199) runs:—

"For producing Native Plants of Ireland not hitherto described.

R. Scott, Esq., M.D., Professor of Botany, T. C. D.	Three new species of Mosses.	£	s.	d.
		17	1	3
John Templeton, Esq.	A new species of Rose.	5	13	9"

The fruit on the E. Bot. figure of *R. hibernica* is from a drawing sent by Templeton to Sowerby with a letter, preserved in the Department of Botany, which is printed in the Supplement to this Journal for 1903, p. 64.

Scott published two of his mosses in the same volume of the *Transactions*, p. 158, with a figure of each, but these seem to have been entirely overlooked. The species—*Grimmia maritima* and *Dicranum Scottianum*—are usually cited as of Turner from his *Muscologiæ Hibernicæ Specimen* (1804), which is dedicated to Scott. It would appear however that the former should be attributed to Smith, to whom Scott sent it and who "aptly named it *Grimmia maritima*." The *Dicranum*, "to which the partiality of my ingenious friend Mr. Turner has affixed the trivial name *Scottianum*," was sent to Turner. The references to the species should therefore be:—

Grimmia maritima Sm. ex Scott, in *Trans. Dublin Soc.* iii. 158 (1803).

Dicranum Scottianum Turn. ex Scott, *l. c.*

Scott's third plant is altogether doubtful; it may, as he suggests, be a *Rivularia*.

Turner (*op. cit.* vi.) makes special acknowledgement of the help he received from Scott and Templeton, to the former of whom he dedicates his book, which he says was begun at his suggestion:—"Viris amicissimis, Roberto Scott, M.D., Botanices, Eblanæ, Professori, W. Stokes, M.D. Sacro-Sanctæ Trinitatis Collegii Socio, Historiæ Naturalis cultori indefesso, et Johanni Templeton, Arm. qui, Hiberniæ septentrionalis incola, regionem illam montosam et naturæ opibus abundantem labore improbo indagavit, et a quo Flora Hibernica mox est expectanda, summas et habeo et ago gratias."

THE OCCURRENCE OF
SPIRANTHES ROMANZOFFIANA IN CO. ANTRIM.

BY W. J. C. TOMLINSON.

THE occurrence of this extremely rare North American orchid in Co. Antrim was discovered six years ago by Mr. William West, F.L.S., who gathered a single specimen on the 31st July, 1901, and forwarded it to Mr. R. I. Praeger. Mr. Praeger, in recording the find (*Irish Naturalist*, vol. x., 1901, p. 171) gives, with praiseworthy indefiniteness, the locality as simply—"between Antrim and Toome." This, to the *over-enthusiastic* collector was provokingly vague. Still it was on a par with the discreetness displayed by the same botanist when he first announced, in 1892, his own memorable discovery of the same plant in Co. Armagh. On that occasion the only topographical detail vouchsafed to the public was that it grew in "a wet worked out bog in the northern portion of the county." That Mr. Praeger's reticence as to the exact localities was justifiable there can be no two opinions. Had they been published, the information might in due time have led to the plant's extermination.

Two years ago I spent several afternoons botanizing about the northern shore of Lough Neagh, and discovered some new stations, between the Main and the Bann, for a few of the rarer members of our local flora. A lookout was kept for *Spiranthes Romanzoffiana*, but no orchid new to me was then observed. I now know, however, that my search over one particular part of the area was made too early in the season—(end of June)—to have been successful, so far as *Spiranthes* was concerned. For, on the same ground I have this year had the pleasure of seeing this unique and beautiful orchid growing in greater profusion than, I venture to say, it has ever been the lot of anyone to behold before, at least outside Kamchatka and North America. A similarly early exploration of the ground this season brought to my notice a couple of plants, apparently orchids, but unlike in colour of foliage and appearance any of the group with which I was acquainted. Encouraged by a confidential communication from Mr. Praeger, I returned to the same ground on Saturday afternoon,

the 3rd August, to see how it fared with the plants noted a few weeks earlier, and which I now knew were growing at practically the same locality as that discovered by Mr. West. As soon as I entered the immediate area, and before I was near to the spots where my marked plants had been located, I detected two or three fairly fine plants of unmistakable *Spiranthes Romanzoffiana*, just coming into bloom. It was evident therefore, that the plant was in fair plenty. Indeed, I incautiously set my foot on one or two less conspicuous specimens, as I walked over to examine more closely the more conspicuous ones that first drew my attention. So, taking pencil and note-book in hand, and keeping my eyes fixed on the immediate area in front, I moved about in a bee-line over the sinuous area and wherever the ground seemed promising, jotting down as I went the number of fresh plants that simultaneously met my gaze. Mostly a single specimen appeared, but not infrequently 2 to 5 would be in such close proximity to each other as to focus themselves on the retina at the same instant. The detailed numerical record thus made, during a survey lasting from two to three hours, is as follows:—1, 3, 1, 1, 1, 1, 1, 2, 1, 1, 2, 2, 1, 1, 1, 1, 1, 1, 2, 1, 1, 1, 1, 2, 2, 1, 1, 2, 1, 1, 4, 1, 2, 3, 5, 4, 3, 1, 1, 4, 1, 1, 1, 3, 2, 1, 3, 1, 1.—A grand total of 81 plants. Surely this eclipses all previous records, and shifts the European centre of gravity of the plant's distribution from the shores of Bantry Bay to those of Lough Neagh. At Berehaven the plant, for some reason, seems in recent years to have been suffering a process of extinction; perhaps the insatiable collector has been rather too much abroad there. In any case I notice from *Cybele Hibernica*, second edition, that the greatest number of individual plants recorded at any time, by a single observer, from that locality was thirty-six.

Mr. West, on discovering *Spiranthes Romanzoffiana* in Co. Antrim, informed Mr. Praeger that it grew in "damp grassy places among *Spiræa Ulmaria*, *Achillea Ptarmica*, *Comarum palustre*, &c." This is quite correct, still I may say that my observation led me to note down, in addition, the following as typical associates:—*Hydrocotyle vulgaris*, *Mentha sativa*, *Stellaria uliginosa*, *Anagallis tenella*, *Orchis incarnata*, and in some places, patches of *Lysimachia Nummularia*. The special

area where the *Spiranthes* grows is a soft, spongy marsh, and flooded apparently during the winter months. It yields beneath the foot as one walks over it. In the drier, grassy patches the plants were closer together; in the more watery patches, full of *Comarum palustre* and *Mentha sativa*, and where it was unpleasant to tread, the orchid was either rare or absent altogether. On the rocky, gravelly, and sandy stretches of ground that adjoined at both ends of the marshy area the plant was nowhere to be seen. A little practice soon gave one the cue as to the kind of habitat most likely to sustain *Spiranthes Romanzoffiana*. Boggy, moist bottoms may be searched with a fair prospect of success; but wherever rock, sand, gravel, or tenacious clay predominate in the upper stratum, I fear it is almost hopeless to look for it.

On August 10 I set off to spend my half holiday once again on Lough Neagh's banks, choosing as a rendezvous a rather remote district, westward of Shane's Castle demesne. It was part of the same area, already alluded to, which I had superficially explored in 1905. I knew it contained a considerable tract of marsh and swampy ground, out of which I formerly thought no good thing could come, and consequently gave a wide berth to. Experience had now taught me that it would not be too moist, or forbidding in aspect, for *Spiranthes*. After traversing a mile or so of varied ground, some of which seemed likely enough, and some of which was too dry and gravelly to hold out any hope, I at last entered an extensive area of several acres of almost flat marshland. A close scrutiny of this very wet, boggy pasture followed, and I was, after sundry windings, soon rewarded with the sight of two stunted specimens of *Spiranthes Romanzoffiana*. Others followed in quick succession, and I soon realised that this orchid held the field there. It was abundant and distributed quite generally over some acres of ground. I counted over 120 plants, and then gave the task up. Time was flying, and I was several miles from the nearest railway station, so further details had to be allowed to wait for a more convenient season. I therefore devoted the remainder of my time to tracing the zone of distribution, which was clearly encompassed by low, dry, gravelly escarpments on which no trace of the orchid was to be seen. On the pasturage area the

plants were smaller and many of them damaged by cattle; but on the other half of the ground, separated by a wire fence, and on which no cattle were to be seen, the plants were much finer, some of them measuring from 9 to 12 inches. *Juncus* was prevalent in the marshes, and *Hydrocotyle vulgaris* and *Anagallis tenella* abundant. The other dominant species before-mentioned were not so common at this station, though *Lysimachia Nummularia* occurred frequently.

This new station is separated by fully four miles of shoreline from the previous one, and the wonder now is how the plant escaped detection so long; for some of the older botanists undoubtedly roamed over the neighbourhood. Records of other rarities at least support this view. The two conclusions at which I had arrived after my survey of the first station, namely—(1) that the north shore of Lough Neagh may now claim to be the headquarters of the plant's distribution in Europe; and (2) that an August search was likely to reveal the existence of this exceedingly rare and beautiful orchid in new localities in the Lough Neagh basin—have, by this second discovery, received an unexpectedly rapid—and, I may venture to add—an agreeably startling confirmation.

On August 22nd I discovered still another Lough Neagh station for this orchid. I met with it, growing sparingly on a small bit of wet, marshy pasture, with a spongy bottom, opposite the Deer Park, and just two miles south of the town of Antrim. The area of suitable ground at the place did not exceed an acre or so, and I could only discover four plants. Still this is a notable extension of range.

Belfast.

NEWS GLEANINGS.

S. A. Stewart.

We regret to learn of the retirement from the curatorship of the Belfast Museum, College Square North, of Mr. S. A. Stewart, A.L.S. After a long period spent in business, during which all leisure time was devoted to scientific pursuits, Mr. Stewart became Assistant Curator in 1880, and Curator in 1891. He will carry with him into his retirement the heartfelt good wishes not only of scientific friends in Belfast, but of many naturalists throughout the British Islands.

OBSERVATIONS ON THE WEIGHTS OF BIRDS' EGGS.

BY NEVIN H. FOSTER, M.B.O.U.

SINCE recording my observations (*Irish Naturalist*, vol. xi, pp. 237-245, and vol. xii., pp. 295-297), I have been enabled to examine eggs of the following species. All these eggs were fresh except those of which the state of incubation is noted (these I had not an opportunity of examining eggs in a fresh state), and it may be well to state again that I have found that eggs lose about 15 per cent. in weight during the process of incubation.

Each set is a clutch taken from one nest, and in some cases where there is a variation in size I have given two clutches distinguished by letters *a* and *b*.

DIPPER (*Cinclus aquaticus*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.				
1.05	×	.74	=	74½	1.04	×	.75	=	74½
1.02	×	.75	=	72½	1.04	×	.75	=	77½
1.05	×	.73	=	74½					

PIED WAGTAIL (*Motacilla lugubris*).

Inch.	Inch.	Grains.		
.74	×	.56	=	30½
.75	×	.57	=	30½
.72	×	.58	=	31

YELLOW WAGTAIL (*Motacilla Raii*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains				
(a) .79	×	.6	=	36	(b) .75	×	.55	=	30
.79	×	.57	=	34½	.75	×	.56	=	31
.78	×	.57	=	33½	.75	×	.56	=	30½
.77	×	.56	=	broken.					

ROCK-PIBIT (*Anthus obscurus*).

Inch	Inch.	Grains.	Inch.	Inch.	Grains.
(a) .96	×	.65 = 56	(b) .83	×	.63 = 39½
.88	×	.66 = 53	.86	×	.63 = 41
.9	×	.65 = 51	.83	×	.63 = 39
.9	×	.64 = 49			

CARRION CROW (*Corvus corone*).

Inch.	Inch.	Grains.	
1.74	×	1.18 = 309	An English egg.

KINGFISHER (*Alcedo ispida*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains
.9	×	.73 = 67½	.88	×	.72 = 63½
.9	×	.72 = 62	.89	×	.73 = 64½
.91	×	.73 = 65	.86	×	.74 = 64
.93	×	.73 = 69			

TAWNY OWL (*Syrnium aluco*).

Inch.	Inch.	Grains.	
1.8	×	1.62 = 685½	An English egg.

MERLIN (*Falco aesalon*). Half hatched.

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
1.73	×	1.25 = 338	1.6	×	1.27 = 330
1.64	×	1.27 = 328½	1.61	×	1.24 = 319

SHAG (*Phalacrocorax graculus*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 2.72	×	1.56 = 532	(b) 2.53	×	1.53 = 815
2.26	×	1.52 = 815	2.41	×	1.5 = 755

COMMON SHELD-DUCK (*Tadorna cornuta*). Almost hatched.

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
2.65	×	1.88	=	1,157½	
2.67	×	1.86	=	1,072½	
2.62	×	1.88	=	1,130	
2.57	×	1.88	=	1,132	
2.61	×	1.9	=	1,155½	
2.54	×	1.87	=	1,031	
2.63	×	1.85	=	1,080	
2.56	×	1.84	=	1,071½	

SHOVELER (*Spatula clypeata*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
2.35	×	1.67	=	816	
2.22	×	1.62	=	734	
2.25	×	1.62	=	761	
2.18	×	1.6	=	723	
2.11	×	1.6	=	699½	

TUFTED DUCK (*Fuligula cristata*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
2.3	×	1.63	=	845	
2.27	×	1.58	=	793	
2.3	×	1.6	=	818	
2.43	×	1.58	=	830	
2.33	×	1.64	=	846	
2.25	×	1.6	=	814	
2.25	×	1.6	=	813	
2.25	×	1.57	=	773½	

RED-BREASTED MERGANSER (*Mergus serrator*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
2.75	×	1.85	=	1,285	
2.6	×	1.88	=	1,240½	
2.7	×	1.87	=	1,260	
2.58	×	1.9	=	1,254½	
2.62	×	1.92	=	1,291	
2.65	×	1.9	=	1,296	
2.67	×	1.9	=	1,295	
2.7	×	1.88	=	1,258	
2.64	×	1.85	=	1,217	
2.7	×	1.88	=	1,303	

RINGED PLOVER (*Ægialitis hiaticola*). Three-quarter hatched.

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
1.25	×	.98	=	143	
1.26	×	1.00	=	150	
1.32	×	1.00	=	154	
1.26	×	1.00	=	151	

WOODCOCK (*Scolopax rusticola*).

Inch.	Inch.	Grains.
1.84	×	1.32 = 414
1.82	×	1.32 = 411
1.8	×	1.3 = 410

REDSHANK (*Totanus calidris*). Almost hatched.

Inch.	Inch.	Grains.	Inch.	Inch.	Grains
1'85	×	1'25 = 323½	1'78	×	1'26 = 314
1'81	×	1'25 = 317	1'87	×	1'24 = 314½

COMMON CURLEW (*Numenius arquata*).

Inch.	Inch.	Grains.	
2'63	×	1'9 = 1,101½	Half hatched.
2'63	×	1'95 = 1,224½	do.
2'75	×	1'94 = 1,222½	Rotten.

SANDWICH TERN (*Sterna cantiaca*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains
(a) 2'02	×	1'42 = 505	(b) 2'00	×	1'43 = 432
2'05	×	1'43 = 454	1'97	×	1'44 = 427
2'07	×	1'45 = 492	1'97	×	1'42 = 447½

LITTLE TERN (*Sterna minuta*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 1'28	×	'95 = 149½	(b) 1'27	×	'91 = 130
1'26	×	'95 = 147½	1'26	×	'93 = 139
1'24	×	'96 = 146½	1'26	×	'93 = 137

BLACK-HEADED GULL (*Larus ridibundus*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 2'13	×	1'46 = 598½	(b) 1'91	×	1'42 = 501
2'11	×	1'5 = 609½	1'87	×	1'38 = 485
2'1	×	1'44 = 570	1'95	×	1'38 = 501
2'15	×	1'45 = 557			

LESSER BLACK-BACKED GULL (*Larus fuscus*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 2'77	×	1'95 = 1,295	(b) 2'63	×	1'86 = 1,150½
2'7	×	1'95 = 1,243½	2'68	×	1'82 = 1,075½
2'58	×	1'95 = 1,217	2'56	×	1'82 = 1,059

GREAT BLACK-BACKED GULL (*Larus marinus*).

Half hatched.

Inch.	Inch.	Grains.
3'12	× 2'15	= 1,806½
3'07	× 2'1	= 1,762½
3'12	× 2'17	= 1,826½

PUFFIN (*Fratercula arctica*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 2'45	× 1'7	= 969	(b) 2'25	× 1'65	× 827

GREAT CRESTED GRÆBE (*Podiceps cristatus*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 2'00	× 1'4	= 501	(b) 2'15	× 1'47	= 620
2'00	× 1'37	= 489			
2'05	× 1'35	= 498			

STORM-PETREL (*Procellaria pelagica*).

Inch.	Inch.	Grains.	Inch.	Inch.	Grains.
(a) 1'1	× '82	= 103½	(b) 1'06	× '79	= 91

Hillsborough, Co. Down.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Cormorant, a Stag, and a Black-headed Gull from Mr. R. M. Barrington, a Cockatoo from Mrs. Baker, a Mayoore from Miss D. Barton, a pair of Otters from Mr. J. W. B. Lindon, a pair of Ravens from Lieutenant-Colonel Edgeworth-Johnstone, and a Macaque from Mr. W. Exshaw. A Chimpanzee, three yellow Baboons and three Lemurs have been purchased. Two golden Agoutis have been born in the Gardens. The Society has sustained a great and unexpected loss in the death of the young Indian Elephant, "Padmahati."

BELFAST NATURALISTS' FIELD CLUB.

The *Proceedings* for 1906-7 have been issued, and we congratulate the Club on having at last pulled up the arrears into which their publication fell some six or seven years ago. The present part concludes the sixth

volume of *Proceedings* which the Society has issued, extending from 1863 to 1907—a fine record for a local Irish Society. The issue before us includes the usual reports, accounts of field meetings, and abstracts of papers read, the only exceptional feature being three plates illustrative of the fauna and flora of Lambay, reprinted (by permission but without acknowledgment) from this Journal.

REVIEW.

THE SENSE OF TOUCH.

