# FOURTH ANNUAL REPORT

OF

THE BELFAST

# NATURALISTS' FIELD CLUB,

WITH

## Statement of Accounts,

AND

## A LIST OF THE OFFICE-BEARERS AND MEMBERS,

FOR THE YEAR ENDING 31st MARCH, 1867.

BELFAST:
PRINTED AT THE DAILY "NORTHERN WHIG" OFFICE.
1867.

# RULES

OF THE

# Belfast Naturalists' Field Club.

I.

That the Society be called "THE BELFAST NATURALISTS' FIELD CLUB."

II.

That the object of the Society be the practical study of Natural Science and Archæology.

III.

That the officers of the Club be a Committee of twelve members, a Treasurer, and two Secretaries. The Committee, on their first meeting, will appoint a Chairman to preside at their meetings.

IV.

That every candidate for membership shall be proposed and seconded at any meeting, and, on paying the subscription, become a member.

V.

That the subscription be five shillings per annum, payable in advance.

VI.

That the members of the Club shall hold at least six field meetings during the year, in the most interesting localities, for investigating the Natural History of the district. That the place of meeting be fixed by the Committee, and that eight days' notice of each Excursion be communicated to members by the Secretaries.

VII.

That fortnightly meetings be held for the purpose of reading papers; such papers as far as possible to treat of the Natural History and Archæology of the district. These meetings to be held during the months from November to April, inclusive.

VIII.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collection of scientific objects of the district. The details of this Rule to be left to the discretion of the Committee for the time being.

IX.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement, shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alterations in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretaries, considered and decided upon.

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NOTICE TO MEMBERS.—*The* TICKET OF MEMBERSHIP *accompanying Treasurer's receipt for the Annual Subscription entitles the holder to free admission to the Museum of the Natural History Society.*

# FOURTH ANNUAL REPORT

OF

# The Belfast Naturalists' Field Club.

It is not as a mere matter of form that the Committee of the Belfast Naturalists' Field Club desire to lay before the members of the Society their Fourth Annual Report. They do so under the conviction that the working of the Society for the past year having been so thoroughly successful, the results attained merit a permanent record.

It is particularly gratifying to the Committee to be able to report that the programme laid down at the commencement of the year for the Summer excursions and the Winter meetings was strictly carried out; all its arrangements were adhered to without deviation. The excursions were made on the days and to the places named, and the Winter meetings were held regularly every fortnight, nothing having occurred during the year to interrupt the uniformity of the Society's proceedings.

By the Treasurer's Report it will be seen that the funds of the Society are in a satisfactory condition, and the number of members is rather increased, although no special effort has been made to obtain new subscribers. The Committee, having considered it more prudent to ascertain first whether their desire to permanently establish the Club could be realized, now, after four years' experience, entertain no doubt on that point, and have no hesitation in pointing to their past success, and claiming a larger share of public support for the future.*

* Since the Report was read at the Annual General Meeting the number of members on the roll of the Club has been very much increased. (See list appended.)

During the past year many of the Summer excursions or field meetings were well attended, and on every occasion they were thoroughly enjoyed by the members and friends who joined them.

In arranging those excursions the Committee have been careful to select places in the neighbourhood of Belfast of special interest, either to the Geologist, Botanist, or Archæologist, or embracing as many objects of interest in those departments as possible, and the managers of the railways afford every facility for reaching those places without fatigue, and at a moderate cost.

Hitherto the members and friends who attend the field meetings, although having no particular scientific object in view, found it an advantage to be accompanied by their fellow-members acquainted with all that was interesting in their respective localities, and willing to afford every information, and gratify every inquiry, thereby adding considerably to the pleasure always excited during a country ramble. It is the desire of the Committee that a larger number, not only of the members, but of the friends of the Club, should avail themselves of the privileges thus provided.

During the year now brought to a close the following excursions were made in the

## SUMMER SESSION.

The First Excursion for the year was made by the members of the Society, on Saturday, the 2nd June, to Whitehead. In the morning the weather was very unpromising, and, doubtless, prevented many from joining the excursionists. The members started by the two o'clock train, and as they proceeded on their journey the clearness of the atmosphere increased with the distance from Belfast, and the evening turned out to be as bright and favorable as could possibly be desired, so much so, that the laugh was turned against those of the party who came prepared with umbrellas and great-coats. As previously arranged, the members of the Club left the train at Kilroot and proceeded on foot to Whitehead. Soon after leaving the station, attention was directed to the gravel ballast along the railway, and several very good specimens of flint

flakes, or what are supposed to have been spear and arrow heads, were picked up. The gravel was obtained from a pit in the neighbourhood of Carrickfergus, between the main road to Kilroot and the railway. This must, therefore, be added to the other localities where those flint flakes occur, on which the pre-Adamite man theory is founded. The specimens were very like those described by Sir C. Lyell, as occurring in the valley of the Somme. Farther along the line the beds of the new red sandstone were examined, and a quantity of selenite, as well as fibrous gypsum, was obtained, some specimens of the former being very beautiful and clear. At Whitehead a great variety of geological formations occur, and their mode of occurrence is highly instructive to the inquiring Geologist. The Lias is exhibited by very good sections, and also the Greensand, and each yield a great number of fossils, some beds in the Lias, as the *Avicula contorta* bed, being apparently made up of shells. The bed characterised by Ammonites planorbis is very well exhibited here. The chalk, too, of the Whitehead quarries was examined, and from it several fossils obtained, particularly a few very large and perfect ammonites, so large, indeed, that the members of the Club had to assist in pairs to remove them to the station. One specimen was about 18in. in diameter, and was well marked on the outer surface by the curious windings of the edges of the sutures. The semi-columnar condition of the trap as it occurs here presented an interesting feature, and several rock specimens were obtained for the cabinets at home. Altogether the excursion was most successful, and the labor of each member was rewarded by the numerous specimens collected.

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The Second Excursion took place on Wednesday, 25th June, when, according to previous arrangement, the members assembled at the Northern Counties Railway Station at half-past nine o'clock, and proceeded to Larne. Here Mr. M'Neill had a well-horsed long van awaiting their arrival, on which they soon took seats for the road. The horses were just bending to their work when the steward of the day called a halt at

Waterloo, and the whole party dismounted to examine the very excellent geological section here exhibited, showing the Chalk, Greensand, Lias, and the Keuper marls *in situ*. Many of the party secured good specimens of the characteristic fossils, particularly the *Gryphea incurva*, commonly called in the locality "witches' cradles." Specimens of pentacrenites were also picked up, called "wall-stones," by the people of Larne.* Again taking their seats on the car the high level of the road afforded a general view of the day's route. Throughout its entire length the main geological features are the same. The several headlands that embolden the coast-line owe their origin to protecting arms or branches of trap that extend outward all round the margin of the great Trappean plateau, covering the County Antrim and the greater part of Derry; inland they form the high hills of Carntogher, Benbradagh, Keady, and Benyevenagh; while along the Antrim coast they crown the heights of Ballygally, Ticmacraven, Ardclinis, and Layd; and thus protecting the headlands leave the intervening valleys or glens to be worn away by the influence of time and the elements; we have, therefore, barren, rough, and rugged headlands, alternating with deep worn glens, that charm the spectator by the richness of their verdure, and reward the husbandman by the fertility of their produce. The first of these headlands from Larne is Ballygally Head, formed of perpendicular masses of semi-columnar basalt, the so-called "corn sacks" of the fanciful. Having rounded Ballygally Head, a fine open well-cultivated country, unseen before, presented itself, the surrounding hills enclosing a rich, varied, and cultivated landscape, sloping down in undulating waves to the water's edge. Arriving at Ballygally Coastguard Station a plentiful supply of the little rue fern (*Asplenium ruta-muraria*) was found on the walls surrounding the premises. A rather long stay was made near the wild undercliff called the Deer Park a little further on. Here the slope from the foot

* The term "wall stones" seems to be a corruption of the term "well stones." The latter applied to the specimens because they were first found in a certain well near the town. They are also called "dancing stones," because they seem to dance about when dropped into vinegar.

of the rough cliffs fronting Ballygilbert Hill down to the road is covered with fallen masses of chalk rocks that ages ago formed the continuation of the beds hundreds of feet above, and are now broken and scattered in the wildest confusion over acres of ground, covering the retreat of thousands of rabbits, and sheltering the hardy shrubs that grow in the narrow clefts between them. Many of these rocks contain hundreds of tons; their enormous dimensions, irregularity of shape, dazzling white colour, and interspersed foliage, form a gigantic rockery of the grandest character. At Macauley's Head, close to Glenarm, a totally different scene occurs. Instead of being scattered and broken, the pure white rocks rise up from the road on the left almost perpendicularly, and are capped by the trap, making a total height of 350 feet, great blocks of rocks overhanging and seeming ready to fall at a touch, while the sea washes close up to the road on the other side, where in storms it makes a clean breach over, and mixes its spray with the falling torrents from the cliffs.

At Glenarm the party placed themselves under the guidance of Dr. Holden, who conducted them over Glenarm Park and gardens, belonging to the Earl of Antrim—in the former, a famous hunting-ground for botanists, good specimens of the bird's nest orchis *(Neottia Nidus avis)* and quaking grass *(Briza media)* were collected. The extensive park scenery, well kept grounds, and excellent gardens, excited the admiration of each of the party, and the courtesy of Messrs. Good and Brunton from the Castle was thoroughly appreciated.

Passing Carnlough, and its fashionable villas, sandy beach, busy pier, and crowded shipping, they soon reached Garron Point. The two great step-like hills or masses of rocks, each of a hundred feet rise, originally formed part of Knockore Hill, a thousand feet above their present level. The tilted nature of the strata, and the fissured condition of the masses, clearly indicate a vast slip over the surface of the underlying marls, how long ago?—aye, how long? On the lower of those slips Garron Tower is built, the residence of the late Marchioness of Londonderry, and now the Summer retreat of Earl Vane. Between Garron Point and Red Bay, or the entrance

to Glenariff, a distance of four miles, there occurs one succession of vast cliffs from five hundred to eight hundred feet high, the upper two hundred feet being almost perpendicular, rising from the sloping undercliff as Cave Hill rises from the Deer Park at Belfast. Here and there the very rugged cliffs are broken by deep gorges and ravines, which vary the scenery, and render it still more imposing and grand. The sheltered valleys are fringed with the hazel, birch, and bramble; the same foliage being scattered among the fallen rocks that in some places almost cover the slope from the hills to the margin of the sea. With this range of magnificent cliffs extending away to Red Bay and up one side of Glenariff, a similar range forming the other side on the southern escarpment of Crockalough and Lurigethan mountains, the wooded hills about Cushendall in the front, and the continued headlands beyond stretching out towards the open sea, with the distant hills of Scotland marking the other side of the Channel, form one great scene of surpassing grandeur.