The Sense of Touch in Mammals and Birds. With special reference to the Papillary Ridges. By WALTER KIDD, M.D., F.Z.S. London: A & C. Black, 1900. Price 5s. net.

This book consists of three parts, of which the first two are anatomical and the third physiological. Part I. deals with macroscopic anatomy of the hand and foot in mammals, and of the foot in birds, the general and larger modifications of the palms and soles being considered in the first chapter and the arrangement of the papillary ridges in chapter 2. Both these chapters are illustrated with numerous drawings both from the actual specimens and from impressions. These drawings are exceedingly interesting, and whether one agrees with all the author's interpretations or not, it is exceedingly instructive to go through the series keeping in view the habits of each animal as one goes along, and noting the modifications in the structure of the manus or pes in connection with modification of function, *e. g.*, elongation of fingers and toes in connection with climbing; compare lemurs, figs. 14-19, and squirrel, figs. 7 and 8, with the Cape Sea Lion, fig. 11. With regard to this part of the subject, it is a pity that more animals are not shown which use their feet solely for walking on the ground.

Part II. deals with the microscopic anatomy of the skin, and is illustrated with numerous photomicrographs of sections of the skin.

Part III. deals briefly with the sense of touch, especially in connection with the thesis which Dr. Kidd supports, *viz.*:—that the papillary ridges are mainly concerned in the sense of touch in opposition to the view held that they are mainly concerned in preventing slipping and giving firmness of prehension in climbing and walking. The author has certainly made out a good case for his view, and his book is most interesting.

Fig. 52A is a very rough copy, and in fig. 52B the part labelled "papillae of corium," should be stratum lucidum, while the "duct of sudoriparous gland" is a portion of the Malpighian layer, with no sudoriparous duct near.

NOTES.

BOTANY.

***Puccinia uliginosa*, Juel. in Ireland.**

The æcidium or cluster-cup stage of this fungus was found on *Parnassia palustris* on 14th June in the marsh beside Leixlip station, Co. Kildare. It has not, so far as known to me, been previously found in Ireland.

J. ADAMS.

Royal College of Science, Dublin.

***Orchis pyramidalis* in Co. Down.**

Last year I recorded (*J. N.*, p. 218) a new station in Down for *Orchis pyramidalis*, namely:—"the sand-hills, a short distance west of Rathmullan Point." However, on July 27 of the present year, Mr. N. Carrothers was botanizing in the same locality, and after meeting with a solitary specimen in exactly the same station, he worked over the dunes westward, and soon came across a fine colony, numbering in all about 20 plants. The locality is about midway between Rathmullan Point and Ringsallin coast-guard station.

W. J. C. TOMLINSON.

Belfast.

***Galium sylvestre* in North Ireland.**

That *Galium sylvestre*, recently detected in Co. Down, can now with certainty be numbered amongst Ulster plants, is not without some interest, more especially so as concerns phytolithological considerations.

It was met with on a grassy bank at Lenadreg, where it occurs in some quantity, spread over a space of several square yards. In view of its marked preference for limestone, the plant was entirely unexpected at this place, the subjacent rock being Lower Silurian, but the dryness of the situation is in a measure indicated by the presence of predominating *Hieracium pilosella*. Seen in previous years, it was cut down with the grass amongst which it grows, before its time of flowering, and was then, without proper examination, passed over as a depauperated state of another species. This year, however, climatic conditions were such that the scythe was not used until late in July, before which time our plant had matured, and when observed in flower was at once recognised as *G. sylvestre*.

The species had previously been reported from Co. Antrim. It is recorded in Professor Dickie's *Flora of Ulster* (1864) and in *Cybele Hibernica* (1866), but as it has never been refound in that county, and has been considered, by various authors, as restricted to limestone regions, the records have been discredited. In *Flora of the North-East of Ireland* it is placed in the list of plants excluded, with the remark, "Only to be looked for on limestone. The plants found at Belfast and Rathlin were *G. saxatile*, and there can be little doubt that those at Fair Head and Lurigedan were the same." Of these localities the two last named were given on the authority of Dr. Moore. The authors of *Cybele Hibernica*, 2nd ed., accepting this opinion, have also excluded it from District XII.; Mr. Praeger, in *Irish Topographical Botany*, disposing of these County Antrim records with the observation, "On the western limestones only."

Since the introduction into Irish botanical writings of the terms "calci-cole" and "calcifuge" there seems to have been an increasing tendency unduly to magnify the distributional influence of the chemical composition of limestone, and to take but little account of the importance of that of the dryness of the rock.

Thus our plant—afortime classed as a subxerophilous species—has, so to speak, not been permitted the liberty of seeking a dwelling-place on the dry basaltic cliffs of County Antrim.

It was almost unthinkable that a botanist so acute and so careful as the late Dr. David Moore could have mistaken *G. saxatile* for *G. sylvestre*, and it has at length been ascertained that there is a specimen to vouch his records, the specimen being labelled in Dr. Moore's handwriting "*G. pusillum*. [= *G. sylvestre*.] Rare. Observed near Fair Head and on Lurigedan Mtn., near Cushendall, July, 1836." This was very obligingly traced out for me by Mr. David M'Ardle, and is contained in the collection made by Dr. Moore, when, in 1836, he was associated as botanist with the Ordnance Survey of Ireland, which collection is now in the herbarium of the Dublin Science and Art Museum. Miss Knowles, who has carefully examined the specimen, gives me assurance that, as was to be anticipated, there is no foundation whatever for the suspicion of erroneous identification. That being so, its claim for restoration to the flora of Co. Antrim I think cannot be set aside. Very probably it will yet be refound in that county.

It is to be said that the identification of the plant from Co. Down has been verified by competent botanists, one of whom, the veteran S. A. Stewart, A.L.S., the first to reject the plant on the grounds above stated, writes: "I have compared your *Galium* with specimens and descriptions, and have no doubt that it is true *G. sylvestre*."

J. H. DAVIES.

ZOOLOGY.

A Note on *Leptoplana tremellaris*.

As the feeding habits of this interesting species, the common Film-Worm or Living Film of our coasts, have, perhaps, not been very closely studied, the following observation may be worthy of record. On the morning of the 10th July last, I placed in a dish of sea-water, with several living specimens of *Leptoplana*, gathered on the rocks of Red Island, Skerries, some days earlier, a single living specimen, nearly one inch long, of the small Razor-fish, *Solen pellucidus*, dredged off Skerries harbour the previous evening. Leaving the *Solen* in the apparently harmless companionship of the Film-worm, I went away, and returned some hours later with the intention of observing the motions of the Razor-fish, which had been particularly lively when placed in the dish. To my astonishment, I found the valves of the *Solen* lying wide open, inner side upwards, with the Film-worm sprawled across them, and in the act of gliding away with its peculiarly even motion. When the worm had fully passed off the valves of the *Solen* I found them quite empty. Not a trace of the living Razor-fish was to be seen, and the swollen state and dark colour of the central region of the worm, originally almost as film-like and pellucid as the rest of its body, showed that it had just gorged itself on the unfortunate *Solen*. The broad elliptic-shaped worm, to all appearance a mere slice of plastic jelly destitute of any definite organs or weapons of defence, had, no doubt, extended itself to a narrow ribbon, and then, sliding in through the slightly gaping end of the *Solen* valves, had proceeded to devour the living tenant. The process by which the Living Film absorbed a Razor-fish fully as large as itself must be one of suction. Perhaps some reader of this journal who has studied the habits of *Leptoplana tremellaris* can tell us something about its feeding mechanism.

N. COLGAN

Sandycove, Co. Dublin.

Scarcity of Wasps.

One of the most noticeable events here in insect life this summer is the total absence of wasps. A few queens (now all disappeared) but not a single worker. Has the cold weather in June and early July annihilated every species of wasp in Ireland, or is their absence here merely a local characteristic?

R. M. BARRINGTON.

Fassaroe, Bray.

Ornithomyia avicularia on Starlings.

A large flock of these birds was crossing the Antrim Road at 8 o'clock, p.m. on 15th August. They were flying very swiftly. About a dozen struck the telephone wires and fell, most of them dead. I examined a dead bird, and one with a broken wing that my son picked up. The dead bird was an old male half through the moult; the wounded one appeared to be a female of the year, a few feathers only were moulted on each side of the breast.

My attention was called by the movements of a fly that was running over the plumage. I secured it in a glass-topped box. I noticed other parasites on the bird and on my hands. Some of these I put in the box with the fly, which I sent to the editors for identification, and find it to be *Ornithomyia avicularia*. This fly was apparently distended with blood. It runs very swiftly, and can proceed with equal ease in three directions, either to right, to left, or forward. These motions are very noticeable, and mark it off from common flies.

H. L. ORR.

Belfast.

Common Heron breeding at Portmarnock.

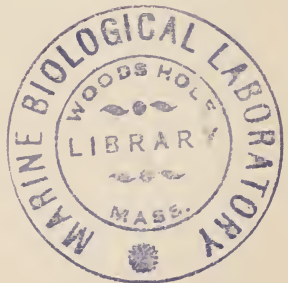
Last year a pair of Herons successfully brought up three young in an old Magpie's nest in a small grove at Beechwood. This year the same nest was occupied, probably by the same pair of birds, and two or three were reared. About a quarter of a mile from this grove on the same townland another pair of Herons enlarged an old Wood-Pigeon's or hawk's nest in a beech-tree and hatched out three young, but one unfortunately was blown off the nest by a strong gale and killed. It is quite interesting to find so large a bird nesting a little over seven miles from Dublin City. There is every likelihood, I think, that a heronry will be established, as every care is taken of the old birds during the breeding season. The Common Heron cannot be looked upon as increasing its breeding range in County Dublin, for up to the middle of the last century a heronry of some size existed close to Malahide Castle, and till quite recently a few pair nested annually at Newbridge, Donabate. At the latter place they were so much harassed that they were obliged to abandon this site. The present birds breeding at Beechwood most likely were members of the Newbridge heronry.

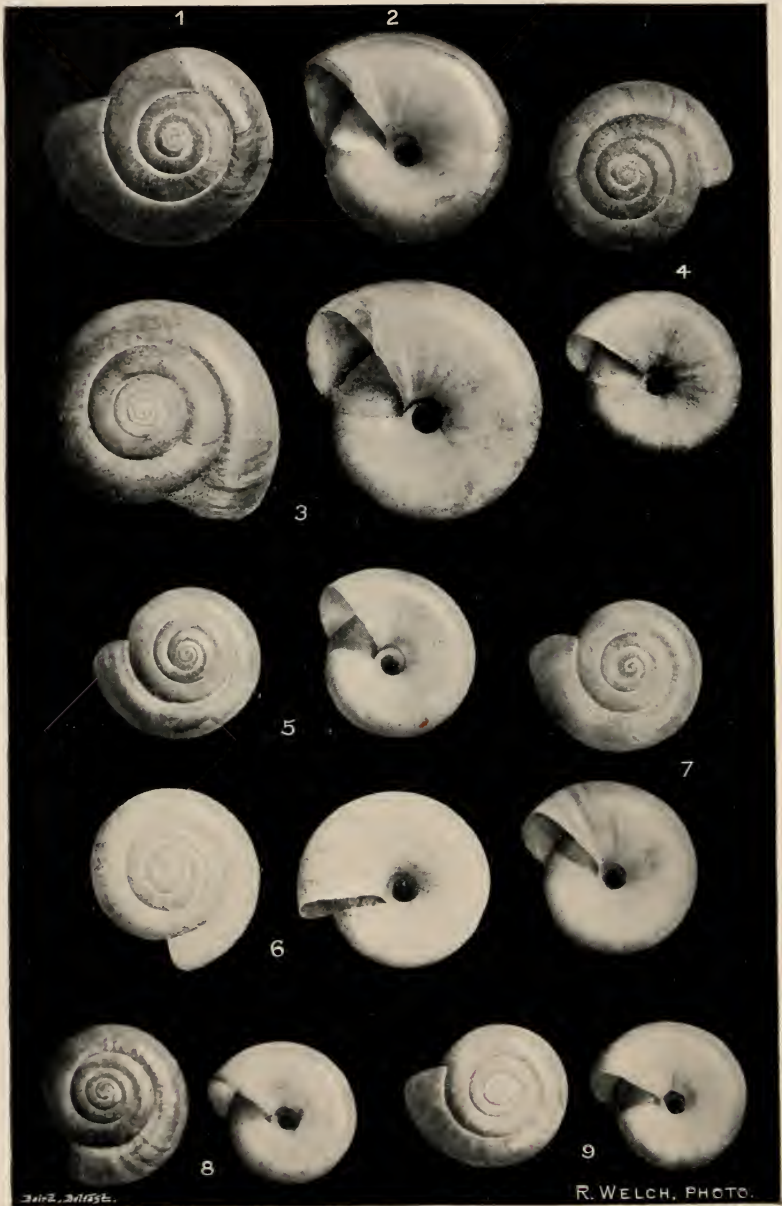
J. TRUMBULL.

Malahide.

Dolphin in Moy Estuary.

In the *Zoologist* for June Mr. Robert Warren records the occurrence of a Dolphin, believed to be *Delphinus delphis*. The carcass, mutilated and decomposed, came ashore near Moyview.





1, 2, 3, *VITREA LUCIDA*; 4, 5, 6, 7, *V. HIBERNICA*, N. Sp.;
8, 9, *V. CELLARIA*.

All enlarged 2 diam.

To face p. 325.

ON VITREA (HYALINIA) HIBERNICA, n. sp.

BY A. S. KENNARD, F.G.S.

WITH NOTES ON THE ANATOMY BY REV. E. W. WAKE BOWELL.

PLATE 42.

THERE has for some time been considerable difficulty as to the correct name of a large species of *Vitrea* occurring not infrequently in Ireland, and which has been called both *V. cellaria* Müll. and *V. lucida* Drap. In 1897 Mr. Lionel E. Adams recorded *Vitrea lucida* Drap. (*Hyalinia Draparnaudi* Beck) from Murlough Bay, Co. Antrim (*Irish Nat.*, vol. vi., pp. 179-183), but the following year this specific name was withdrawn in favour of *H. cellaria* Müll. He says, "In the *Irish Naturalist* for 1897 I included *Hyalinia Draparnaudi* Beck, in the list of species from Murlough and Rathlin Island. I now wish to withdraw the species for the present, for the following reasons:—In Lancashire and the Isle of Man a large form of *Hyalinia* with a dark blue animal has been found. This also occurs at Rathlin Island and at Murlough Bay. The animals from Tenby (*Hyalinia Draparnaudi* Beck) like those from Exeter are a dark but brilliant cobalt blue, those from Murlough are an indigo. The mantles of the Irish specimens are always flecked with dark brown like normal *cellaria* whilst the Tenby shells do not possess these. Mr. Moss says that the radula and genitalia of the Lancashire, Manx, and North Irish specimens are nearer to *H. cellaria* than to *H. Draparnaudi*. Lancashire specimens are 12-13 mm. in diameter, whilst Murlough examples are 12-14 mm. A typical *cellaria* is 10 mm. and *Draparnaudi* 14 mm. I am inclined to think them a form of *H. cellaria*."¹

Mr. J. W. Taylor says, "In the west and north there is apparently a larger but more ancient and weaker race of this species [*Hyalinia cellaria* Müll.] which forms a still closer connecting link with *H. lucida*, from which it is often very difficult

¹ *Irish Nat.*, vol. vii., 1898, p. 82.

to separate it by external characters: the anatomy of these somewhat dubious forms is, however, undoubtedly that of *H. cellaria* and they may be referable to the var. *compacta* of Jeffreys."¹ It may here be noted, that whilst Mr. Taylor says that the anatomy is undoubtedly that of *cellaria*, Mr. Moss states that the anatomy is nearer to *cellaria* than *Draparnaudi*.

My attention was first called to this form a few years ago, when several examples were sent me with other shells from Beginnish Island, Valentia, Co. Kerry, by Miss Delap. Noting at once their difference from typical English and continental *cellaria* an attempt was made to identify them, but this I was unable to do, and they were placed on one side to await determination. In spite of the repeated statement that these shells were *cellaria*, I have always been doubtful of the identification, although in correspondence I have called them by that name. In the early part of this year Mr. R. Welch, M.R.I.A., kindly forwarded me a large series of living examples from Murlough Bay, the first living specimens I had seen, and my original doubts were at once confirmed on noting the dark coloured animal, so different from the light-coloured form of the south-east of England. Examples were sent to Dr. O. Boettger, of Frankfort, and to Rev. E. W. Wake Howell, whose knowledge of the anatomy of our non-marine mollusca is unsurpassed. Dr. Boettger's determination is as follows:-- "The *Hyalinia* from Murlough Bay I have as *cellaria* var. *compacta* Jeff. from Gills Bay, Caithness; the nearest continental shell I have is a var. of *V. Draparnaudi* Beck from the Botanical Gardens, Dresden."

Rev. E. W. Wake Howell at once pronounced the Irish shells to be distinct from *cellaria*. He says:—"Your Irish specimens are readily distinguished from all the *cellaria* I have seen by the shape of the central tooth. This, of course, varies in different specimens, but not so as to make distinction impossible. The basal plate is also different. The bluntness of the teeth on the Irish examples remind me of *alliaria* in this respect. I have examined young *cellaria* radulæ to see whether they are the same as *alliaria*, but they do not appear

¹ "Monograph," part 14, p. 37.

to be so. I think that this Irish form may be considered a distinct species. If we are to go on the principle of having as few species as possible, then we ought to consider *Vitrea lucida*, *cellaria*, *helvetica*, and *alliaris* as a single very variable form, but it seems more natural to name the different forms, because we do find that some (e.g. the big cobalt-blue *Draparnaudi* and the common *cellaria*) are very well fixed. We might now and then find a *cellaria* with one or more of the characters of *Draparnaudi* or of your Irish form, but I do not think that it is at all likely that we should ever come across the complete thing in a community of *cellaria*."

It will thus be seen that this Irish shell is unknown on the Continent and is quite distinct from *cellaria*. Under these circumstances a name is needed, and I would suggest the name of *Vitrea hibernica*.