The sun having now sunk behind the summit of Trostan, and the breeze off the sea becoming cooler than agreeable, the party gladly availed themselves of the hospitality of the Glens of Antrim Hotel, in the romantically situated village of Cushendall. Mrs. Martin, the hostess, soon had each comfortably provided with every requirement, the style and character of which was as creditable to the establishment as it was satisfactory to the visitors.

Remaining at the hotel for the night, next morning, at half-past seven, the steward summoned all to breakfast, and the good things provided were dealt with, with a zealous determination to prepare for a hard day's work. Soon after eight the party started for Glendun. Nothing could surpass the beauty and grandeur of the wild hills that surround the extensive valley of Glendun. The beautiful road runs along the south side of the glen for some distance, then crosses by a viaduct at a spot that gives the best possible view of the country around. Eighty feet below the Dun River flows onwards in its course from the Eagle Hill and Slieveanorra Mountain to the sea at Cushendun. Looking up the glen the Craig Mountain rises to

the left eleven hundred feet high, and its northern slope, running east and west, is so steep and high that the sun never shines on it for nine months of the year. On the right of the glen, still looking westward, mountains from eleven to twelve hundred feet high form the northern side of the valley, so situated that it catches all the sunshine of the year, and is proportionably verdant and beautiful. The intersecting river courses are embosomed in the richest foliage, and the hill slopes are covered with the most luxuriant shrubs of every form and kind, growing in harmony with the surrounding grandeur, and uniting to form a scene words cannot well describe, or pencil properly pourtray. Leaving the glen, the whole party were so enraptured with the pleasures of the trip and the character of this locality, it was proposed, and carried by acclamation, that the Committee should be requested to make this an annual trip. The subject was laid before the Committee, but they could not accede to the request, as they wish to be free to make every year's arrangements as may be considered best for the interest of the Club.

Arriving at Cushendun the curious caverns found in the rough conglomorate of the Old Red Sandstone were examined. On the face of these cliffs and overhanging precipices the sea spleenwort grows freely. From Cushendun the party came straight for Cushendall, arriving about one o'clock for lunch. This being duly discussed, they prepared for the return home, and transferred their heterogeneous collection of plants, and stones, and shells, and tools to the van, and bid the Glens of Antrim Hotel farewell, thoroughly gratified with the comfort of the house, the character of the entertainment, the attention of the servants, and the kindness of the hostess, Mrs. Martin.

It was now determined that an ascent should be made to the top of Glenariff, and explore its waterfalls. Accordingly the party left Cushendall, and soon passed under the archway cut through the Old Red Sandstone, on the road near the pier, and entered the magnificent Glenariff, bounded on either side by precipitous hills from 1,100 to 1,300 feet high. The glen or valley extends inland for some three miles, and from summit to summit across is about a mile and a half. The surrounding

hills form perpendicular escarpments, from the foot of which the valley slopes on either side with an unbroken sweep to the flat below, where the Invir or Glenariff river traces its course to the sea. Being unbroken by intervening hills or undulations of the surface, the whole extent of the valley is constantly in view from the road. This was the last scene of Coxwell's balloon exploit. Limestone quarries occur on the north side of the valley, in one of which were collected very good clear crystals of double-refracting spar. Along the banks the ladies gathered quantities of wild strawberries, which abounded here melting with ripeness. At the head of the glen the river, like our own Woodburn, divides into two branches, on each side of which there are some splendid waterfalls, the main branches, as well as the tributary streams, being fringed with groves of the densest foliage, where the botanists of the party collected many specimens of our native plants, including the following ferns :—The maidenhair spleenwort (*Asplenium trichomanes*), the beech fern (*Polypodium phegopteris*), and the brittle bladder fern (*Cystopteris fragilis*). At three o'clock the whistle of the steward again called the party together; and, at the village of Waterfoot, they exchanged the hotel van for their own, and passed on for Larne. The cliffs along the road now looked imposingly grand. The craggy prominences, reflecting back the brilliant rays of the evening's sun, stood out boldly, and cast dark shadows athwart the receding surfaces; and all was so clear and well defined that, hundreds of feet above on the rocky face of the escarpment, the mountain sheep were seen browsing on the scanty herbage that occasional projecting ledges afforded.

Reaching Garron Point the party alighted to visit the Tower, and away they went scrambling up the winding path along the face of the thickly-wooded hill directly under Garron Tower. They were received by Mr. Portens, the gardener; and, with a rapidity that scarcely did justice to the place, they were shown over gardens, greenhouses, vinery, and rosery, and were amazed at the amount of taste and skill displayed in converting this ledge of fallen rock into a paradise of flowers. Art, thus triumphing over the desolation of nature, has transformed