***Vitrea hibernica*, n. sp.**

Shell somewhat convex above, less so beneath, thin, glassy, semi-transparent, pale horn-colour above, clouded white beneath; striæ parallel with the mouth and more pronounced at the suture. Whorls 5-6, body-whorl about half the size of the shell, spire slightly produced, apex blunt, suture shallow and grooved, mouth semilunar and somewhat oblique, umbilicus narrow and deep. Height 6-7 mm. Breadth 11-14 mm. It can be distinguished from *V. cellaria* by the greater height of the spire and by the more oblique mouth: this last being very noticeable in adult examples though less so in immature specimens. (Plate 42, figs. 4-7.)

There is a small amount of variation in the shell, but most of the examples that I have seen are much higher in the spire than *cellaria*, and it also attains, as Mr. Adams pointed out, to a much larger size. The largest example I have seen was 15 mm. in diameter from Drumcliffe crannoge, Co. Clare (Mr. J. W. Taylor has stated that at Drumcliffe crannoge specimens are said to attain 15 mm. in diameter—*Monograph*, part 14, p. 31. This statement is only true of one example which is now in the Dublin Museum). Examples are often 7 mm. in height. The highest *V. cellaria* I have noted is 6.5 mm., though I have examined many thousands of examples. It must of course be admitted that in a highly specialized group like the Vitreas, where the shell is in a degenerate state, there is great difficulty in discriminating between the species on conchological grounds, yet we must not on account of this

difficulty consider all the forms as one species. There is considerable anatomical difference between *Hygromia sericca* Drap. and *Hygromia rubiginosa* A. Sch., yet no one has yet been able to point out any constant conchological difference.

Vitrea hibernica is represented in my collection in a recent state from Beginnish Island, Co. Kerry (coll. Miss M. Delap), Murlough Bay, Co. Antrim (coll. R. Welch, M.R.I.A.), and Rathkeale, Co. Limerick (coll. H. Fogerty); and in a fossil state from Drumcliffe crannoge, Co. Clare (coll. Miss Parkinson), Clanreen crannoge, Co. Clare (coll. Miss Parkinson), and a rainwash at Dog's Cave, Edenvale, Co. Clare (coll. R. Welch, M.R.I.A.).

Mr. A. W. Stelfox has kindly submitted to me the Vitreas collected by him during the recent Cork Conference and during a subsequent collecting tour in the south-west, and the new species is represented there from near Youghal, Co. Waterford; Kenmare, Kerry South; Carrigrohane, Mid Cork; Killarney, Kerry North; and Rostellan, Cork East. The mistake in the past has been the elevation of Jeffreys' *British Conchology* to infallibility. Shells have been provided with names because they must be that species, since that was the nearest one known to Jeffreys; the name being given after a series of eliminations rather than by direct comparison and identification. There are other forms in Ireland which may well be new records for the British Isles, for amongst the shells sent me by Mr. Stelfox are some Vitreas which I cannot identify with any known British form. The shells which are always called *Valvata piscinalis* Müll. are undoubtedly a composite group of at least two species, *V. piscinalis* Müll. and *V. alpestris* Blau; and the latter species is not uncommon in Ireland. It may be urged that I am adding another ill-defined and unsatisfactory species to an already difficult group, but it appears to me better to name the form than to persist in calling it *V. cellaria* Müll, which it certainly is not, or *cellaria* var. *compacta* Jeff. which includes both *cellaria* and *lucida*.

I must tender my best thanks to those who have so kindly assisted me in endeavouring to ascertain the correct name of this Irish mollusc, and especially to Dr. Boettger, the Rev. E. W. Wake Bowell, and R. Welch, M.R.I.A.

DESCRIPTION OF PLATE 42.

- Fig. 1. *Vitrea lucida*, Drap.—Bristol. ×2.
 2. " " "—Carrigrohane, Co. Cork. ×2.
 3. " " "—Dublin. ×2.
 4. *V. hibernica*, n. sp.—Beginnish. ×2.
 5. " " "—Murlough Bay. ×2.
 6. " " "—Dog's Cave, Ennis. ×2.
 7. " " "—Rostrevor. ×2.
 8. *V. cellaria*, Müll.—Cudham, Kent. ×2.
 9. " " "—Lancaster. ×2.

1, 4, 5, 6, 8, from the author's collection; 2, from J. N. Milne; 3, Dublin Museum; 7, A. W. Stelfox; 9, J. W. Jackson.

NOTE ON THE ANATOMY OF *VITREA HIBERNICA*.

BY THE REV. E. W. W. BOWELL.

THE specimens of *V. hibernica* sent me by Mr. Kennard differ notably from *V. cellaria* as it occurs in this country. They were larger than the average, and the colouring was of a dark slate blue, somewhat resembling the tone of the pigment known as ultramarine ash. On examination, it was found that the cells of the skin were more opaque than those of *cellaria*: they were also more symmetrical in their distribution, and cells containing brown or black branched pigmentary bodies seemed to be absent.

Throughout this examination, I compared Mr. Kennard's specimens with examples of *cellaria* from Penshurst and Sissinghurst (Kent), and the preparations here contrasted were in each case submitted to the same treatment throughout. As I have dissected over 100 *cellaria* during the past year, I am able to say that the specimen here selected for comparison was normal.

In respect to all details of anatomy *V. hibernica* proved to be more thickset and strongly built. This is well exemplified in fig. 1, which represents the radulæ of the two species as they appear in their natural investments and muscular attachments.

Fig. 2 shows the genitalia of *V. hibernica*. It will be noted that the spermatheca is a flat and spoon-shaped organ, very different from the globular or sub-globular spermatheca of

cellaria, though under certain physiological circumstances the spermatheca of *cellaria* itself assumes a somewhat similar shape. Its duct, in *V. hibernica*, is longer: the vagina is relatively long and twisted. The penis and epiphallus are large and distinct, so also is the dilatation of the vas deferens. On the whole, one may say that these organs are more suggestive of *V. lucida* than of *V. cellaria*. Throughout the group there is of course great variation due only to the physiological age and condition of the individual. The abortive development sometimes found in undoubtedly adult *V. cellaria* may probably be correlated with the parthenogenetic habit which

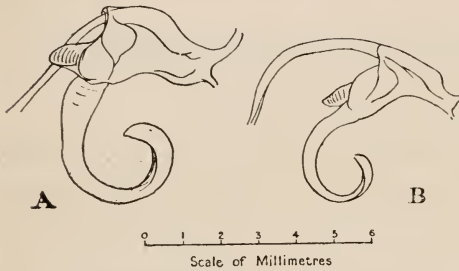


Fig. 1. Radulæ of Vitreæ in situ.
A. *V. hibernica*, Kenn. B. *V. cellaria*, Müll.



Fig. 2. Genitalia of
V. hibernica, Kenn. sp. n.

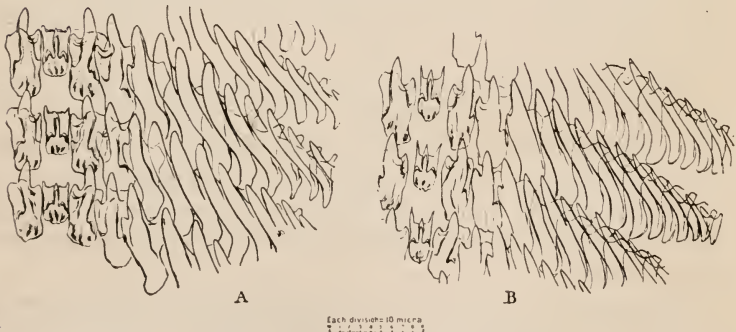


Fig. 3. Radular Teeth of Vitreæ.
A. *V. hibernica*, Kenn. sp. nov. B. *V. cellaria*, Müll.

is recorded of that species. Like many other ill-bred creatures, *V. cellaria* is amazingly prolific, and apparently it not unfrequently omits to go through a part of the normal process.

The radulæ of *hibernica* and *cellaria* I have drawn in fig. 3. The compact oblong centrals are found consistently in *V. hibernica*: in *V. cellaria* one occasionally finds an approximation to this form, but chiefly in specimens exhibiting strong marks of irregularity. The greater thickness and prominence of the teeth on the outer rows is a character well defined in all my specimens.

The accompanying figures are all tracings made with the Abbe drawing apparatus. The radulæ were traced with the Zeiss 3 mm. apochromat, compensating ocular 4. It may be worth while to mention that by the use of these lenses an absolutely flat field is obtained, which is indispensable for the present purpose. A curvature so slight that it is inappreciable for ordinary visual purposes is enough to make the accurate drawing of radulæ of this type an impossibility. Figures 3A and B are to be regarded merely as transcripts of fact: they have not been conventionalised in any way. In the lowest row of figure 3B a "tooth" is shown which does not lie parallel to the axis: it is consequently slightly foreshortened. I have drawn these figures with the points of the teeth upward, and I wish them to be so examined. The convention to the opposite effect is due, I suppose, to the idea that the normal position of the snail in the dissecting dish is the position of running away from the operator. Be that as it may, I am convinced that I am not alone in the feeling that the best way of looking at a conical object is to look at it with the points turned up and not down. A drawing of St. Paul's Cathedral, for example, may be equally good upside down, but it appears to me that it is not equally intelligible.

The general impression left with me by the study of these Vitreæ is that *V. hibernica* plays dominant to *V. cellaria*'s recessive. *V. hibernica*, however, appears to be a pure dominant, and probably also fixed: while *V. cellaria* includes not only pure recessives, but—partly owing to its debased gametic habits—a large number of mixed forms, among which examples resembling the pure dominants, may occasionally crop up. I hasten to add that I alone am responsible for this speculation; but it seems to me to justify Mr. Kennard's name *Vitrea hibernica*.

MUSCI AND HEPATICÆ FROM CO. MAYO.

(Collected for the Fauna and Flora Committee of the Royal Irish Academy, July, 1906.)

BY DAVID M'ARDLE.

THE following lists of mosses and liverworts are the result of a week's collecting in July last year. I went from Dublin to Ballinrobe, from there I drove on a car to Clonbur, a distance of about nine miles, and on the route enjoyed the view of Lough Mask and mountains, with numerous islands in the foreground of the lough, making a pretty picture. In Mount Gable Hotel I was soon comfortably settled, and I made excursions, collecting every day. My first trip was to Ballard, on the shore of Lough Corrib, along which I worked around to Carrick, and then took a boat and rowed over to one of the promising islands called Illaunaknick. As the boat grounded I gathered *Cinclidotus fontinaloides*, which was plentiful on the stony margin of the little isle, where it is often submerged. Some very fine specimens of the Little Tree-moss (*Climacium dendroides*) were growing amongst the moist rocks.

Liverworts were scarce. *Frullania germana* grew sparingly on the trunks of Alder trees, with a proliferous form of *Metzgeria furcata*. Mosses were better represented, and I collected twenty species on the little island. A most interesting day was spent in the limestone district of Cong, where I tramped through acres of white flat rocks, with more or less success. The route from Clonbur was by the splendid demesne of Ashford, with its extensive woods and coverts. I spent a long time in the Pigeon Hole cave, near the village of Cong, which one can descend by rude stone steps on the rocky walls. Mackay's *Lejeunea* was growing plentifully. I was glad to find this curious liverwort. The only district near this that I know of where it grows is on rocks by the margin of a small lake near Letterfrack, which is in County Galway. In the cave it was growing in company with *Metzgeria furcata*, and they grew so tightly to the rocky walls that I had to scrape them off with a knife. On the rocky steps and away down in the dark where

I had to light matches, large masses of *Conocephalus conicus* flourished, and pushed its fronds into every moist crevice. Among the mosses, *Amblystegium serpens* was everywhere, and I also collected three species of *Eurhynchium*—*E. pumilum*, *E. Teesdalei*, and *E. tenellum*; the latter was conspicuous by its yellowish soft silky tufts. Some interesting collecting was done in the neighbourhood and around the shore of Loughnafooy and along the banks of the Finny River, up to the waterfall and along the mountainous rocks which back up the lough on to the rugged pass. I spent a day about Curranamona, where I gathered the curious *Andræa crassinervia* on the rocks. There was very little to be found. It is possible to detect this plant in the field with the help of an ordinary pocket-lens on account of the leaf blade being suddenly narrowed from above the wide base almost to the nerve in the upper half.

On this delightful excursion, which was mostly in wild and rocky mountain recesses where the moss flora is often poorly represented, I gathered thirty-eight species and five varieties of *Hepaticæ*, and sixty-four species and four varieties of *Musci*. The identification of some of the forms is often difficult, but becomes a pleasure when one has the assistance of H. N. Dixon, F.L.S., of Northampton, to whom I offer my best thanks.

MUSCI.

- Sphagnum cymbifolium**, Ehrh.—Bogs on the shore of Loughnafoey. Heaths along the shore of Lough Corrib near Ballard.
- S. papillosum**, Lindb.—On peaty banks among rocks, waterfall at Curranamona, Loughnafoey.
- S. tenellum**, Ehrh.—On heaths among rocks, Loughnafoey, very scarce. Dr. Moore, in his Report on the Mosses of Ireland,¹ records this plant from Glenmalure, Co. Wicklow, and from Brandon, Co. Kerry. He writes "rare in Ireland."
- S. acutifolium**, Ehrh.—Marsh at Curranamona, Loughnafoey.
- Andræa crassinervia**, Bruch.—On rocks, Carrick Hill, Curranamona. Differs from *A. Rothii* only in the stronger nerve, the limb of the leaf very narrowly contracted from just above the expanded base, the lamina in the upper part extremely narrow, sometimes ceasing below the apex, so that the nerve is slightly excurrent.

¹ *Proc. R. I. Academy* (2), vol. i., ser. ii., p. 135.

Although there is much diversity of opinion as to the claim this plant has to rank as a species on account of its affinity to *A. Rothii* it is, nevertheless, interesting to discover it in Co. Mayo. Dr. Moore, in his work above quoted, gives the locality as Upper Lough Bray, Co. Wicklow.

- Catharinea undulata**, Web. & Mohr.—Shore of Lough Corrib near Ballard.
- Polytrichum commune**, L.—Woods near Cong.
- P. piliferum**, Schreb.—Peaty banks among rocks, shore of Lough Corrib near Ballard.
- Ceratodon purpureus**, Brid.—Peaty banks, shore of Lough Corrib near Ballard; near waterfall at Curranamona.
- Campylopus subulatus**, Schp.—Bank by the shore of Lough Corrib near Ballard.
- C. fragilis**, B. & S.—Bank near the waterfall at Curranamona.
- C. atrovirens**, De Not.—Peaty banks, Loughnafooe; bank by the Finny River.
- Dicranum scoparium**, Hedw.—Woods near Cong.
- D. Bonjeani**, De Not.—On peaty banks among rocks, Loughnafooe; woods near Cong.
- D. fuscescens**, Turn.—Among rocks, shore of Lough Corrib near Ballard; woods near Cong.
- Leucobryum glaucum**, Schp.—Banks among rocks, Loughnafooe.
- Fissidens bryoides**, Hedw.—Banks by the shore of Lough Corrib near Ballard.
- F. adiantoides**, Hedw.—Wet rocks, Illaunaknick, Lough Corrib.
- F. decipiens**, De Not.—Rocks in wood near Cong.
- Grimmia trichophylla**, Grev.—On rocks in a wood near Cong. Not previously recorded from Mayo.
- Racomitrium aciculare**, Brid.—On rocks, shore of Lough Corrib near Ballard.
- R. protensum**, Braun.—On rocks, shore of Lough Corrib.
- R. canescens**, Brid.—On rocks and heaths, shore of Lough Corrib.
- Ptychomitrium polyphyllum**, Furrn.—On rocks, Illaunaknick, Curranamona, Loughnafooe; shore of Lough Corrib about Ballard.
- Hedwigia ciliata**, Ehrh.—On rocks, shore of Lough Corrib.
- Weissia rupestris**, C. M.—On damp rocks, Loughnafooe.
- Trichostomum mutabile**, Bruch, var. **littorale**, Dixon.—On banks on the shore of Lough Corrib near Ballard.
- T. flavovirens**, Bruch.—Banks, Loughnafooe; wood near Cong.
- T. tenulrostre**, Lindb.—On rocks, Pigeon Hole near Cong. Illaunaknick.
- T. tortuosum**, Dixon.—Rocks in wood near Cong; Carrick Hill.
- Cinclidotus fontinaloides**, P. Beauv.—On stones, shore of Illaunaknick; river at Cong Bridge.
- Ulota crispa**, Brid.—On Alder trees, Illaunaknick.
- Philonotis fontana**, Brid.—Bogs, Loughnafooe.

- Bryum pseudotriquetrum**, Schwgr.—Marsh on Illaunaknick.
- B. capillare**, L.—On the trunks of trees in wood near Cong; Illaunaknick.
- B. alpinum**, Huds.—On wet rocks, hills about Lough Corrib.
- Mnium cuspidatum**, Hedw.—Woods near Cong.
- Fontinalis antipyretica**, L.—On stones in Lough Corrib near Ballard.
- Neckera crispa**, Hedw.—On the trunks of trees in wood near Cong.
- N. complanata**, Hübn.—On trunks of trees, Illaunaknick.
- Homalla trichomanoides**, Brid.—On the trunks of trees, Illaunaknick; wood near Cong; waterfall at Curranamona.
- Porotrichum alopecurum**, Mitt.—On rocks, Illaunaknick; wood near Cong.
- Climaclum dendroides**, W. & M.—Very fine on Illaunaknick.
- Camptothecium lutescens**, B. & S.—Among stones, Illaunaknick.
- Brachythecium velutinum**, B. & S.—Illaunaknick.
- B. purum**, Dixon.—Abundant among grass, Illaunaknick.
- Eurhynchium pumilum**, Schp.—Pigeon Hole, Cong.
- E. Teesdalei**, Schp.—Pigeon Hole, Cong; Illaunaknick.
- E. tenellum**, Milde.—Pigeon Hole, Cong.
- Plagiothecium depressum**, Dixon.—On the trunks of trees near the ground, waterfall at Curranamona; Carrick hill.
- P. pulchellum**, B. & S.—Among rocks, shore of Lough Corrib near Ballard; waterfall at Curranamona.
- P. undulatum**, B. & S.—Wet rocks, Illaunaknick.
- Amblystegium confervoides**, B. & S.—On damp rocks, wood near Cong.
- A. serpens**, B. & S.—On rocks, wood near Cong; Pigeon Hole, Cong.
- Hypnum stellatum**, Schreb.—Shore of Lough Corrib near Ballard; Illaunaknick.
- H. uncinatum**, Hedw.—Bank of Finny River.
- H. commutatum**, Hedw.—Shore of Lough Corrib near Ballard.
- H. falcatum**, Brid.—Shore of Lough Corrib.
- H. cupressiforme**, L.—Shore of Lough Corrib; Illaunaknick.
- Var. **filliforme**, Brid.—On the trunks of trees, Illaunaknick; shore of Lough Corrib near Ballard; Carrick Hill.
- Var. **resupinatum**, Schp. (*H. resupinatum*, Wilson).—On the trunks of trees near the waterfall at Curranamona.
- Var. **ericetorum**, B. & S.—On trees in wood near Cong.
- H. hamulosum**, B. & S.—On rocks in wood near Cong.
- H. molluscum**, Hedw.—Waterfall at Curranamona; wood near Cong.
- H. scorpioides**, L.—Bogs about Loughnafoeoy.
- H. sarmentosum**, Wahl.—Shore of Lough Corrib near Ballard. A very remarkable plant, of a deep purplish crimson, often variegated with green and orange.
- Hylocomium triquetrum**, B. & S.—Among grass, Illaunaknick.

HEPATICÆ.

- Frullania Tamarisci**, Linn., Dumort.—On the trunks of trees, Curranamona; Illaunaknick.
- Var. **robusta**, Lindberg.—On the trunks of trees, Curranamona.
- F. microphylla**, Gieseke.—On the trunks of trees, Loughnafooy.
- F. germana**, Taylor.—On the trunks of trees, Illaunaknick.
- F. dilatata**, Linn., Dumort.—On rocks, shore of Lough Corrib near Ballard; Illaunaknick on trees; woods near Cong.
- Lejeunea Mackaii**, Hook., Sprengel.—Woods near Cong, on *Metzgeria furcata*. On rocks, Pigeon Hole, plentiful.
- L. serpyllifolia**, Dicks., Libert.—On old wood near Cong; on the trunks of trees, Illaunaknick.
- Var. **cavifolia**, Ehrhart, Lindberg.—On the trunks of trees, Loughnafooy (only previously recorded from Co. Kerry).
- L. minutissima**, Smith.—On the trunks of trees, wood near Cong.
- Radula Carringtonii**, Jack.—On wet rocks, Carrick Hill.
- R. complanata**, Linn., Dumort.—On the trunks of trees near Cong.
- Porella platyphylla**, Linn., Lindberg.—On rocks in wood near Cong.
- Kantia trichomanis**, Linn., Gr. & B.—Banks in wood near Cong; shore of Lough Corrib near Ballard.
- Cephalozia catenulata**, Huben.—Damp bank among rocks, Loughnafooy.
- C. lunulæfolia**, Dumort.—On old wood, Loughnafooy.
- C. connivens**, Dicks.—On peaty banks, Loughnafooy.
- C. curvifolia**, Dicks.—On peaty banks, fertile, Loughnafooy.
- C. denudata**, Nees, Spruce.—On *Leucobryum glaucum*, Loughnafooy.
- C. divaricata**, Smith, var. **Starkii**, Spruce.—On damp bank, Loughnafooy.
- Scapania resupinata**, Linn., Dumort.—A minute form on the trunks of trees, shore of Lough Corrib.
- S. nemorosa**, Linn., Dumort. var. **purpurea**, Hook.—Bog at Loughnafooy.
- S. uliginosa**, Swartz, Dumort.—Bog on the shore of Lough Corrib near Ballard.
- S. curta**, Mart., Dumort.—Moist bank shore of Lough Corrib near Ballard.
- Diplophyllum albicans**, Linn., Dumort.—Banks, Loughnafooy; Carrick Hill; shore of Lough Corrib near Ballard.
- Lophocolia bidentata**, Linn., Dumort.—Illaunaknick.
- Mylia Taylori**, Hook., Gr. & B.—On peaty banks, Loughnafooy.
- Plagiochila asplenioides**, Linn., Dumort.—On rocks, Carrick Hill; woods near Cong; Curranamona; shore of Lough Corrib near Ballard.
- Var. **minor**, Lindenberg (*Plagiochila*).—Woods near Cong.
- P. spinulosa**, Dicks., Dumort.—On rocks, Loughnafooy.
- Jungermania crenulata**, Smith.—On moist banks, Loughnafooy.
- Nardia hyalina**, Lyell.—Moist bank, shore of Lough Corrib near Ballard.

- Nardia compressa**, Hook., Gr. et Benn.—On wet rocks, Loughnafoeey.
- Var. **rigida**, Lindberg.—On wet rocks, Loughnafoeey.
- N. scalaris**, Schrad.—On banks, Loughnafoeey.
- Marsupella sphacelata**, Gieseke.—Wet rocks, Loughnafoeey.
- Fossombronina pusilla**, Dill., Linn.—Bank of the Finny River.
- Pellia epiphylla**, Linn.—Waterfall at Curranamona.
- Metzgeria furcata**, Linn., Raddi.—On the trunks of trees, Cong; Illaunaknick; Carrick Hill; shore of Lough Corrib near Ballard; waterfall at Curranamona.
- Var. **prolifera**.—On trees, Illaunaknick; Carrick Hill.
- M. conjugata**, Lindberg.—On trees in wood near Cong; waterfall at Curranamona.
- Conocephalus conicus**, Neck., Dumort.—Pigeon Hole and in woods near Cong.
- Reboulia hemisphærica**, Raddi.—Crevices of rocks in wood near Cong.

Royal Botanic Gardens, Glasnevin.

ATTEMPTED NESTING OF THE RED-THROATED DIVER IN IRELAND.

BY W. C. WRIGHT, M.B.O.U.

It is well known that at least one pair of these fine birds frequent a certain part of the North of Ireland during the breeding season, and it is probably equally as well known, at least to egg collectors, that the annual efforts to nest and hatch out young are frustrated by the greed these so-called collectors have to possess a British-taken clutch of Diver's eggs. This craze to have the eggs of rare British-breeding birds seems a strange and quite useless desire on the part of collectors, as in the case of these Divers they willingly pay the person who takes the eggs anything up to £2 a set, not being satisfied with a foreign clutch, worth as many shillings, for their cabinets.

I could produce a witness to prove that this person is so well acquainted with the Divers that in the district they are known by his Christian name as "Dan's Birds." It is within his memory that only one single young one has been successfully reared in the last ten years, and that at least two clutches have been laid and taken each year. Is this not sufficient to rouse the anger of all true naturalists, and to make them feel that such cold-blooded cruelty should be put a stop to?

Colymbus septentrionalis is included in the schedule of the Wild Birds Protection Act of 1880, but unfortunately this does not include the eggs and broods, and as the new Wild Birds Act of 1894 leaves these to the tender mercies of the County Councils, it is the duty of all bird lovers, when a case such as the present occurs, to see that the law is rigidly enforced, and to get the local County Council to apply for an order prohibiting the taking or destroying the eggs of birds such as the case in question. I am happy to say that owing to a superstition prevailing in the neighbourhood, no harm will come to our Irish Divers themselves as long as they continue to visit the present district, but something must be done to prevent the persistent taking of their eggs every season, and I think all ornithologists will agree with me that steps should be taken before the next nesting season comes round to secure this end.

In the *Irish Naturalist*, vol. xii., page 199, attention was called to this subject, and we were assured that the landlord of the property on which the lough is situated had "issued orders to his keepers for the strictest preservation of the birds and their eggs for this and future seasons"—with the result as I have stated; the very persons, I am informed, who should have carried out their master's wishes being the chief defaulters. The loughs and fishery which these birds haunt have, owing to the death of the aforesaid landlord, changed hands, and I believe the present owner has the protection of the Divers at heart, having, I am told, offered the individual who took the eggs this year the amount he receives for them, to leave them to be incubated next year. The offer was refused, the man saying if he did not take them some one else would, and as he was the occupier of the land

(this person living on the land sub-let to him) on which the birds bred, he had a perfect right to do as he pleased with the eggs. I paid a visit to this particular person last August and had a long talk with him about the Divers; all the persuasion I could use would not draw from him the promise to leave the birds unmolested during the breeding season, as he seemed to think he could command almost any price for the eggs in the future.

I enlightened him on the fictitious value he put on them, and he was much surprised when I told him he could buy foreign sets for about two shillings apiece and do quite a nice little trade with his friends; so let collectors take warning, for purposely I gave him the names and addresses of a few dealers where his wants can be supplied; and believe me it would be a great temptation to a poor Irish peasant to make a money-lender's profit on a small invested capital. During our conversation he told me he had more orders for the eggs than he could supply, and that during the nesting season he rises at 3 a.m. every morning, walks the three miles separating his cottage from the mountain where the breeding place is situated, watches the birds until the nest is found, takes the egg as soon as laid, not even giving the birds time to complete the full clutch, in case some of the numerous natives who are always on the look-out, should come along and deprive him of what he considers his just right. The first nest is generally made on a small islet at the far side of the lough, and when this is robbed, after a short interval, another site is chosen on the edge for the second nest, and when this meets the same fate as the first, a third and even a fourth nest is built at different portions of the edge of the lough.

Truly these poor birds, after noble endeavours to increase their species, deserve better at our hands, and I shall be glad to hear from anyone and to co-operate with them to form a plan whereby they may receive adequate protection in the future.

Marlborough Park, Belfast.

REVIEWS.

THE SOILS OF IRELAND.

A Description of the Soil-Geology of Ireland, based upon Geological Survey maps and records, with notes on climate, by J. R. KILROE. Dublin. 1907. Published by the Department of Agriculture and Technical Instruction for Ireland. (Official). Alex. Thom and Co. Pp. 300. Price 6s.

This interesting volume contains a great fund of information on a topic of deeply absorbing interest—the soil.

In the opening chapter, the general methods of formation of soils and their classification are dealt with, and then follows a discussion of the stratified and crystalline rocks, their economic uses, and the agricultural value of the soils they give rise to. The third chapter of Section I. introduces us to drift soils. These are shown to be of great advantage to the agricultural interest (i.) by spreading fertilizing materials over a much greater area than would otherwise be the case; and (ii.) by mixing materials from different sources. In respect of the first point large tracts of Dublin, Wicklow, Wexford, Carlow, Kilkenny, Tipperary, Cork, King's and Queen's Counties, Monaghan, and Meath, amounting to 750,000 acres, are shown to have their value highly enhanced by a small admixture of carbonate of lime. So beneficial is this admixture that in Wexford these drifts are known as "manure gravels." In support of the second point Dr. Fream has shown that the richest tracts in England follow the junction of the different formations, and in Ireland we know that the proverbial wealth of the Golden Vale and of the valleys generally in the south of Ireland, is due to the mixture of soils derived from the Silurian, Old Red Sandstone, and limestone rocks. while in the north, the remarkable fertility of the Lagan valley is due to the commingling of materials derived from the breaking up of the Silurian, white limestone, and Triassic sandstone rocks, together with those from the igneous rock, basalt, which caps the limestone from Moira to Belfast.

In Section II. the bearing of the different geological formations on agriculture is introduced, and the question of irrigation is discussed. "The regular and curving profiles" of the Silurian areas are shown to lend themselves very suitably to improvement in this way. A difference is pointed out between the Old Red Sandstone tracts in the south and those of Tyrone, the former having calcareous bands known as "cornstones," whilst the latter are destitute of these. Consequently the waters of these areas in the south bear away more valuable fertilizers than those in the north. Soils formed from Carboniferous limestone of course lose heavily, not only in actual carbonate of lime, but in phosphate of lime, which in small quantity (12% in Moira white limestone) is present presumably in all limestones.

Upon this subject of irrigation two considerations force themselves upon one. In the first place, while acknowledging the general truth that fertilizing materials are carried off from the land by drainage, we do not know the actual amounts carried away in this manner from areas of these different formations, and consequently we are in the dark as to the practical utility of irrigation in certain areas. Secondly, some degree of doubt is entertained as to whether the adverse conditions engendered by keeping the soil wet for a longer time, which it is presumed would follow if irrigation was practised, would not more than counteract the advantages derived by the soil from a return of the nutrient substances carried away.

The opinion of such a man as M. Risler, director of the Agricultural College of Paris, on this subject is, however, of great weight. He says, "The distribution of waters, as that of mineral matters, depends upon the geological constitution of a country. By regulating their flow according to the needs of nourishment of agricultural produce, the wealth of France could be doubled."

The soils derived from the igneous rocks are then dealt with, basalt being shown to give rise to soils of greater value than those derived from granite.

Chapter XI. discusses glacial drifts and the such monuments of the Ice Age as erratics. Smoothed and striated surfaces, boulder-clays, moraines, and eskers are successively described.

The chapter on peat is highly interesting. The cause of bog slides seems to lie in the fact that the lower layers of turf—black or stone turf—have a higher specific gravity, and the upper layers—yellow turf—a lower specific gravity than water. Bogs are higher towards the centre in the vicinity of springs, and this is due to the fact that *Sphagnum* grows much faster here than in other places. It thus happens that when a great quantity of rain has fallen these springs are more copiously supplied, and a reservoir of water is held between the upper and lower layers. The sides eventually give way and a mass of mud turf is urged along at varying rate sometimes a distance of two or three miles.

In treating of the reforestation of certain areas there is an interesting zoological reference to the Pine Weevil, which wrought such damage to young pine and larch trees planted at Curraghmore in three successive years.

The chapter on recent life forms is particularly interesting, and allusion is made to the somewhat conflicting views of geologists and zoologists as to the necessity or otherwise of postulating a land connection of Ireland with the Continent in early Pleistocene times. In order to allow the incoming of certain types of our flora and fauna, some of which, from their affinity to Spanish types, are termed Lusitanian, while others are characterised as having northern affinities.

Section III. is devoted entirely to the consideration of the Drifts of Ireland and their relation to the soils of the four provinces. It contains much valuable information, the result of many years of research in the field.

In Section IV the climate of Ireland is discussed. It is not so much that we have more rain than our neighbours that makes our climate so damp and forbidding, as that the rainfall is spread out over so many "soft" days. The cutting down of the forests since man appeared in the country is shown to influence the rate of evaporation, and so a moist envelope is maintained for a longer time. Some useful hints in the paragraph given to weather prognostication should be of service to farmers, especially in harvest.

The book is amply illustrated, and has only to be read to be enjoyed. Though some of the chapters may prove somewhat difficult to the uninitiated on account of the technicalities of the subject, it is to be hoped that it will be widely read by the farming community, and especially by the younger portion of that class, amongst whom has been aroused of late since the establishment of the Department of Agriculture a spirit of inquiry into scientific methods which is sure to bear a rich harvest in the near future.

ISAAC SWAIN.

A BOOK OF BEASTS.

Mammals of the World. By W. F. KIRBY, F.L.S. With an Introduction on Structure by W. EGMONT KIRBY, M.D. Pp. 141. 30 coloured plates and 11 figures in text. London: Sidney Appleton, 1907. Price 6s. net.

The coloured plates of this volume contain pleasing illustrations of 169 species of Mammalia, for which Mr. Kirby—turning awhile from his entomological pursuits—has written descriptions, with short diagnoses of the orders and families to which they belong. The work has been done with Mr. Kirby's usual care, and though the information given is necessarily condensed, space has been found for several rather irrelevant anecdotes. The classification adopted follows closely the familiar sequence of Flower and Lydekker, but we note the separation—unjustifiable zoologically—of man as a distinct sub-order of the Primates.

Dr. W. E. Kirby's introduction is a summary of mammalian anatomy and physiology condensed into twenty quarto pages, and we fear that the language is too technical for the work to be of service to the uninstructed readers who may desire to "make up" the subject from such a convenient epitome. A few of the statements are decidedly misleading, such as "the cranial nerves pass off directly from the cerebrum," and "the kidneys secrete urea,"

G. H. C.

INSECT LIFE.

The Story of Insect Life. By W. PERCIVAL WESTELL, F.L.S., M.B.O.U. With 138 illustrations from photographs, and 8 coloured plates by E. J. Bedford. London: Robert Culley. Pp. 339. Price 5s. net.

It cannot be denied that author, photographers, artist, and publisher have conspired to make a most attractive book. Mr. Westell writes pleasantly and clearly, arranging his material in seven chapters. First comes a general introduction with short accounts of the structure, transformations, and habits of insects and their relations with plants; then follow chapters on the Coleoptera, Orthoptera, Neuroptera (*sens. lat.*), Hymenoptera, Lepidoptera, and Hemiptera, and Diptera. Technical language is avoided as much as possible—even to the use of English names for species of butterflies and beetles—and the volume is a typical response to the modern demand for “science made easy.” Unfortunately Mr. Westell’s work is disfigured by a number of errors which should have been avoided with a little care. In the introductory chapter it is stated that the head of an insect is usually formed of one “ring,” and that the abdomen may have as many as sixteen—the head apparently having been deprived of segments that they may be added at the other end of the insect! “Two jointed organs”—presumably the maxillary palps—are said to belong to the mandibles of beetles. The “mouth organs of a small beetle” (fig. 7) are evidently the chelicerae and palps of a mite; the “wing of a bluebottle fly” (fig. 126) is the hind wing of a hymenopterous insect. Even where, in his structural descriptions, Mr. Westell avoids positive errors, his statements are so vague as to give no clear information to the reader. His accounts of habits, on the other hand, are bright and entertaining. For the illustrations we have little but praise; Mr. Bedford’s coloured plates are mostly excellent both in design and reproduction. But why have the Neuroptera on Plate iv. only two pairs of legs, and why are the May-fly’s fore legs represented as feelers? The few line drawings are rough, but the numerous photographs are for the most part excellent, Miss Perceval-Wiseman’s picture of the newly emerged Tiger moth (fig. 105), and the large Vanessa on the Iris blossom (fig. 86) being among the best of their kind.