the *débris* of a geological catastrophe into a scene of matchless order and the rarest beauty. Hurrying down the precipice at the risk of broken necks or sprained limbs, the party once more took a car for a straight run to Larne. The day's work was now finished, and time was afforded to reflect on the scenes passed through, the geologists being thoroughly pleased with the great variety of geological features exhibited along the route, the numerous sections of fossiliferous beds, the grand physical features of the coast line, and the stupenduous erosions, contortions, and landslips indicating the vast disturbances of past geological ages. Nor were the botanists less interested. With better opportunities of collecting specimens, they returned laden with spoil, and those who, on this occasion, were in quest of such, did not fail to enrich their herbaria by the addition of many rareties. The rocky cliffs afford most suitable habitats for the interesting, though difficult, family known as the Hawkweeds. Specimens were obtained of three species not of common occurrence, namely—*Hieracium Murorum*, *H. Vulgatum*, and *H. Anglicum*. The heathy mountain slopes and rocky escarpments which all along the route limit the domain of Neptune were decorated and rendered still more picturesque by many of our maritime and rupestral wild plants, the bright blue of the sheep's scabious contrasting with the abundant white flowers of the sea campion rendered gay many a jutting point on the coast; while more shady rocks were festooned by the trailing stems of the wood-vetch, bearing in profusion those racemes of elegant blossoms which distinguished this species. On the beach at Red Bay were collected the sea holly (*Eryngium maritimum*), with its low tufts of rigid and spiny leaves. Adjacent spots were enlivened by the bright yellow heads of *Trifolium procumbeus*. Here, associated with the rest harrow (*Ononis arvensis*), on the margin of a small stream hard by, the botanical collectors rejoiced to find *Senecio saracenicus*, a plant not hitherto recorded in our local floras.

Glendun and Glenariff are so situated as to afford natural habitats for sub-Alpine and marsh plants, and during the brief exploration on this occasion yielded many such, some of

these being reckoned among our rarest forms. We may enumerate *Alsine verna, Melampyrum sylvaticum, Myosotis repens, Gymnadenia conopsea,* and many others of less note. Many other localities hastily examined produced their quota to interest; and on the whole it may be asserted that no more profitable route could have been selected to interest and instruct those who take an interest in the botany of our native country.

In making arrangements for the coming year, the Committee have included this excursion again, and they hope that a good number of the members will endeavour to attend it.

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The Society's Third Excursion for the year took place on Saturday, 21st July, when about twenty-five members visited Shane's Castle. Leaving by the Northern Counties' Railway for Randalstown, and entering the demesne by the Randalstown gate, the party walked through to Antrim, exploring by the way the very many interesting features which contribute to make this one of the most beautiful localities in the North of Ireland. The flora of the park is for the same compass one of the most varied to be found within many miles of Belfast; and the botanical visitor, no matter how far he has travelled, need not be apprehensive of coming away from it with an empty vasculum. Its ancient groves, although interspersed with some exotics introduced in later times, include many noble specimens of our native forest trees. Amongst these some fine old oaks well worthy of admiration, throwing out their trunks of vast dimensions, and their massive branches in every form, aptly typifying that sturdy independence of character of which Britons boast as theirs in a special degree. And while surveying these princes of the vegetable kingdom, it was impossible to pass unnoticed the many elegant native wild flowers that spring up at their base. In the great plan of creation there is nothing thrown away—no waste of force or of material; and accordingly we find the interspaces of the forest filled up with undershrubs and perennial or annual herbs, and even vacancies left by these affording habitats for moss, lichens, and fungus. The sylvan species were, of course, well repre-

sented. In the park the wood club rush (*Scrupus sylvaticus*) was found in abundance. Orchids displayed their racemes or spikes of fancifully-constructed flowers in profusion, and as many as six species were observed. The number of woodland forms obtained was large, and was augmented by an examination of the margin of the lake, where several rare plants were collected, as the yellow violet (*Viola lutea*), the hemp agrimony (*Eupatorium cannabidum*), the upright or highland cudweed (*Gnaplialium sylvaticum*), the scull-cap (*Scutellaria galericulata*), the gipsy wort *Lycopus Europœus*), the great yellow loosestrife (*Lysimachia vulgaris*), and the tall fescue grass (*Festuca arundinacea*), with many others of less note. At the quarry head a rockery has been recently formed, and here the members of the Club had an opportunity of examining all the varieties of ferns found in the park, including the Royal fern, so common in the South and West of Ireland, but so rare in the North East. Having examined the old castle and the adjoining graveyard, the party walked on to Antrim, and visited the beautiful Round Tower near the town. This tower has a rude cross cut in the lintel over the door, and is, therefore, claimed as a witness in favour of the Christian origin of those remarkable structures.

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The Fourth Excursion for the year was to the Woodburn River on Saturday, 11th August.

Many interesting plants found at Woodburn have been enumerated in former reports. We only mention that on this occasion the steep banks of the waterfall were observed to be gay with the brilliant crimson blossoms of the rosebay (*Epilobium angustifolium*), well known in cottage gardens as "blooming sally." As a wild plant, this species is very rare in Ireland, and it is remarkable that this year it was met with at two of our field meetings, viz., at Woodburn, as just mentioned, and also on rocks near Cushendall on occasion of the visit to that locality.

The secondary fossils found on this day were similar to those formerly reported, but some members being desirous to see the later tertiary deposits which here cover the secondary rocks, a

visit was paid to the high banks of the river near Woodburn factory, where is exposed in a fine section the "drift clay" of the glacial era. Specimens were obtained of several species of shells, the remains of boreal molluscs who had peopled the waters of the glacial sea in a period long past. These were the well known *Leda oblonga*, with *Astarte compressa*, *Tellina solidula*, and fragments of *Cyprina islandica*, and several other species not determinable with certainty.

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The Fifth Excursion took place on the 1st September to Castle Espie, on the borders of Lough Strangford, County Down.

At Castle Espie the carboniferous or mountain limestone occurs, dipping in a North-easterly direction, and probably passing under the sandstone of Scrabo Hill, the latter belonging to the new red sandstone, rather than to the old red, as some have supposed. It is not likely that coal occurs anywhere in the neighbourhood; but as the carboniferous limestone of Castle Espie constitutes the base of the coal measures, and the magnesian limestone of Cultra, near Holywood, overlies the system, the intermediate beds occupy the strata-graphical position of true coal, and there only it could be found. The Castle Espie limestone occurs very low—indeed, so low as to require the quarries to be sunk very much below the level of the water in Strangford Lough, on the margin of which they are worked. Formerly they were worked without any system, and when the difficulty of contending with the water increased the works were abandoned. The property has recently been purchased by Mr. Murland, and he has commenced to work the quarries properly on an extensive scale, providing all necessary plant, buildings, railway, and kilns. The latter were only in process of construction on the occasion of our visit, and at first sight looked more like the foundation of some dry dock than lime-kilns. Those kilns are on Hoffman's principle, and consist of a series of chambers or separate kilns, arranged in an oval form or plan, and communicating separately with a main chimney shaft of large dimensions. In the present instance, there are twenty-

four of those chambers (forming an oval group 300 feet by 40 feet), all of which may be in operation at the same time, charging, firing, and drawing them one after the other. Thus, after a number are charged with stone, No. 1 may be fired, during which operation it is the only one in connection with the shaft. When the stone is burnt into lime, No. 2 (which has been getting heated from No. 1) is connected with the chimney shaft and fired, and so each one in succession. The charging of the remainder is thus approaching No. 1 as the firing of the others is going from it, and when No. 24 is charged, No. 1 is cool, after having been burnt, and ready to have its lime drawn and charged with a fresh supply of stone, thus the fire is kept continually burning, and no heat is lost; the cooling chamber communicating its heat to the next one ready for firing. The expenditure of time, labor, and fuel, is by this plan reduced to a minimum. Mr. Bagnall, the engineer in charge of the works, explained the details of the several operations to the ladies and gentlemen of the party, and conducted them over the quarries.* The members found the limestone very rich in fossils, and, considering the short time spent examining the beds, several good specimens were obtained, including some beautiful corals (*Alveolites polymorpha*) and *Cyathophyllum expansum*. A specimen of the great Orthoceras was also found, and some of the smaller forms of Producta, Orthis, Spirifer, and Terrebratula.

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On Saturday, the 15th September, the Sixth and last Excursion for the year was taken to Kilcorig, near Lisburn.

Owing to the very uncertain state of the weather, the meeting was not a large one; but the few members who assem-

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* By the 10th of March in the present year the superstructure of the kilns was completed. These kilns are an oblong structure with octagonal ends, containing 2,500 cubic yards of masonry, and covering a superficial area of 1,820 cubic yards. The fires were put to the kilns on Thursday, the 18th, in the presence of a number of Mr. Murland's friends, who had been invited to witness the formal opening of the works. The first fire was lighted by Mrs. Thomson, wife of Professor James Thomson, Queen's College, Belfast, and Chairman of the Belfast Naturalists' Field Club.

bled enjoyed one of the best meetings for the year. Although the effects of the past week's storm were unmistakably indicated by the saturated ground, swollen rivers, and scattered corn, and even several drenching showers fell during the day, yet there was nothing in the weather to cause more inconvenience than was amply compensated for by the clear sunshine that broke out between the showers, and lightened up the landscape as far as the eye could reach. Nowhere was the effect of the previous rain more evident than in the well-named "Bog Meadows," near Belfast, which appeared from the railway one sheet of water, in which the tree-tops served to mark the hedge-rows beneath, and the haycocks, half submerged, seemed floating over the fields where the crop was grown. Leaving the train at Lisburn the party had a good open country walk of about three miles to the limestone quarries, the property of Bennet Megarry, Esq., of Kilcorig House. At Kilcorig the limestone or chalk immediately overlies the New Red Sandstone series, without the Greensand and Lias which usually occur between these formations. The latter two occur between the chalk and the Keuper marls of the Red Sandstone group at Larne, Whitehead, and Belfast; and at Colin Glen they make up a thickness of about ninety feet; and, as they increase in thickness from east to west, it is not likely that their absence so near Colin Glen as Kilcorig should be owing to any thinning out of the beds. The probability is, that at Kilcorig the whole suit of rocks occurring there are portions of a landslip which became detached from the White Mountains, and, sliding over the Lias clays and shales, rested permanently on the Keuper marls below, as we now find them. Over the marls the several beds of chalk make up a total thickness of about thirty-five feet, the upper surface of which exhibits evidence of long exposure to atmospheric denudation, and the deep hollows worn on the surface are filled with gravel and blocks of flint, which, with the accompanying clay, became subsequently burnt, or indurated by the intense heat of the trap rock, when in a melted state it overflowed the district. The trap in the section exposed attains a thickness of about fifteen feet, and is semi-columnar, somewhat like the trap of Whitehead. Between this