G. H. C.

MEMORIES OF FAMOUS MEN.

Memorials of Linnæus. BRITISH MUSEUM (Natural History) Special Guides, No. 3. London, 1907. Price 3d.

This is a short descriptive account prepared by Dr. A. B. Rendle, of the collection of portraits, autographs, specimens, &c., arranged by order of the Trustees to celebrate the bicentenary of the birth of

Linnæus. Though few readers of the *Irish Naturalist* are likely to have an opportunity of inspecting the collection in the Department of Botany in the Natural History Museum in London, we would advise all to invest 3*l.* in this Guide for the sake of the two fine portraits of Linnæus, selected from a series got together by Dr. W. Carruthers, ex-keeper of Botany. In each portrait the alpine *Linnaea borealis* is conspicuous.

T. J.

Précis des Caractères Génériques des Insectes, disposés dans un ordre naturel. Par le CITOYEN LATREILLE. Pp. 208. Breve: F. Bourdeaux. An 5 de la R. [1797]. (Reprint of 200 copies. A. Hermann, Paris, 1907. Price 7 fr.)

Naturalists of to-day owe a debt of gratitude to publishers like M. Hermann who present us thus with the old classics of systematic zoology in the garb that clothed them when they first appeared. The date on the title-page of this scarce memoir of P. A. Latreille reminds us that he and several of his notable compatriots worked at their beloved sciences amid the turmoils of the Revolution and the massacres of the Terror. Perhaps there was some compensation for an environment so unsuitable to biological study in that he could deal with all the genera of Insects—"Animaux sans vertèbres, dont le corps et les pattes sont des plusieurs pièces"—all the Arthropoda therefore of modern zoologists in 200 octavo pages of large type!

G. H. C.

MORE NATURE PICTURES.

Pictures from Nature's Garden: Stories from Life in Wood and Field. By H. W. SHEPHEARD-WALWYN, M.A., F.Z.S., F.E.S. With 78 Photographic Illustrations from Nature by the Author. London: John Long, 1907. Price 6*s.*

Mr. Shepheard-Walwyn is well known as an enthusiastic entomologist and a skilled photographer, and in his latest volume he presents us, as usual, with a number of charming photographic illustrations of insect life, while the stories which compose the letterpress are all flavoured—some of them strongly and others very faintly—with natural history of not too advanced a kind. So much of the volume is occupied with clever children's chatter—of which we are assured that all the more remarkable utterances have been actually spoken in the author's presence—and with sketches of some amusing human oddities, distinguished by their friendliness or unfriendliness to the author's animal favourites, that it would be scarcely within the province of a reviewer for a natural history journal to attempt to give a general idea of the book's merits. But we venture to say that the reading of it will give pleasure to many naturalists and nature lovers, and may possibly convert some of those who have hitherto been insensible of the charms of field study into genuine votaries. We hope, at any rate, that no one will be deterred from embracing entomology as a pursuit by the author's rather alarming account

of an adventure which befel him one night when out sugaring in an English wood. We confess that we have read the story—it is a very well told one—twice through without feeling quite convinced that the narrator was in anything like such serious peril from the “murderous gipsy” as he supposed. But it seems that Mr. Shephard-Walwyn never now goes his nocturnal “mothing” expeditions without a loaded revolver, and perhaps the hint will be considered useful by some of his brother collectors in this country during any entomological visits they may pay to the southern English shires.

C. B. M.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two small Snakes from Mr. N. G. Ball, a Blessbok from Mr. E. O. Anderson, a pair of Kestrels from Mr. A. J. Clutterbuck, a Rattlesnake and a Copper-head Snake from Mr. W. T. Hornoday (New York Zoological Park), a Meerkat from Lady Hamilton, a Sparrow Hawk from Mr. F. Donaldson, Griset Monkeys from Mr. J. Bergin and Miss E. Perse, a pair of Buzzards from Mr. W. C. Tait, a pair of Field-mice from Mr. R. M. Barrington, a Blackbird from Miss Jury, and a pair of Kestrels from Mr. H. Finn.

DUBLIN MICROSCOPICAL CLUB.

MAY 8TH.—The Club met at Leinster House. Prof. Carpenter (President) in the chair.

Dr. G. H. PETHYBRIDGE showed a specimen of the potato-disease fungus (*Phytophthora infestans*) growing on a tuber of a variety newly introduced by Labérgerie, called *Solanum Commersonii* (violet). Many experts are of the opinion that this new variety is identical with one which has long been known under the name of “Blue Giant.” Labérgerie claims, however, that his variety is an entirely new and valuable one, and, moreover, that it is immune against the blight. In Ireland, however, this is not the case, for the material shown was obtained from tubers grown in the ordinary way in this country.

Prof. G. H. CARPENTER showed specimens of a springtail *Isotoma bidenticulata*, Tullberg, from mountain streams on the Comeraghs, Co. Waterford, the Mournes, Co. Down, and the Douce, Co. Wicklow. The insects had been found in colonies beneath partly submerged stones. The species is a most interesting addition to the fauna of the British Isles, having been previously known from Arctic countries—such as Franz Josef Land, Lapland, and Northern Siberia—and the Swiss Alps (Engadine).

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

SEPTEMBER 27.—ANNUAL MEETING.—Sir Otto Jaffé (President) in the chair. The Secretary (R. M. YOUNG) read the annual report, which contained a reference to the resignation of the Curatorship of the Museum by S. A. Stewart, A.L.S. The report was adopted, and certain re-elections to Council were made. J. H. DAVIES then proposed—"That the most cordial thanks of this meeting be tendered to Mr. S. A. Stewart, F.B.S.E., A.L.S., for the donation of his exceedingly valuable herbarium and palæontological collections, formed during the many years of his long and active life, that have been devoted to botanical and geological researches in this country." He said it seemed right that some expression should be made of the Society's sense of deep indebtedness for the services Mr. Stewart had rendered. To have had one of his wide general knowledge and scientific attainments in the position he occupied had been a positive honour to the Society. Not only was he an eminent botanist, as they all knew, but he was possessed of a close acquaintance with almost every branch of natural science, being indeed the very type of a true field naturalist. To all beginners in natural history studies who had sought help from his wide experience it had ever been ungrudgingly given.

Mr. Stewart's communication runs as follows:—"Dear Mr. Davies,—Advancing years compel me to cease my botanical and geological work in the field, and I have been considering as to the best means of disposing of my accumulated specimens, that they may be helpful to others who follow and carry on the local natural history studies. As the best means of preserving these specimens and making them available for future reference, I desire them to be kept in the Belfast Museum, and I wish, through you, to present my flowering plants and fossils to the Belfast Natural History and Philosophical Society as the proper custodians of what relates to the natural history of the North of Ireland. With regard to the botanical collections, I may say the specimens represent the flora of the British Isles, not completely, but the exceptions are not, however, very numerous. The Irish specimens have mainly been collected by myself; those of England and Scotland have mostly been received from correspondents. The plants are not mounted in herbarium fashion, but in loose sheets, furnished with localities and dates of collection. As to the geological specimens, they are not so well authenticated but are mainly local. Those in the Greensand and the hard white Chalk may be taken to be from the local Cretaceous rocks, but exact localities are absent. Knowing your interest in natural science and your success as a botanical expert, I would ask you kindly to be the medium through which this transfer is made.—S. A. Stewart. P.S.—I may mention further that it is my intention later on to present your library with my *Journal of Botany* (nearly 40 volumes) and some other of my scientific books.—S. A. S."

ROBERT YOUNG, J.P., seconded the resolution, which was supported by Joseph Wright, F.G.S.; William Gray, M.R.I.A.; Robert Patterson, M.R.I.A., and the President, and passed amid applause.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 14.—EXCURSION TO POWERSCOURT.—A party of seventeen attended the day excursion to Powerscourt, admission to the demesne having been kindly granted by Lord Powerscourt. The weather was everything that could be desired; the long drive from Bray through Lord Monck's demesne and the Powerscourt woods to the Deer Park was most enjoyable. On arriving at the waterfall shortly after noon the members divided; one party climbed to the summit of Douce Mountain while the rest explored the woods in the immediate vicinity. Special attention was given to wood-feeding insects, for which the Deer Park offers special opportunities, and some local beetles were collected. They include such species as *Sinodendron cylindricum*, the dead remains of which were found in decaying ash and holly trees. Several fine specimens of *Melanotus rufipes* were dug out of an old holly, which also contained abundant traces of the work of *Rhopalomesites Tardyi*, though very few living specimens of this interesting species were seen. A larva was, however, found in an old holly. A freshly emerged specimen of *Thanasimus formicarius* was found crawling on an ash tree. *Priobium castaneum* is also responsible for considerable injury to the ash trees in the Deer Park. On some shallow pools numerous examples of the local water-bug *Gerris costæ* were noticed. The mountain party secured *Pterostichus vitreus*, *Mitopus alpinus*, and other species on the summit. Perhaps the most interesting insect taken was the springtail *Isotoma bidenticulata*, colonies of which occurred under stones in the river above the waterfall. It is an arctic and alpine species only this year recognised in these islands. In the late afternoon the party drove back to Fassaroe, where they were hospitably entertained by Mr. and Mrs. R. M. Barrington. After tea Mr. Barrington's fine collection of Irish birds, containing beautifully mounted examples of such rarities as the Barred Warbler, Bee-eater, Osprey, Squacco Heron, &c., was greatly admired. The party returned to town by the seven o'clock train from Bray.

OCTOBER 5.—EXCURSION TO THE SOUTH BULL.—Fifteen members assembled at the Pigeon House at 2.30. Proceeding along the breakwater, the party arrived at the sand-bank, known as the South Bull, or "Shelly Bank." The highest point of the bank is sparsely covered with vegetation characteristic of the littoral zone. After some time had been spent in exploring the sand-bank, a heavy storm of rain came on, and the party dispersed rapidly.

NOTES.

BOTANY.

Mosses in Ireland—A Correction.

At p. 234 of the *Irish Naturalist* for August, 1907, Mr. D. M'Ardle records *Polytrichum attenuatum*, Menz. (*formosum*, Hedw.) as a rare moss from Co. Fermanagh, and quotes its having been found elsewhere in Ireland only in Wicklow and Galway, and then says, "I have not heard of the plant being rediscovered in Ireland since the publication of Moore's work in 1873" [? 1872].

This is a moss which only requires to be known to be found. It is recorded from two localities in Co. Down, by "H. W. L." and "C. H. W." in Stewart and Praeger's *Supplement to the Flora of the North-East of Ireland*, which was published in 1894. And it is also recorded from a third Co. Down locality in the *Irish Naturalist* for 1905, p. 3. So far from this plant being rare, I have found it abundant in Co. Down, and I have specimens from eleven of the other counties of Ireland, and, what is worth mentioning, one of these I picked up while botanizing with Mr. M'Ardle in Co. Mayo.

H. W. LETT.

Loughbrickland.

Allium Scorodoprasum in Co. Dublin.

Last June I accompanied Mr. Hinch when, as is his practice, he went over the ground it was proposed should be traversed by the Field Club on the ensuing excursion. We were proceeding from Lucan to Leixlip through the demesne, keeping a look-out for what native plants might be in bloom, and as an expeditious mode of note-keeping collecting scraps of them. On the right side of the path (that next the river), in a somewhat open spot under large trees, we noticed an *Allium* of an unfamiliar species in considerable quantity, though scattered. Unlike *A. ursinum*, which grows in abundance in the more shady parts of the wood, it bore instead of flowers a cluster of bulbils on stalks about two feet high; the leaves also were cauline and linear. We collected a couple of specimens, one of which I brought home, which, on examination was referred to *A. Scorodoprasum*. Mr. Hinch handed over to Miss Knowles the collection, with a view to its possible use in the preparation of the programme for the excursion on which she was to act as conductor. She was much interested to find in it this plant, for it is not included in the county flora. On referring to the herbarium collection, she found it contained a specimen of *A. Scorodoprasum* collected by Dr. Scott. It bears a label in his own handwriting which runs thus, "Discovered by me in a meadow between the Royal Canal and Cardiff Bridge,

June, 1808." There is also attached to it the following note by Mr. Colgan (1894):—"There can be little doubt this specimen was gathered and labelled by Dr. Robert Scott, Professor of Botany in Trinity College, Dublin, 1804 (1800?) to 1808." It is probably the plant recorded in Mackay's Catalogue, 1825, sub *A. carinatum* as found "in a field on the right-hand side of the Royal Canal, &c., where it was pointed out to me by the late Dr. Scott." In Mackay's Catalogue the mistake is made of confusing this species with *A. carinatum*, and in his flora Mr. Colgan, who must have quite forgotten the authentic specimen examined by him in the herbarium, relegates it, under its erroneous name, to the appendix, where, after quoting the note in Mackay's Catalogue, he remarks, "a relic of cultivation or an error in naming." Thus a trustworthy record by an error in placing has come to be overlooked. It is conceivable that it may yet be rediscovered in the station mentioned by Dr. Scott, and possibly search might reveal it in other stations in the vicinity, presumably about Chapelizod. In a note on the subject to Miss Knowles, I ventured the suggestion to account for its being overlooked in such a prominent position at Lucan, that it was probably to be explained by assuming that in previous years the grass here had been mown before the *Allium* had advanced far enough to attract attention, and what led to this suggestion was that on a visit there shortly afterwards I failed to identify the spot, as the grass had in the meantime been cut. I may further remark that Miss Knowles, on the excursion alluded to, saw the plant, and under the conditions described above. It is not a species that could be suspected of introduction from commercial sources, as it is entirely devoid of any claim to beauty, nor am I aware that it has any economic value.

W. B. BRUCE.

Dublin.

In the course of a short ramble through Lucan demesne late last June I found about thirty specimens of *Allium Scorodoprasum* growing by the river about half a mile from the entrance gates. The plant is probably not native there, but its occurrence is worthy of record, as its other known Irish stations are all in the extreme south. Not far from it I gathered *Hypericum hirsutum* and *Poa nemoralis*.

R. A. PHILLIPS.

Cork.

Vicia Orobus in Co. Antrim.

Till lately, the only northern station for the Bitter Vetch, *Vicia Orobus*, was Sallagh Braes, Co. Antrim, where Mr. S. A. Stewart discovered it thirty-four years ago. He only met with one plant, which was again seen in healthy condition nine years later. It was reserved for Mr. C. J. Lilly to announce last year (see *Irish Naturalist*, pp. 267-268) its discovery by him in three new stations, the central one—Lower Ballygowan Hill—

where it was in abundance, being five miles south of the Sallagh Braes. I have now to record the plant from two additional Antrim stations. A short distance from Ballyboley station, in the townland of Ballybracken, and adjoining the Ballymena and Larne railway on the south side, is a piece of rough, bushy, and heathy pasture. Here, on July 6, I espied a fine plant of *Vicia Orobus* in full bloom. I met with a half-dozen more plants as I tramped across the area. Some of the plants noted formed, as it were, a flat rosette on the rocky, stunted pasture. This station, at Ballyboley, is $1\frac{1}{2}$ miles south-west of Mr. Lilly's one at Lower Ballygowan, and is still further away from Sallagh Braes. My second station is on Irish Hill, just four miles south of Ballyboley, and about five miles north-west of Carrickfergus. I found it on the south side of this hill, on July 22, growing sparingly—only three plants noticed—among Calluna, on the heathy slope, and attaining a height of about 20 inches.

W. J. C. TOMLINSON.

Belfast.

Hieracium serratifrons, var. *Cinderella*, in Ireland.

A hawkweed which grows on rocky wooded ground at Rowallane, near Saintfield, Co. Down, was recorded as *Hieracium sciaphilum*, Uechtr., by D. Redmond in the "Supplement to the Flora of N.E. Ireland." I have sent it several times to the Exchange Clubs, and it has proved a difficult plant to name. Rev. A. Ley has now identified it, in the report of the Botanical Exchange Club for 1907, p. 103, with a variety lately described by him, *H. serratifrons*, Almq., var. *Cinderella*, Ley. Revs. W. R. Linton and E. S. Marshall agree, and the latter says, "it is unlike *H. sciaphilum* both in foliage and inflorescence, and identical with Mr. Ley's new variety, except that the head-glands are a little denser."

The species is remarkable for the long teeth at the truncate bases of the leaves. The following description of the variety is given in the *Journal of Botany* for March, 1907, p. 109:—

"Aspect and height of var. *lepistoides*, K. Johannis., which it closely resembles in its root-leaves. The following characters separate it from that plant:—Stem-leaf well developed, ovate-lanceolate, often deeply toothed at the truncate base. Peduncles long; phyllaries long, narrowly subulate, senescent, very glandular; floccose on the surface, and very floccose-edged. Heads narrow, light grey to brown, never black; small normally cuneate-based. Ligule rather densely ciliate-tipped. Style liviscent. Banks and woods; June."

It has been found in the west of England and in Wales.

C. H. WADDELL.

Saintfield.

Orchis pyramidalis in Co. Down.

In the *Journal of Botany* for October, Mr. A. A. Dallman records the finding of a colony of this orchid at Mountstewart, near Newtownards.

ZOOLOGY.

Cyclisticus convexus in County Down.

I took lately two specimens of this rare woodlouse on the sea-shore at Bangor, Co. Down. It has only been taken in Ireland previously in Counties Dublin, Fermanagh, and Carlow, having been found on all three occasions by Dr. Scharff.

DENIS R. PACK-BERESFORD

Fenagh House, Bagnalstown.

A New Irish Amphipod.

In a paper "On some Freshwater Amphipods: the Reduction of the Eye in a new Gammarid from Ireland" (*Sitzb. Königl. Böhm. Gesellsch. d. Wissen.*, 1905, and *Ann. Mag. Nat. Hist.* (7), xx., 1907, pp. 227-245, pls. xi.,-xii.), Prof. F. Vejdosky describes four specimens from Lough Mask, with vestigial eyes and pigment, referred by Mr. Kane to *Niphargus kochianus*, as a new genus and species, *Bathyonyx de Vismesi*. The new genus is intermediate in character between *Gammarus* and *Crangonyx*, and, in the opinion of the author, furnishes "excellent evidence as to the probable first stage in the degeneration of the eyes." The ommatidia are in a reduced condition, not forming a compact compound eye, but "loosely scattered under the hypodermis."