fifteen feet bed of trap and the chalk below there occurs at Kilcorig a carbonaceous band of from three to twelve inches thick. This band is composed of lignite, or semi-coal—like charred wood; indeed, the woody nature is quite evident, and several good specimens of the deposit were secured. This band was originated probably by the overturning of some forest, as the melted trap flowed from its source. A more extensive bed of the same kind occurs at Killymorris, a few miles from Ballymena, where it is extracted as from a regular coal mine and sold for fuel. The Kilcorig quarries furnish a very excellent assortment of fossils, more remarkable for the great variety of species than for the number of individuals, and the collectors of the party obtained several species new to their cabinets; indeed, the gathering on this excursion was the richest made for the year, and included good specimens of the following species:—Ammonites Gollevillensis, Nautilus radiatus, N. lævigatus, Helicoceras Hibernicum, Belemnitella mucronata Turritella unicarinata, Trochus cirrus, Pleurotomaria perspectiva, Lima elegans, Pecten nitidus, Pholadomya cordata, P. obliquissima, P. Stewarti, Ostrea vesicularis, Arca, albæ-cretæ, Terrebratula abrupta, T. semiglobosa, T. carnea, Rhynchonella octoplicata, R. plicatilis, Ananchytes ovatus, Micraster cor-anguinum, and Galerites abbreviatus. The weather-worn surfaces of several of the chalk rocks are covered with the beautifully ornamented spines of fossil sea-urchins, and with fragments of corals that once lived together in deep seas, at the bottom of which the limestone itself was deposited as mud, and the closer the rock is examined, the more it is found to be made up, as it were, of deep sea forms of animal remains. Sponge remains are also common at Kilcorig; and one species, *Guettardia stellata*, assumes the shape of a distinct cross, of the form which ecclesiologists would call the "Calvary cross," in contra-distinction to the Greek, Latin, and crosslet types. *Amorphospongia ramosa* ramifies over some of the beds, and specimens of the *Paramudra Bucklandi* occur in great abundance—indeed, more frequently than is profitable to the quarry owner, for, being composed of flint, they are useless for lime. After thoroughly exploring the quarries, Mr. Megarry very kindly took the party to his

residence, Kilcorig House, where he entertained them most hospitably, and prepared them for the walk back to Lisburn. The evening was beautifully fine, and from the high level of the road a most extensive and richly-cultivated landscape presented itself. The belt of country bordering the Ulster Railway formed the foreground, and several towns—Lurgan, Moira, Hillsborough, and Dromore—were distinctly visible; and even the fields on the slope of Slieve Croob, beyond Ballynahinch, could be clearly traced, and the whole range of the Mourne Mountains well marked in the distant horizon, while Carlingford Mountain blended with the more distant hills of Monaghan and Louth.

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The following papers were read before the Society during the

## WINTER SESSION.

The meetings were unusually well attended, and great interest was taken in the papers introduced, and was frequently manifested by the animated discussion that followed the reading of the respective papers.

The Session was opened on Thursday Evening, the 22nd November, with a paper on "The Recent Elevation of the Land in the Vicinity of Belfast," by Robert Young, C.E.

Belfast is peculiarly favoured in many ways, and, among others, it is a highly interesting field for the geological observer. Within a very few miles of the town a very extensive series of rock formations are exposed to view, at many places easy of access, and many of the beds abounding in fossil remains. Mr. Young referred to those, and stated that the more recent and superficial phenomena which, under the various titles of alluvium, diluvium, drift, boulder, clay, &c., as used by various authors, are now occupying a very large share of the attention of geologists, both at home and abroad, are also well displayed in this neighbourhood, as well as the

evidences of the extensive denudation of the secondary and trappean rocks, and the markings of the former sea lines.

This part of the paper was illustrated by a large section of the district, taken between Divis Mountain and Castlereagh, passing across the valleys of the Blackstaff and Lagan rivers, and shewing the succession of strata from the trap in Divis downwards through the Chalk, Greensand, Lias, Keuper marls, and New Red Sandstone, to the Silurian rocks of the County Down, and the enormous amount of material that must have been torn away to give the present contour of the country.

The various agencies that are known to be capable of wearing down rock were then discussed, and the opinion of eminent geologists on this point were cited, and the conclusion was expressed strongly, that such denudation as there is evidence of in this district could only have been accomplished by icebergs on the gigantic scale of those observed at the present days around the coast of Greenland ; the whole country being submerged 2,000 feet or more, and strong ocean currents sweeping over it from north to south.

The various levels at which the land had paused on its subsequent emergence from the ocean was then referred to, and among other evidence of one of the more ancient sea levels was adduced the fact of the caves in the Knockagh, Carnmoney Hill, and first cave of Cave Hill, being about the same general elevation of 600 feet above present sea level, and being characteristic of sea-worn caves at present being hollowed out on the Antrim Coast. The action of glaciers in wearing off the edges of the earlier beaches was mentioned, in explanation of the difficulty of identifying the higher ones, except under very peculiar conditions. This difficulty does not exist in respect of the latest sea margin, which can be readily traced around the entire district, and, indeed, around the whole coast of Ireland and Scotland, at a height of about twenty feet above present high water mark.

The evidence of the Roman wall, at the Firth of Clyde, not having changed its relative level to the Firth since its erection, was given, in connexion with the observed rate of wearing of sea-

caves on a coast line, as proof that the last elevation was at least 2,000 years ago.

He next described the lowest level in connection with some discoveries that had lately been made in the Valley of the Blackstaff, where the elevation of the marine silt, abounding in recent shells, had been exposed in making a large reservoir. A large number of the bones and horns of the red deer, in good preservation, and the remains of several other animals had been found, together with several horns and bones, exhibiting evident marks of their use by man.* A very curious discovery, also, had lately been made in the boulder clay, in a brick field off Dover Street, where large oak piles, rudely fashioned, were found embeded on solid clay, and having all the appearance of being there prior to the deposit of the superincumbent mass. These piles, he believed, had formed an ancient dwelling of the earlier inhabitants of the country, as they exactly resembled those that had been found in other parts of the country.