Recent captures of Irish Crustacea.

I have lately taken *Gammarus Duabeni* in L. Erne, near Castle Archdale, and in L. Mask; *Gammarus campylops* in L. Conn, and *Mysis relicta* in L. Ree and the Shannon at Portumna.

W. F. DE VISMES KANE.

Drumreaske, Monaghan.

Miscellaneous Captures of Lepidoptera in Ireland.

The following were taken at Lambay at the close of May, the weather being extremely cold, which prevented much success:—

Micropteryx calthella, *Xylopa fabriciana*, *Clepsis rusticana*, *Cnephasia musculana*, *Plutella maculipennis* (abundant) *Eupacilia maculosana* (abundant), *Gelechia ericetella* (abundant). The rather local geometer *Panagra petrararia* was fairly numerous on the eastern half of the island. At Castle Archdale, County Fermanagh, I was fortunate enough to meet with the rare *Eupithecia togata*.

During an expedition to the County Clare, in June, the following species were captured in the neighbourhood of Ballyvaughan and Black-head :—

Spilosoma mendica var. *rustica*, several of both sexes. One of the females laid a number of ova, which are in the possession of Mr. Frederick Hanbury, who doubtless will rear a good series of this rare Irish insect. *Arctia fuliginosa*, a pair, and a good many larvæ of *Hadena contigua* feeding on *Lotus corniculatus*.

On our way back to Ardrahan I succeeded in finding one or two localities for *Platyptilia tesseradactyla*, the Galway plume. And as the evening was coming on we found the moths beginning to fly over the food plant, so that my friend Mr. Hanbury took back to London a fine series of over three dozen freshly emerged specimens such as I have not hitherto met with.

W. F. DE VISMES KANE.

Drumreask, Monaghan.

Humpbacked Whale at Moville, Lough Foyle.

The body of a Humpbacked Whale (*Megaptera boops*) stranded near Moville about 1st July last. It was reported in the local papers as a Grampus, but fortunately Rev. S. R. Craig, Moville Rectory, examined, sketched, and photographed the carcase, and identified it as *Megaptera boops*. The identification was confirmed by Dr. Scharff, to whom I sent the photo. and sketch. The whale was a young male about 28 feet long, or a little over half the size of a full-grown animal. Rev. Mr. Craig sent a very good account of the whale to the Derry papers, describing the immense length of the curious white pectoral flippers, with their notched or indented longitudinal edges, also the deep furrows on the skin of the throat, and the comparatively short baleen plates. This is the second occurrence of the Humpbacked Whale on the Irish coast. With the assistance of the Collector of Customs and Rev. Mr. Craig, I hope to have the skeleton eventually for our City Museum.

D. C. CAMPBELL.

Londonderry.

Irish Notes in the "Zoologist."

In the *Zoologist* for September, Mr. W. J. Williams records the occurrence of a Scops Owl at the Fastnet, a Montagu's Harrier at Sally Gap, Co. Wicklow, and an Osprey near Drogheda. Mr. Robert Warren writes on the breeding of Tree Sparrows and Dunlins in Co. Mayo—the former near Killala, the latter on Bartragh Island in the same locality.

SOME NOTES ON THE LAND AND FRESHWATER
MOLLUSCA OF GALWAY AND DISTRICT.

BY A. W. STELFOX.

IN company with Dr. Chaster, of Southport, Messrs. E. Collier and R. Standen, of Manchester, and Mr. C. E. Wright, of Kettering, I had some few days collecting in the neighbourhood of Galway in September, 1906. Lists of the mollusca for this district have been previously published,¹ but as the present one includes a large number of shells not hitherto recorded, I give below a complete list of species taken during the trip. The first few days were spent in and around Galway, while for the remainder of the holiday we made Roundstone our headquarters. I here give a short account of the itinerary which we followed:—

9TH SEPTEMBER.—The other members of the party, who were on the ground a day before I could join them, worked the neighbourhood of Galway and on to Coolagh and Menlough, on the bank of the River Corrib. They found large quantities of *Helix virgata*, *H. intersecta*, *H. ericetorum*, and *H. acuta*. At Coolagh, some distance inland, these four xerophiles were found living together. At Menlough *Balea perversa* was plentiful in the crevices of the large Lime trees, but not associated with *Orthotrichum*, as in most cases. *Planorbis fontanus* occurred near Coolagh. In the evening they went to Salthill, a suburb of Galway, on the shore of Galway Bay, and found amongst other species a beautiful small form of *H. ericetorum* very varied in marking. I have included in my list the species taken during this day.

10TH SEPTEMBER.—Taking the steamer which runs daily on Lough Corrib, we landed at Kilbeg, about half way to Cong. Here some fine old woods are to be found, in which, however, some pines have recently been introduced. Mollusca, as a rule, have no liking for Conifers, but in this case all the trees, whether pine or otherwise, were crowded with specimens, the following species being noted:—*Hyalinia alliaria*, *Hy. pura*,

¹*I.N.*, Sept., 1895, and *Journ. Conch.*, April, 1896; *I.N.*, Sept., 1896; *I.N.*, June, 1899; and *I.N.*, Jan., 1903.

Arion hortensis, *Helix nemoralis* in all stages of growth, *H. fusca*, *H. hispida*, *H. lamellata*, *Pupa cylindracea*, *P. anglica*, *Balea perversa*, and *Clausilia bidentata*. The trees on which these were taken were:—Oak, Beech, Ash, Hazel, and Spruce. The district being a limestone one, we naturally expected a large list, and in this we were not disappointed, fifty-eight species being recorded in the five hours at our disposal.

11TH SEPTEMBER.—Haying been told that on Tuesdays visitors could have a longer stay on Aran than on any other day, we chose this one for our excursion to the islands, but to our keen disappointment the boat called at both of the smaller islands, leaving us only three hours in which to explore Inishmore. On landing, the party divided, Messrs. Collier, Standen, and Wright making for Killeany, where the large *H. nemoralis* are found, while Dr. Chaster and myself worked northwards, hoping to reach Dr. Scharff's habitat for *Vertigo moulinsiana*; but our time was much too short to allow of this. The Aran Islands, although belonging politically to Galway, come—according to Mr. Praeger's division of Ireland—under County Clare, owing to their geology being so similar to that of the Burren or limestone area which covers the northern portion of that county. Twenty-nine species were taken on Inishmore, the most noteworthy being *Helix rupestris*, var. *viridescenti-alba*, *Hydrobia ventrosa*, and *H. Jenkinsi*, which latter occurred in a small lake near Kilonan, it evidently having some subterranean connection with the sea.

12TH SEPTEMBER was spent in working the six or seven miles of country lying between the stations of Ross and Moycullen, which includes several small areas of old natural wood along the northern shore of Lough Ross. Here, as at Kilbeg, many species were taken on the trunks of the trees, and it seemed strange to collect from there such shells as *Pupa anglica*, when their usual habitat is in marshy ground or under dead leaves. A keen look-out was kept for *Vertigo Lilljeborgi*, but it did not turn up, the best finds for the day being—*Helix lamellata*, *H. fusca*, *Pupa anglica*, *Planorbis glaber*, *P. vortex*, *Neritina fluviatilis*, *Acme lineata*, and *Anodonta cygnæa*.

13TH SEPTEMBER.—A drive to Clare-Galway Abbey, via Ballindooley castle and lough, comprised this day's work. In a peaty drain below the castle Dr. Chaster discovered

Sphærium lacustre in large numbers. The coffin boards in the churchyard at Clare-Galway yielded a great variety of slugs, *Arion intermedius* and *Limax flavus* being in abundance.

14TH SEPTEMBER.—We moved on to Roundstone, working Ballynahinch on the way. Having reached the granite of Connemara and left the limestone area behind, fresh species were not long in turning up. We visited the spot where Dr. Chaster and Mr. J. R. le B. Tomlin in 1902¹ rediscovered *Vertigo lilljeborgi* on the shore of Ballynahinch Lake. At this spot we took about twenty specimens in all, but near the outlet of the lake, about a mile distant, Dr. Chaster and I took seven specimens, which indicates that the shell will probably turn up in other localities in the district.

15TH-19TH SEPTEMBER were spent at Roundstone. Dog's Bay and Cregduff Lough occupied most of our attention, but a visit was paid to Maumeen Lough and Ballinaboy on the coast road to Clifden. A short time was also spent on Inishmacdara, twenty-three species being recorded, most of which, however, were found there in 1895 by Mr. Welch.² At Dog's Bay *Vertigo angustior* was living in great quantity, and we were all very much elated at finding it alive, as dead shells of this species are more numerous than those of any other *Vertigo* in the "shell-pockets" of most of our northern and western sand dunes, and yet we have often searched in vain, in neighbouring marshy situations, to find living specimens. This appears to be only the third time this species has been found alive in Ireland. Miss Warren has taken it sparingly at Ballina, in County Sligo, and P. H. Grierson in County Carlow. Later it came to be regarded by us as almost the commonest *Vertigo* in the Dog's Bay district, Mr. Standen taking 36 specimens off a single piece of disintegrating felspar, which stone it seemed to prefer, and on which it was very hard to see. *Vertigo Lilljeborgi* was found living sparingly in the rejectamenta from Cregduff Lough, in company with *V. antivertigo* and *V. substriata*, the dead stems of *Scirpus lacustris* and the roots of *Eriocaulon* being its favourite hiding place. The discovery of this habitat in 1902 also belongs to

¹ *I. N.*, Jan., 1903

² *I. N.*, Sept., 1895.

Messrs. Chaster and Tomlin. A marked increase in the number of Vertigoes was noted as soon as we left the limestone, and every likely spot yielded *V. antivertigo*, *V. pygmæa*, and *V. angustior* in dozens, with always a few specimens of *V. substriata*. The last species seems much the rarest of the genus in the district, with the exception, of course, of *V. Lilljeborgi*. Large numbers of *Pupa anglica* of a very dark form were taken with *V. angustior* on Gorteen Point and elsewhere, none of the var. *pallida*, which is usually so common in Ireland, being seen at this spot. Our failure to find *Pupa muscorum* alive was somewhat surprising, as Mr. Standen recorded it from here in 1895. On Earawalla Point a colony of very high-spired *Helix virgata* was found, many specimens being almost scalariform, while the var. *albicans* was the chief form of colour variation. A peculiar form of *H. cricetorum* was noticed at Dog's Bay, the animal and shell having a distinct reddish-purple tinge all over, which remains in the shell after the animal has been extracted. On Gorteen Point some exceedingly fine specimens of *Aplexa hypnorum* were collected, the largest measuring 13mm. in height. After reading Dr. Scharff's note on *Helix tonnensis* in the *I.N.*, Aug., 1906, we were naturally much interested in large heavy *H. nemoralis* from the Dog's Bay deposits. Most of the *H. aspersa* from these also showed the same tendency to heaviness. I collected a small quantity of shells from these deposits which I have handed over to Mr. A. S. Kennard, who, with Mr. R. Welch, has in preparation a paper on this subject.

In the following list of species I have followed for convenience Dr. Scharff's nomenclature, as given in the *I.N.* vol. 1 :—

LIST OF SPECIES.

- Vitrina pellucida**, Müll.—Rather scarce—seen alive at Galway, Dog's Bay, and on Inishmore. It was evidently too early in the season for this shell.
- Hyalinia cellaria**, Müll.—Common in all localities visited, including Inishmore and Inishmacdara.
- Hy. alliaria**, Miller.—Not nearly so common as the last species, but was taken sparingly at Kilbeg, Ballinodoley, Clare-Galway, Ross, and Ballynahinch; and plentifully on Inishmore.
- [**Hy. Draparnaudi**, Beck.—This species has been recorded from Clare-Galway and Inishmore by Mr. Standen and Dr. Scharff, but we did not obtain any specimens of it on the present occasion.]

- Hyalinia nitidula**, Drap.—Taken at Kilbeg, Ross, Dog's Bay, and Inishmacdara, but did not appear plentiful in any of these localities.
- Hy. pura**, Alder.—Frequent in all the old wooded areas—Kilbeg, Ross, Ballynahinch; also at Dog's Bay.
- Hy. radiatula**, Alder.—Fairly common in suitable situations at Kilbeg, Ross, Ballynahinch, Dog's Bay, and on Inishmacdara. The var. *viridescenti-alba* was noted at Kilbeg.
- Hy. crystallina**, Müll.—Plentiful in most localities, including Inishmore.
- Hy. fulva**, Müll.—Common everywhere:—Kilbeg (var. *mortoni*), Ballin-dooley, Ross, Ballynahinch, Cregduff, and Inishmore.
- [**Hy. excavata**, Bean.—Recorded by Mr. Standen from Gentian Hill, near Galway, in 1895, but was not taken by any of our party].
- Hy. nitida**, Müll.—Very common on the limestone:—Kilbeg, Ross, and Inishmore. It also occurred along the shore of Cregduff Lough at Roundstone.
- Arion ater**, L.—Common everywhere, including Inishmore and Inishmacdara. The var. *succinea* was taken near Ross, var. *albolateralis* at Coolagh, while the vars. *castanea* and *plumbea* were observed in several localities.
- A. subfuscus**, Drap.—Common at Clare-Galway, Ross, Ballynahinch, Inishmacdara, Dog's Bay, and Maumeen.
- A. hortensis**, Fér.—Common throughout the district, including Inishmore and Inishmacdara.
- A. circumscriptus**, Johnst.—Not common, and occurred at Kilbeg and Dog's Bay only.
- A. intermedius**, Normand.—Plentiful under the coffin boards at Clare-Galway abbey, and in a small wood north of Dog's Bay.
- Limax maximus**, L.—Clare-Galway, Ross, and Dog's Bay.
- L. flavus**, L.—Very common with *A. intermedius* at Clare-Galway, but not seen elsewhere.
- L. marginatus**, Müll.—Common in most of the localities visited.
- Agriolimax agrestis**, L.—Common everywhere, including Inishmore and Inishmacdara. The var. *lilacina* was taken at Galway, and in several localities near Roundstone.
- A. lævis**, Müll.—Found in most damp situations:—Kilbeg, Ballin-dooley, Ross, Roundstone, and Inishmacdara.
- Amalia Sowerbyi**, Fér.—Occurred at Kilbeg, and was common at the foot of gardens near the railway bridge at Galway, where Mr. Standen took ten specimens under one stone. Also taken on Inishmore.
- A. gagates**, Drap.—More plentiful than *A. sowerbyi*, especially so near the coast. Fairly common at Kilbeg, Galway, Inishmacdara, Eara-walla Point, and Inishmore.
- Helix pygmaea**, Drap.—Common at Cregduff and on Inishmacdara, and taken sparingly at Kilbeg and Ballynahinch.

- Helix rupestris**, Drap.—Abundant and generally distributed, but was not taken further west than Ballynahinch. The var. *viridescens-alba* was taken on a wall under trees near Kilonan, on Inishmore.
- H. rotundata**, Müll.—Common on Inishmore and Inishmacdara, as well as all localities on the mainland.
- H. pulchella**, Müll.—Generally common, most of the specimens being referable to *H. excentrica*, Sterki. The var. *costata* was taken sparingly at Gorteen Point, together with an abundance of the type. The type was observed on both Inishmore and Inishmacdara.
- H. aculeata**, Müll.—Occurred in moss shakings from Kilbeg, Ross, and Gorteen Point. The var. *albida* was seen at Kilbeg and Cregduff. On the shore of Cregduff Lough I took several specimens without spines. This form does not seem to have been described by any of our authorities as a variety, though it is probably common, as I have taken it in several other localities, though, strange to say, always in exactly similar situations, *i.e.*, on lake shores under stones just above the level of the water, and usually in company with *Vertigo antvertigo*, *Succinea elegans*, and *Limnæa truncatula*.
- H. lamellata**, Jeff.—Under dead leaves and on the trunks of trees in the old woods at Kilbeg, Ross, and Ballynahinch.
- H. hispida**, L.—Kilbeg, Clare-Galway, Ross, Roundstone, Inishmore, and Inishmacdara. Fairly common, but not nearly so plentiful as the next species.
- H. rufescens**, Penn.—Common everywhere, including Inishmore.
- H. fusca**, Mont.—Plentiful in the old natural woods at Kilbeg, Ross, and Ballynahinch.
- H. virgata**, Da Costa.—Found everywhere, except at Ross and on Inishmacdara, the commonest forms being the type and vars. *lutescens* and *albicans*. This shell was extremely common on Inishmore. Two specimens showing extended lips were taken at Dog's Bay, where a colony of very high-spired shells were living.
- H. intersecta**, Poir.—Apparently the rarest xerophile in the district, but occurred sparingly at Kilbeg, Ballindooley, Ross, Galway, Coolagh, and on Inishmore.
- H. ericetorum**, Müll.—Very common everywhere, including Inishmore and Inishmacdara. As usual, this species showed marked local variation, the more inland specimens being flatter and larger than those taken in the coast sand-dunes. Mr. A. S. Kennard was greatly surprised on seeing some of these latter from Inishmore, as they are strikingly different from the large flat form found in the south-east of England.
- H. acuta**, Müll.—Common on the sand-dunes at Dog's Bay, on Inishmore, and Inishmacdara. This species also occurred at Coolagh, which is well inland.
- H. nemoralis**, L.—Common in most of the localities visited, including Inishmore and Inishmacdara, and like *H. ericetorum* showed great local variation; for example, all the specimens taken on Gorteen

Point, Dog's Bay, were of the yellow form, while those from Earawalla Point were all var. *rubella*. These two habitats are only separated by about half a mile of sand. The prevailing form was undoubtedly var. *libellula*, with a band-formula of 00000 or 00300. The only white-lipped specimens which I saw were from Inishmacdara. This seems strange, as in West Donegal, a very similar locality, var. *albolabiata* frequently outnumbers the type. Mr. Wright collected a few specimens with rather remarkable band-formulae, viz:—10305, 00340, 02305, 12300, 10345, 00005, 00305, and 003055.