Mr. Young exhibited a large number of the horns of the red deer. The remains of about fifteen individuals were found, also bones of the horse, dog, pig, and several other animals. The silt also contained shells not now living in the locality. Mr. Gray exhibited at this meeting a beautiful group of serpulæ from Belfast Lough.

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At the Second Meeting for the Session, held on Thursday Evening, 6th December, Mr. Robert Smith read a paper on "Glacial Periods: their Causes and Effects."

The history of the world, written in the great stone book of the earth's crust, proves that change, constant change, has been the characteristic feature, not only in the forms of life, but also in the conditions of existence. There have been periods of intense heat, changing slowly to periods of cold, equally in-

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* One bone was evidently cross cut as if by a rude saw, and several of the horns had artificial marks on them.

tense. The last leaf in the great volume—the latest deposit of sedimentary matter just underlying our vegetable soil—tells us of an icy period which, at its commencement, found the Continent of Europe much higher above the level of the sea than it is now; and the shallow sea which now divides the British Islands from the main land, was then a great plain, covered with vegetation, and teeming with multitudes of living beings. As the cold became more intense, the land began to sink, and continued till not only was that great plain submerged, but also the greater part of what now constitutes the dry land of England, Scotland, and Ireland; and all that remained of the British Islands was a little archæpelago of rocky islets, formed by the tops of our mountain ranges. Over this glacial sea floated icebergs from the Scandinavian mountains, dropping over the submerged land the mud and stones and boulders, which are known now as the glacial drift. Slowly there came a diminution of the intensity of cold, and slowly the land began to rise, till ultimately it had attained its former height, again to sink to its present level. That this change in the level of the land was intermittent, is proved by the existence of inland cliffs which mark the action of the sea when the land was lower. The rocky, almost perpendicular, face of our Cave Hill and the Knockagh Mountain, point to a period when the movement was arrested for a great length of time. Between Larne and Glenarm we have an inland basaltic cliff at the same height; and above the present limestone cliff at Glenarm we have a basaltic one, which belongs to the same period of arrested movements. It can be traced all along the coast of Antrim. During the glacial period the glaciers which now fill our Alpine valleys were far more extensive than now; that of the Rhone filled the whole of Switzerland with a mass of ice 100 miles long by 50 wide, depositing its boulders on the flanks of the Jura, above the lakes of Neufchatel, and extending on the right to Soleure, on the left to Geneva. That the area of extension of cold was at this period very great, is proved by the discovery by Dr. Hooker, in his travels in Syria, of the moraines of great glaciers. On these moraines grow the cedars of Lebanon.

What are the causes which have produced these great changes in temperature? To this question there have been various answers. All of them seem inadequate. The most recent discoveries in astronomy and physics seem to offer some clue to the solution of the problem. Herschel discovered, from apparent changes in the position of the fixed stars, that the sun, with all its attendant planets and satellites, was steadily moving in a given direction in space. Argelander, of Bonn, M. Altho Struve, of Pulkova, in Russia, and his associate, Peters, have further investigated this wonderful discovery, and have determined that our sun is at present moving in the direction of the constellation Herculus, with a speed of thirty-three million miles in a year. They have further determined, that the star Alcyone, one of the Pleiades, is the central star round which our system is moving. This star is so distant that the light by which we see it has been five hundred and thirty-seven years on its journey. The nature of heat, and its relation to mechanical motion, has been investigated by many experimenters. Count Rumford, Mr. Joule, of Manchester, Dr. Mayer, of Heilbron, in Germany, Professor Tyndal, and Sir William Thomson, have all contributed to prove that heat is molecular motion among the particles of a body; that arrested sensible motion becomes converted into heat, and that heat is convertible into equivalent sensible motion. The mechanical equivalent of heat has been determined, and with the data thus supplied, it has been calculated that the stoppage of the earth in its orbit would produce an amount of heat equal to the combustion of fourteen globes of coal, each equal to the earth in magnitude; its subsequent fall into the sun would generate an amount of heat equal to the combustion of 5,600 worlds of solid carbon. The investigations arising out of the discovery of Fraunhofer's lines in the solar spectrum have shewn that the substance of the sun is identical with that of the earth, and that if it do not receive new accessions of heat it must become cooled. Sir William Thomson (our respected Chairman's brother) believes that the fall of meteors into the sun is the source whence the sun derives new accessions of heat; that the zodiacal light

is but a vast collection of meteoric masses revolving rapidly round the sun, very near to its surface; the fall of these into the sun adds to its heat by the amount of sensible motion arrested. In the great circle traversed by the sun there will be blank spaces, where the supply of fresh fuel will be deficient, and a diminution of its heat will produce a glacial period. In other parts of its orbit the supply will be great, and the consequent increase will produce a warm period. We are at present enjoying one of the warmer periods, the mid-summer of which may have been about the 11th century of our era. For, since then, the glaciers of the Alps have been slowly descending. In the 17th and 18th centuries they stopped up roads formerly open, and covered forests of ancient growth, and the early Arctic explorers found the Arctic Seas much more free of ice than they are now. We are again slowly approaching a cold period; whether it may be equally intense with the last one who can tell?