H. aspersa, Müll.—Very common in old walls throughout the district. Abundant on Inishmore and Inishmacdara, and especially so in the churchyard at Clare-Galway. In a field near Roundstone Mr. Wright discovered, among heaps of stones, a colony of very large specimens, all var. *tenuior*, some having a band formula of 10005 and 10040. The var. *exalbida* was taken by Mr. Standen near Killeany on Inishmore, from which locality several specimens were taken in 1895. The shells of this species taken from the Dog's Bay deposits, like the *H. nemoralis* from this source, were remarkable for their great thickness and weight.

Cochlicopa lubrica, Müll.—Common at Kilbeg, Ballinoooley, Clare-Galway, Ross, Inishmore, Ballynahinch, Dog's Bay, and Inishmacdara.

Pupa anglica, Fér.—Two forms of this species were taken; the first, pale grey, short, and somewhat squat in appearance, was found in the old woods at Kilbeg, Ross, and Ballynahinch, while the second was much taller, dark brown and very highly polished, and inhabited the damper areas along the coast from Roundstone to Ballinaboy.

P. cylindracea, Da Costa.—Very abundant everywhere, Inishmore and Inishmacdara included. The var. *albina* was taken on Inishmore.

P. muscorum, L.—This species has been recorded by Mr. Standen from Dog's Bay, Inishmore, and Inishmacdara, but we could not find any trace of live specimens on this occasion.]

Vertigo edentula, Drap.—Nowhere common, but was not searched for keenly. Specimens were taken at Kilbeg, Ross, Ballynahinch, and in moss shakings from Dog's Bay.

V. Lilljeborgi, West.—Guided by Dr. Chaster we visited the habitats for this species at Ballynahinch and Cregduff Loughs, where, after a very keen search, we were successful in finding a few specimens each. This shell lives among the rejectamenta of the lakes mentioned, which consists chiefly of the roots of *Eriocaulon septangulare* and the hollow stems of *Scirpus lacustris*.

V. pygmæa, Drap.—Common in most localities, including Inishmore and Inishmacdara. This species, like the rest of the genus, was noticeably commoner on the granite than on the limestone areas. All my specimens from Inishmore and most of those from Dog's Bay

were of a very slender form, approaching the shape of *V. alpestris*, and had six teeth, instead of the usual four or five, in the mouth of the shell. Two of these teeth were placed on the columella, three on the outer edge of the lip, and one on the body whorl. On Inish-macdara Mr. Standen took a specimen which is double the normal size.

- V. substriata**, Jeff.—With the exception of *V. lilljeborgi*, this was much the rarest *Vertigo* in the district, though generally distributed. Found at Kilbeg, Ross, shore of Cregduff Lough, Dog's Bay, on Inishmacdara, and also at Maumeen Lough.
- V. antivertigo**, Drap.—Very large and common at Kilbeg, Ross, shore of Cregduff and Maumeen Loughs, and at Dog's Bay. Also found sparingly at Ballindooley, Ballynahinch, and on Inishmore.
- V. angustior**, Jeff.—Very abundant on the under side of stones, and in the moss and grass surrounding these, in the marshy places on Gorteen and Earawalla Points, at Dog's Bay. Also plentiful by the side of the lane leading from the main road to Dog's Bay.
- Balea perversa**, L.—Not by any means plentiful, but occurred in the woods at Kilbeg, Ross, Ballynahinch, and near Dog's Bay; in the ruins of Clare-Galway Abbey, and among stones near the sea shore on Gorteen Point and Inishmacdara.
- Clausilia bidentata**, Ström.—Common everywhere, including Inishmore.
- Succinea putris**, L.—Typical specimens were taken only at Clare-Galway, but a small dark-coloured form from this locality, as well as from Ross and Dog's Bay, has been identified by Mr. J. W. Taylor as var. *parvula* of this species. He also considers some small specimens from Clare-Galway referable to var. *drouetia*. One specimen of var. *albida* was taken at Dog's Bay.
- S. elegans**, Risso.—Mr. Taylor has identified a specimen of this species from Clare-Galway as referable to var. *psiffiferi*.
- Carychium minimum**, Müll.—Common in all the damper places on the mainland, but not recorded from either of the islands visited.
- [**Alexia denticulata**, Mont.—Recorded from Gentian Hill by Mr. Standen in 1895.]
- Limnæa stagnalis**, L.—Appeared common in Lough Corrib at Kilbeg; Ross and Ballindooley Loughs.
- L. peregra**, Müll.—Common everywhere on the mainland.
- L. palustris**, Müll.—Fairly abundant at Kilbeg, Ballindooley, Ross, Ballynahinch, and Cregduff and Maumeen Loughs.
- L. truncatula**, Müll.—Kilbeg, Ballindooley, Ross, Ballynahinch, Cregduff and Maumeen Loughs. Also taken on Inishmacdara.
- Physa fontinalis**, L.—Common in Lough Corrib at Kilbeg, and in Ballindooley and Ross Loughs.
- Aplexa hypnorum**, L.—Only found in Lough Dolloug near Ross, and in marshes on Gorteen and Earawalla Points, Dog's Bay.

- Planorbis marginatus**, Drap.—Lough Corrib and Ballinacorney Lough only.
- P. vortex**, L.—Mr. Collier picked up a dead specimen of this shell on the shore of Ross Lough.
- P. spirorbis**, L.—Common, but very small, in most localities:—Kilbeg, Ballinacorney, Ross Lough, Ballynahinch, Cregduff, Maumeen, and in pools on Gorteen and Earawalla Points at Dog's Bay. Some small specimens of this species from Dog's Bay were sent by Mr. A. S. Kennard to Dr. Boettger of Frankfurt, who says that they are typical continental *P. spirorbis*, and that the larger form usually looked upon as the type, which is common in N.E. Ireland and England, is var. *leucostoma*. He adds that the latter is often referred to as a separate species by continental authorities.
- P. contortus**, L.—Locally common:—River Corrib at Galway, Kilbeg, Ross, and Ballynahinch.
- P. glaber**, Jeff.—Mr. Collier also found on the shore of Ross Lough a specimen of this local shell.
- P. albus**, Müll.—Fairly common where it occurred, but local.—Kilbeg Ballinacorney, Clare-Galway, Ross, Ballinaboy, Cregduff and Maumeen Loughs.
- P. crista**, L.—Undoubtedly rare in this part of the country, and was only taken with *Aplexa hypnorum* on Gorteen Point at Dog's Bay, and in Maumeen Lough.
- P. fontanus**, Lightf.—Taken only at Coolagh, by Mr. Standen.
- Ancylus fluviatilis**, Müll.—Not at all common, but was recorded from Kilbeg, and Cregduff and Maumeen Loughs.
- Acme lineata**, Drap.—Apparently rare, though taken sparingly in moss shakings from Kilbeg, Ross, and Dog's Bay.
- Bythnia tentaculata**, L.—Common in Lough Corrib, Ballynahinch and Ross Loughs, and in Ballinaboy River.
- Hydrobia ventrosa**, Mont.—Some fine specimens were taken in a small lake north-west of Kilronan, Inishmore, which contained brackish water.
- H. Jenkinsi**, Smith.—A few specimens of this species were taken with the last species near Kilronan, on Inishmore.
- Valvata piscinalis**, Müll.—Lough Corrib, Clare-Galway, Ballinacorney, Ross and Maumeen Loughs.
- V. cristata**, Müll.—Found at Kilbeg, Ballinacorney, Clare-Galway, and Ross Lough.
- Neritina fluviatilis**, L.—Only seen in Ross Lough, where however it was quite common.
- Sphærium corneum**, L.—Common at Kilbeg, Ballinacorney, and Ross Lough.
- S. lacustre**, Müll.—The drain below Ballinacorney Castle, mentioned in the introduction, was the only habitat discovered for this local species.

- Anodonta cygnea**, L.—Dead shells from the shore of Lough Ross were the only indication we had that this shell was to be found in the district.
- Pisidium nitidum**, Jenyns.—Rare, and seen only in Ballindooley Lough.
- P. fontinale**, C. Pfr.—Common at Kilbeg, Ballindooley, Cregduff, and Maumeen Loughs.
- P. millum**, Held.—Kilbeg, Ballindooley, and Roundstone.
- P. obtusale** C. Pfr.—Apparently rare and local :—Ballindooley and Maumeen Loughs.
- [**P. pulchellum**, Jenyns.—Found by Mr. Standen at Annaghdown, Lough Corrib, in 1895].
- P. pusillum**, Gmel.—Common at Kilbeg, Ballindooley, Roundstone, and Maumeen.

In the above list of 85 species 80 were collected on the limestone and 64 on the granite area. In a paper on the mollusca of this district, published in the *Journal of Conchology*, vol. viii., p. 177, Messrs. Collier and Standen state that the collecting “proved to be of a somewhat unpromising character conchologically, whenever we got off the limestone.” The above figures will, I think, show that this is not strictly correct. With regard to the mollusca at present living at Dog’s Bay, Messrs Collier and Standen stated in 1895 they could find only four species—*H. aspersa*, *H. ericetorum*, *H. acuta*, and *P. muscorum*—on the sand-dunes and promontories composing this locality, although the search was carried on in very favourable weather. This seems very strange, as on this occasion we obtained 33 species living in this very restricted habitat: several species, such as *Helix virgata*, *H. nemoralis*, and various *Vertigoes* being in great abundance.

I have to thank Mr. Charles Oldham for identifying the *Pisidia*, Mr. J. W. Taylor, F.L.S., Mr. R. Welch, M.R.I.A., Mr. A. S. Kennard, F.G.S, and also the other members of the party for their assistance in preparing these notes. Below are lists of localities, showing the county divisions in which they come, and list of species found in each division. In these I have followed Mr. Praeger’s division of Ireland. Species for which I can find no previous record are marked *, while those in brackets have been recorded but were not found by our party on this excursion.

9. CLARE (Inishmore).

Vitrina pellucida.	Amalia gagates.	Helix nemoralis.
Hyalinia cellaria.	Agriolimax agrestis.	aspersa.
[Draparnaudi].	Helix rotundata	Cochlicopa lubrica.
alliarum.	rupestris	Pupa cylindracea.
radiatula.	pulchella.	[muscorum].
crystallina.	hispidum.	Vertigo pygmæa.
fulva.	rufescens.	antivertigo.
nitida.	virgata.	Clausilia bidentata.
Arion ater.	intersecta.	*Hydrobia ventrosa
hortensis.	ericetorum.	*Jenkinsi.
Amalia Sowerbyi.	acuta.	

16. GALWAY WEST. (Ross, Ballynahinch, Roundstone, Dog's Bay, Maunteen, Ballinaboy, and Inishmacdara).

Vitrina pellucida.	Helix aculeata.	[Alexia denticulata.]
Hyalinia cellaria.	*lamellata.	Limnæa stagnalis.
alliarum.	hispidum.	peregra.
nitidula.	rufescens	palustris.
pura.	*fusca.	truncatula.
*radiatula.	virgata.	*Physa fontinalis.
crystallina.	*intersecta.	*Aplexa hypnorum.
fulva.	ericetorum.	Planorbis [marginatus.]
[excavata].	acuta.	vortex.
nitida.	nemoralis.	spirorbis.
Arion ater.	aspersa.	albus.
*subfuscus.	Cochlicopa lubrica.	contortus.
hortensis	*Pupa anglica.	*crista.
circumscriptus.	cylindracea.	*glaber.
*intermedius.	[muscorum].	Acylus fluviatilis.
Limax maximus.	*Vertigo edentula.	*Acme lineata.
marginatus.	pygmæa.	Bythinia tentaculata.
Agriolimax agrestis.	Lilljeborgi.	Valvata piscinalis.
*lævis.	antivertigo.	*cristata.
*Amalia Sowerbyi.	*substriata.	*Neritina fluviatilis.
gagates.	*angustior.	Sphærium corneum.
Helix pygmæa.	Balea perversa.	*Pisidium fontinale.
rotundata.	Clausilia bidentata.	pusillum.
*rupestris.	Succinea putris.	*milium.
pulchella.	elegans.	*obtusale.
*and var. costata.	Carychium minimum.	*Anodonta cygnea.

The following 23 species were taken on Inishmacdara :—

<i>Vitrina pellucida.</i>	<i>Amalia gagates.</i>	<i>Helix aspersa.</i>
<i>Hyalinia cellaria.</i>	* <i>Helix pygmæa.</i>	<i>Cochlicopa lubrica.</i>
<i>nitidula.</i>	<i>rotundata.</i>	<i>Pupa cylindracea.</i>
<i>Arion ater.</i>	* <i>pulchella.</i>	[<i>muscorum</i>].
* <i>subfuscus.</i>	<i>hispidula.</i>	* <i>Vertigo pygmæa.</i>
* <i>hortensis.</i>	<i>ericetorum.</i>	* <i>substriata.</i>
<i>Agriolimax agrestis.</i>	* <i>acuta.</i>	<i>Balea perversa.</i>
* <i>lævis.</i>	<i>nemorialis.</i>	* <i>Limnæa truncatula.</i>

17. GALWAY, NORTH-EAST.—(Kilbeg, Lough Corrib, Coolagh, Galway, Clare-Galway, Ballindooley).

* <i>Vitrina pellucida.</i>	<i>Helix aculeata.</i>	<i>Limnæa truncatula.</i>
<i>Hyalinia cellaria.</i>	<i>lamellata.</i>	<i>Physa fontinalis.</i>
[<i>Draparnaudi</i>].	<i>hispidula.</i>	<i>Planorbis marginatus.</i>
<i>alliaris.</i>	<i>rufescens.</i>	<i>spirorbis.</i>
<i>nitidula.</i>	<i>fusca.</i>	[<i>vortex</i>].
<i>pura.</i>	* <i>virgata.</i>	* <i>contortus.</i>
<i>radiatula.</i>	* <i>intersecta.</i>	* <i>albus.</i>
<i>crystallina.</i>	<i>ericetorum.</i>	[<i>crista</i>]
<i>fulva.</i>	* <i>acuta.</i>	<i>fontanus.</i>
<i>nitida.</i>	<i>nemorialis.</i>	<i>Ancylus fluviatilis.</i>
<i>Arion ater.</i>	<i>aspersa.</i>	<i>lacustris.</i>
<i>subfuscus.</i>	<i>Cochlicopa lubrica.</i>	<i>Acme lineata.</i>
<i>hortensis.</i>	<i>Pupa anglica.</i>	<i>Bythinia tentaculata.</i>
<i>circumscriptus.</i>	<i>cylindracea.</i>	<i>Valvata piscinalis.</i>
<i>intermedius.</i>	<i>Vertigo edentula.</i>	* <i>cristata.</i>
<i>Limax maximus.</i>	<i>pygmæa.</i>	[<i>Neritina fluviatilis</i>].
* <i>flavus.</i>	<i>antivertigo.</i>	<i>Sphærium corneum.</i>
<i>marginatus.</i>	* <i>substriata.</i>	* <i>lacustre.</i>
<i>Agriolimax agrestis.</i>	<i>Balea perversa.</i>	* <i>Pisidium nitidum.</i>
<i>lævis.</i>	<i>Clausilia bidentata.</i>	* <i>fontinale.</i>
<i>Amalia Sowerbyi.</i>	<i>Succinea putris.</i>	* <i>miliium.</i>
* <i>gagates.</i>	<i>elegans.</i>	* <i>obtusale.</i>
<i>Helix pygmæa.</i>	<i>Carychium minimum.</i>	<i>pusillum.</i>
<i>rotundata.</i>	<i>Limnæa stagnalis.</i>	[<i>pulchellum</i>].
<i>rupestris.</i>	<i>peregra.</i>	[<i>Anodonta cygnea</i>]
<i>pulchella.</i>	<i>palustris.</i>	

Belfast.

REVIEW.

BRITISH TUNICATA.

The British Tunicata: an unfinished Monograph. By JOSHUA ALDER and ALBANY HANCOCK. Edited by JOHN HOPKINSON, F.L.S., F.G.S., Secretary of the Ray Society. Vol. II., with lives of the Authors by CANON A. M. NORMAN, M.A., D.C.L., F.R.S., and the late DENNIS EMBLETON, M.D. Pp. xxviii. + 164, Pls. XXI. to L. London: Ray Society, 1907. Price 1*l*.

The following bibliographical notice, extracted from Canon Norman's history of this work in vol. i. (Ray Society, 1905), may explain its origin and mode of publication.

Between 1855 and 1860 Alder undertook to prepare a catalogue of British Tunicata for the British Museum. This was finished in 1863, but owing to the withdrawal of the grant from the Trustees, the idea of publication had to be abandoned. Alder then consulted his old friend, Albany Hancock, and it was decided to expand the catalogue to the dimensions of a monograph, and to publish it in their joint names. After Alder's death, in 1867, Hancock was more than ever anxious to complete the work in the contemplated manner, and in the following year published a paper "On the Anatomy and Physiology of the Tunicata," in the *Journal* of the Linnean Society, making known his views up to that date. In 1873 Hancock was "within two years of the time when he expected to be able to bring it to a conclusion." But soon after this his final illness attacked him, and he died on 24th October, 1873. Huxley undertook to write an introduction, and generally to prepare the work for the press, but he abandoned the idea owing to the Ray Society not being in a position to publish the work at that time. The MSS. and drawings were placed under the care of the Committee of the Natural History Society of Newcastle-upon-Tyne, where they remained till 1904, when, the work having been again accepted by the Ray Society, they were at last sent, at Canon Norman's request, for publication by the Society.

The book begins with short but interesting lives of the authors—of Alder by Canon Norman, and of Hancock by Dr. Embleton—with an addendum by Canon Norman. Short and of course incomplete in detail as they are, they serve to show the extraordinary amount of perseverance and of application shown by these two typical old-fashioned naturalists in their work. Judged from the modern standpoint, when we consider our enormous advantages in the possession of the microtome and innumerable selective stains, their work is little short of marvellous, and might serve even now as a criterion in specio-graphic research.

Except for the authors' lives, the book is entirely devoted to the systematic treatment of those species of British Tunicata not included in vol. i. The general anatomy was dealt with in that volume.

Volume ii. contains descriptions of Ascidiæ belonging to the following families:—(1) part of Ascidiidæ, including *Ciona* and *Corella*; (2) *Molgulidæ* (*Molgula* and *Eugyra*); (3) *Cynthiidæ*, including *Cynthia*, *Styela*, and *Styelopsis* (the last by the Editor; A. and H. left a space in MSS. for a new genus to include several *Cynthiidæ*; Traustedt established the genus in 1882), *Thylacium* and *Pelonaia*; (4) *Clavellinidæ* (*Clavellina*, *Perophora*, *Diazona*).

In some cases slight alterations have been made in the text by the editor: thus "anal" has been replaced by "atrial" when the external opening is referred to. The lists of synonyms and localities have also been brought up to date. The descriptions are entirely by the authors, with the exception of a few notes by the editor for the sake of clearness, and are exceptionally lucidly expressed, though somewhat wordy at times. They are not quite as methodical as could be wished. Thus, in some instances, the dorsal tubercle is passed over without mention, while in others a fairly full description is given. The branchial sac, too, is often insufficiently described, considering its importance in identification. Some of the descriptions are of animals never seen by the authors, and are simply drawn from descriptions supplied by the finders. The arrangement of the families and genera differs considerably from that in general use to-day—that given by Herdman in his Revised Classification—but this is of course a matter of not much consequence. The genera themselves are much the same as they are to-day with a few exceptions, e.g. *Polycarpa* and *Forbesella* are included in the genera *Styela* and *Cynthia*. The new species have, most of them, as good a claim to newness as most of those founded to-day, but the following at least seem to have been separated on insufficient grounds, especially as the internal organs of some of them were partially decomposed. Time has, however, shown some of them to be good species:—

Corella larvæformis, from two specimens from the same locality; *Molgula complanata*, from one specimen; *Molgula valvata*, from one specimen with internal parts much injured; *Molgula inconspicua*, from one specimen; *Eugyra globosa*, from one specimen with internal parts in bad condition; *Cynthia ovata*, from one specimen; *Styela opalina*, from one specimen with internal organs partially decomposed; *Styela violacea*, from two specimens too minute and delicate for internal parts to be examined; *Styela spherica*, one specimen with young one attached. Of these, at least two, *Molgula valvata* and *Eugyra globosa*, are admittedly very near *Molgula oculata* and *Eugyra arenosa*, respectively.

The plates and figures in the text are on the whole good, though one or two, e.g. fig. 10, pl. xxii. and figs. 2, 3, 4, and 5, plate 1., seem to have been drawn from much contracted specimens. But they are much better than the average, and cannot but be extremely useful. To anyone with a fair knowledge of the group the book will be of great help, as, even if not in every case strictly accurate, descriptions are a valuable aid, be it only to show that a specimen does not belong to the species described. To a novice, however, the book cannot be recommended, as

he would probably have no idea of the large extent of the variation in the Tunicata, and would be apt in reading the specific descriptions to look upon the characters given as absolutely fixed, little or nothing being said about variation.

H. J. BUCHANAN WOLLASTON.

NOTES.

BOTANY.

Vitality of Seeds swallowed by Animals.

It is well known that the manure of horses fed on oats frequently contains whole seeds of that species, but it may not be so well known that these can retain their powers of germination. I have seen a number of examples of this of late, and, indeed, a garden plot that was manured in this way would, if left to itself, have produced a fair crop of oats.

Some horse manure was obtained in 1906 for the growth of *Mucor*, as it forms one of the best culture media for that fungus. After the *Mucor* died off it was succeeded by another fungus—a species of *Coprinus*. This in turn was followed by still another fungus—a species of *Ascobolus*. Of eleven flowering plants which made their appearance four were Oat, five Perennial Ryegrass, one Soft Brome Grass, one *Holcus lanatus*, and one other species was accidentally destroyed before flowering. The seeds of all these grasses were doubtless present in the hay on which the horse was fed. As the seeds of grasses and cereals take up water very slowly, continuing to absorb it for forty-eight hours it would seem that they were not submitted long enough to the action of the digestive ferments to receive serious injury.

During the spring of this year a number of seeds of Ivy were isolated from the excrement of birds—either Blackbirds or Thrushes. Sixteen seeds in all were planted on 29th April, and on the 28th June ten had germinated. Succulent fruits, such as Hawthorn, Bramble, and Gooseberry, usually have their seeds distributed by birds, but in that case the seed is protected by a hard stone or seed-coat so that it is not crushed in the bird's gizzard and is scarcely acted on by the digestive juices. In the case of the Ivy, however, the seed is surrounded by a thin membrane only, through which one would suppose the digestive ferments could easily pass. It is certainly rather curious that the seeds are not ground up, as they are quite soft.

The berries of the Ivy are poisonous to cattle, though it does not necessarily follow that they have a like effect on birds. As in the case of Yew, it is possible that the poisonous principle is located in the seed and not in the succulent part enclosing it, and, if that be so, it might account for the fact that the birds survive, the seeds passing through the intestine intact.

J. ADAMS.

Lycopodium alpinum in Co. Dublin.

Hitherto there has existed no well authenticated record for the occurrence of this plant in Co. Dublin. It is true it is mentioned in the *Cybele Hibernica* as having been found on Feather-bed Mountain by Mr. D. Orr. But in the absence of other evidence, and on account of the extreme rarity of its occurrence towards the eastern parts of this island, as well as on other grounds, doubts had been entertained as to its title to a place in the county flora, so that in later floras it had been omitted from the Dublin list. In April last I had the good fortune to find the plant on or near the summit of Cruagh (1,714 feet). It was by the merest accident, and under circumstances that prevented a proper examination of the spot in respect of the extent of its distribution—not only was I running homewards before driving rain, but I was at the time unacquainted with the species. Having identified it as *Lycopodium alpinum*, I took occasion on a visit to the National Herbarium to mention the circumstances to Miss M'Ardle, Miss Knowles' assistant there, who quickly drew my attention to its critical place in the flora. Both Miss Knowles and Mr. Colgan have since identified the plant as *Lycopodium alpinum*, though, as the latter remarks, "a somewhat straggling form." Growing, as on this occasion it was found, among short heather, it is exceedingly difficult to distinguish, and much patient search may be required, but it remains for some one to locate it again in this station, and to work out its distribution.

W. B. BRUCE.

Dublin.

Entomological Notes from Co. Mayo.

I spent five weeks this summer in the wild west, chiefly in Co. Mayo, from 13th July to 20th August. The wet and cold weather experienced during the greater part of my stay was unfavourable for collecting insects, but nevertheless I managed to take a fair number, including several species of interest. I made Westport my centre, but visited other parts of Co. Mayo, notably Pontoon (22nd to 29th July) and Achill Island (5th to 16th August). A tour was made in the far-famed Connemara district, but was much curtailed on account of the wet weather.

I am greatly indebted to Messrs. W. F. Johnson and J. N. Halbert for kindly identifying many of my captures. I append a list of the more interesting species; those marked with an asterisk are new to Mayo.

LEPIDOPTERA.—*Vanessa io*. I found three full-fed caterpillars, August 18th, on nettles growing on the embankment near Westport railway station.—*Epinephele janira*, I took three interesting varieties of this common butterfly at the foot of Nephin: one, a fresh male, had the right

hind wing bleached to a silvery grey colour; the second, a female, had the fulvous patches of both wings much extended, approaching var. *hispulla*; the third, also a female highly coloured, has a small black spot below the large apical eye-spot.—*E. hyperanthus*, not uncommon near Westport and Pontoon.—*Cænonympha typhon*, one very worn specimen in a marshy bit of ground bordering Lough Conn near Pontoon.—*Nudaria mundana*, a few at dusk, also came to light, Westport.—*Nemophila russula*,* captured a very fresh female on road near Pontoon on July 26th. Was surprised to meet with this moth so late in the season.—*N. plantaginis*,* one specimen on the heather at foot of Nephin.—*Hepialus hectus*,* occurred commonly in fir plantation above the Anglers' Hotel, Pontoon.—*Lasiocampa quercus*, var. *callunæ*, I saw a few male specimens flying over the heather on Croagh Patrick and Nephin in July; I captured a worn male flying along the Pontoon road, and took at dusk on 28th July a female in the act of ovipositing, which laid over a hundred eggs in the pill-box; these hatched about five weeks later.—*Thyatira derasa*, *T. batis*, both came to sugar in an old oak wood near Pontoon.—*Xylophasia monoglypha*, var. *athlops*, one at sugar, Pontoon.—*Hama furva*,* a single specimen came to light in Railway Hotel, Westport.—*Agrotis strigula*, one at dusk, Pontoon.—*Cleoceris viminalis*,* one example of this rarity at dusk, July 25th, near Pontoon.—*Plusia interrogationis*, I found this beautiful species in great abundance and in grand condition on July 19th on the Pontoon side of Nephin up to a considerable elevation, and took a dozen choice specimens without much trouble. Unfortunately these got badly rubbed in the pill-boxes. I paid two subsequent visits to the locality, viz., on July 24th and 27th, but the moth had then become scarce, and I had to content myself with a very small series—*Carpe diem!* *Acidalia dimidiata*, Pontoon.—*Scodonia belgiaria*,* one female at foot of Croagh Patrick.—*Larentia cesiata*, I found this species very commonly on Nephin in company with *Cidaria truncata* and *C. immanata*; also took it on Croagh Patrick.—*Eupithecia oblongata*, one in hotel, Dugort, Achill.—*E. nanata*, a few on Nephin; also occurred near Westport.—*E. minutata*, Westport.—*Melanthia albicillata*,* one specimen at dusk, Pontoon.—*Eucosmia undulata*, two specimens at dusk, Pontoon.—*Cidaria testata*, one example of a violet tinge on boggy ground near Dookinelly, Achill.—*Acipitilia tetradactyla*,* one near Pontoon.—*A. pentadactyla*,* several near Westport.—*Crambus margaritellus*,* a single specimen on Nephin.—*Tortrix viridana*,* single specimens on Old Head, Clew Bay, and at Pontoon.—*Mixodia schulziana*,* in profusion on Croagh Patrick from a thousand feet to the summit; also on Nephin, but less commonly at the same altitude.

COLEOPTERA.—*Carabus catenulatus*, remains under a turf sod near Dookinelly, Achill.—*C. granulatus*, very common and variable on Achill, took two black specimens.—*C. clathratus*, two specimens on Achill, one near Dookinelly and the other at Old Dugort.—*Stomis pumicatus*,* *Taphria nivialis*,* near Westport.—*Anchomenus angusticollis*,* near Westport.—*Olisthopus rotundatus*,* Westport and Achill.—*Patrobis assimilis*, Croagh Patrick.—*Læmostenus complanatus*,* I took four specimens under a stone at Westport Quay; Mr. Halbert, who examined them, thinks they may have been

imported with shipping; *Cercyon depressus*,* *C. quisquilius*,* near Pontoon.—*Tachinus marginellus*,* near Westport.—*T. laticollis*,* in fungi, Lord Sligo's demesne, Westport.—*Leistotrophus murinus*,* one specimen in *stercore humano*, near Keel, Achill.—*Philonthus splendens*,* common near Westport. one specimen on Achill.—*P. intermedius*, Westport and Achill.—*Xantholinus glabratus*,* very common on Achill, also near Westport.—*X. ochraceus*,* Murrisk.—*Oxyteles sculpturatus*,* *O. complanatus*,* Westport. *Hister neglectus*,* *H. carbonarius*,* single specimens of each near Westport.—*Epuræa deleta*,* in fungi, Lord Sligo's demesne, Westport.—*Byrrhus fasciatus*, one example on summit of Croagh Patrick.—*Aphodius fossor*,* near Westport.—*A. sordidus*,* several in horse dung, Dugort strand, Achill.—*A. rufescens*,* Westport and Achill.—*Cryptohypnus iv.-guttatus*,* a few on the shore of a small lake near Pontoon.—*Corymbites cupreus*, var. *æruiginosus*,* one specimen in flight about half way up Croagh Patrick.—*Telephorus nigricans*,* one specimen at Pontoon, a second on the summit of Nephin.—*Rhagium inquisitor*, a specimen came to sugar in an old oak wood near Pontoon.—*Strangalia armata*,* common in the Pontoon district.

Kensington.

J. H. BONAPARTE WYSE.

ZOOLOGY.

Scarcity of Wasps.

I quite agree with Mr. R. M. Barrington about the rarity of wasps this season. I have been living, travelling, or collecting in eleven Irish counties, and the only wasps I have seen were in a Dublin house and garden, and one or two in Co. Cork. On eighteen days spent in the open air in Clare, Galway, Mayo, and Donegal, I saw none.

Belfast.

R. WELCH.

Limax cinereo-niger—A correction.

In the mollusca list of the Cork Conference (p. 279 *supra*) A. W. Stelfox and I give the specimen of the above, collected at Lough Allua, as the first Irish record of var. *vera*. We find, however, that Miss Eva O'Connor, of Ballycastle, sent this variety from Fair Head in 1904 to W. Dennison Roebuck, F.L.S., the first specimen of the species found in the north-east. It is recorded in the appendix to Taylor's "Monograph of the Land and Freshwater Mollusca of the British Isles," vol. ii., p. 269. In September this year A. W. Stelfox and I found the same variety again on the great rock talus under the cliff face of Fair Head. In his monograph, vol. ii., and appendix, Taylor gives records of the species from twelve Irish counties or vice-counties.

Belfast.

R. WELCH.

Melampus bidentatus in Co. Cork—a Correction.

In our Cork list of Mollusca, *ante*, p. 282, A. W. Stelfox and I give the above as a species common at Rostellan. This is incorrect; the species we collected there is *Alexia denticulata*, var. *myosotis*. Many errors of determination seem to have been made in these two species in the past; the latter is larger and darker in colour, and is evidently more abundant in Ireland.

R. WELCH.

Belfast.

GEOLOGY.

Curious boulder at Narin.

While in West Donegal in September I noticed a large boulder on the shore below Narin, which seemed to consist of a core of diorite, with an outer covering of grey granite. The boulder was oval in shape, about 26 inches in longer diameter, with a patch of the outer layer broken away, revealing the darker rock inside. The granite covering was about one inch thick. Prof. Cole tells me there is granite intruding into diorite near Portnoo, the little port at Narin, but the boulder formation is not explained by that.

R. WELCH.

Belfast.

IRISH SOCIETIES.

DUBLIN MICROSCOPICAL CLUB.

OCTOBER 9.—The Club met at Leinster House. Prof. G. H. CARPENTER (President) showed specimens of a springtail, *Isotoma tenella*, Reuter, found in the spring of 1907 in large numbers feeding on leaves of tobacco seedlings grown at Kilkenny. The species, first discovered in Finland and subsequently noticed in Germany, is new to the Britannc fauna.

W. F. GUNN showed a fungus, *Botrytis parasitica*, Cav., which is very destructive to Tulips when they are grown in large quantities. A portion of a leaf was shown covered with the olive-brown aerial hyphæ bearing umbellate clusters of conidia. On a separate slide the sclerotia form of fruit was shown. According to Masee, this fungus is morphologically indistinguishable from *Botrytis galanthina*, which attacks the Snowdrop, but differs from it physiologically, and he suggests that both these species "will eventually prove to be nothing more than physiologically differentiated from *Botrytis cinerea*, Pers."

Dr. G. H. PETHYBRIDGE again exhibited "fruiting" specimens of potato blight (*Phytophthora infestans*) growing on the supposedly immune or resistant *Solanum Commersonii* Violet. Earlier in the year it was shown that this fungus would grow well when inoculated on the cut tubers of this variety. In the present instance it was growing profusely on the

foliage, having made its appearance there in the ordinary course of cultivation and without artificial inoculation. The plants on which the blight was growing were raised from tubers of the variety directly imported this season from France.

BELFAST NATURALISTS' FIELD CLUB.

JULY 11 TO 16.—Thirty-three members and friends attended the fifth Triennial Conference of the Field Clubs of Ireland at Cork, an account of which appeared in the September number of this Journal.

JULY 27.—EXCURSION TO GREYABBEY.—The fifth excursion was to the familiar ruins of Greyabbey, when 47 members and friends attended. At the usual business meeting a resolution was passed recording the regret of the Club that S. A. Stewart had resigned the Curatorship of the Belfast Museum.

AUGUST 10.—EXCURSION TO GLENDUN.—A party of 26 left Belfast by the 9.15 train for Parkmore, and drove to Glendun by the new road. Two hours were allowed for collecting at the viaduct, when the President's prize was won by Miss A. M'Connell. The party returned to Belfast by the 6 train.

AUGUST 24.—EXCURSION TO LARNE HARBOUR.—More than 60 members and friends attended, leaving Belfast by the 7.15 train. On arrival at Larne Harbour the party broke up into several groups; some visited the laboratory of the Ulster Fisheries and Biology Association, where a large number of living specimens were on view; others went out on short trips in the Association's steam launch, while a large party visited the site of the Larne gravels, and a few made their way across the lough to visit the cromleac known as the Druid's Altar. At 6.30 all met at the Laharna Hotel, where the President entertained the party to tea. One new member was elected, and the members returned to town by the 8.10 train.

SEPTEMBER 7.—EXCURSION TO BALLYCASTLE.—51 members and friends went on this excursion, which was specially organised for an inspection of the new coal mines and fire-clay mines at Ballycastle. On arrival at Ballyvoy the manager conducted the party over the extensive works, while several members descended to the bottom of the mine. The geological members were much interested in all they saw, and the whole party wished the undertaking every success. Leaving the mines at 1 o'clock, the drive was continued as far round as the coast road permitted, when members alighted, and proceeded to search the sandstones and shales for the plant and fish remains which are numerous there, many specimens being secured. At five o'clock all met for tea in the Antrim Arms, when a business meeting was held, at which the President briefly reviewed the work of the Summer Session, and drew attention to the lectures to be delivered during the winter months. The average attendance at the eight summer excursions was 52. The party left Ballycastle by the 5.45 train, arriving in Belfast at 8.25.

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