The effects of the last glacial period are clearly apparent in the form of the surface in Northern Europe. Our rivers flow through broad valleys that have been scoped out by ice; our lands have been covered with sediment, the grindings of the rocks of ancient glaciers, which has given richness and fertility to our vegetable soils. Lakes of exquisite beauty have been hollowed out by the grinding power of ice, which now, filled with water, are slowly silting up, yielding broad meadows on their shores, and proving that liquid water was not the agent that formed them. The gradual advance of living forms from the lowest to the highest, which the rocks disclose, has probably been greatly promoted by the constant change in the conditions of life, which alternate cold and warm periods must have produced. Sir Charles Lyell has shown that man's existence on the earth can be traced to the close of the glacial periods. If the doctrine of the continuity of life, so ably advocated by the great Darwin, and so well sustained by Mr. Grove, at the recent meeting of the British Association, be true, then man's predecessors must have existed through all that epoch. How the difficulties of that period may have acted on his intellect it is very easy to see. The necessity for shelter, for clothing, for mutual intercourse and

language, the ultimate necessity to migrate, all would tend to develope his highest powers, and his migration southwards would be that of a conqueror and civilizer of inferior races. He thus reached the shores of the Mediterranean, Egypt, India—the builder, perhaps, of the cyclopean monuments—to return again northwards when a warmer period gave life and fertility to the regions he had left. Philology tells us of an Aryan race whose language was the parent of Sanscrit, Greek, Latin, Zend or Bactrian, Lithuanian, old Sclavonic, Gothic, and Armenian. The roots of this old language are found in all our modern languages. To that old race we, perhaps, owe that intellectual development which has placed the western nations first in the ranks of progress and civilization. When we consider that the tendency to improve increases with improvement, what may we not hope for humanity. Should the slow advance of another glacial period again render these islands uninhabitable by man, the great English speaking race have already made themselves a home in other lands—in America, Australia, New Zealand, and India. The great continent of Australia would by such a change become more moist and fertile. It is yet to people; and the mighty rivers of South America are yet destined to bear on their broad bosoms the noble ships of commerce. Its wild savannahs, unpeopled, save by wandering tribes and lonely squatters, will yet echo with the ring of the hammer, the adze, and the song of an English speaking race, and fields and gardens, rich in corn, and fruits, and flowers, will replace the gloomy forest, and the far extending but now silent prairie.

The usual discussion followed the reading of Mr. Smith's Paper, after which a number of geological specimens were exhibited, including one of the six species of Woodocrinus, from the mountain limestone of Yorkshire. The species exhibited (*Woodocrinus macrodactylus*), was a very beautiful specimen, obtained by one of the members from the discoverer, Edward Wood, Esq, F.G.S., of Richmond, in exchange for specimens forwarded to him from this locality.

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On the 20th December, a paper on "The Roman Antiquities of Bath," was read by Mr. Hancock, who explained that having

lately visited that city, and been introduced to the Secretary of the "Bath Natural History and Antiquarian Field Club," he had the pleasure of attending a field excursion, and also of hearing a paper read, besides frequent opportunities of inspecting the Museum of the Society, and, in company with one of the members, of visiting places of interest in the neighbourhood; thus he was induced to bring forward a subject in no way connected with our field of observation; for although we find nothing of Roman origin in Ireland—except, perhaps, a few Terra colla beads, or coins—yet it is very desirable to know something of a people so closely connected with the early history of Britain.

He then proceeded to read one of the several curious traditions relating to the discovery of the hot springs and subsequent building of the baths upon their site. A record of the city is found in the history of Antonine, where it is called "Aquæ Solis," a name which might have passed for pure Latin, were there not strong evidence to show that it was probably "Aquæ Sulis," Sul being the name of the British Sun Divinity. In Ptolemy's Geography Bath is reckoned amongst the towns of the Belgæ. The city probably sprung into importance about the year 43, being nearly the centre point of the district of country conquered in the third Roman expedition to Britain, under Aulus Plautuis. There seems also little doubt that it rapidly increased about the year 79, for it was in that year that Agricola overcame the British natives by milder measures than those of his predecessors, particularly encouraging them to settle in towns, build halls and temples, adopt the Roman dress and manners, &c. And indeed the mixture of British and Roman remains in Bath has given rise to much speculation as to whether the city was originally of British or Roman origin. In favour of the former view, the pentangular form of the walls has been urged, but on the other hand, their construction is generally declared to be of Roman character. As to the more important antiquities discovered in and around the city, the specimens of lead in pigs are some of the most interesting. Of these the first found some years ago bears the impression of the Emperor Hadrian's name, and weighs 195 lbs. It was, no doubt, brought from the Mendip

Hills, where the Romans had extensive mines, and where, also, a very perfect pig of the reign of Claudius, about A.D., 45, was found, showing at what an early period this portion of the Island was brought under tribute—the natives being always compelled to work the mines, a degredation commented on by the British chief Galgacus, when addressing his followers previous to an engagement with the Romans. Although Bath was evidently a large city, there is nothing to show that it was a military stronghold, like Chester, for instance. The funeral monuments to soldiers found at different times appear to have been those of veterans and invalids, who came for the benefit of the waters and died there. The numerous and extensive villa remains, which have been discovered within a mile or two of the city, would seem to show that the inhabitants lived in security and even luxury. No less than sixteen of these are at present known. The form of the walls, as before observed, is pentangular, the mediæval resting on the Roman. There were four gates at the cardinal points, and the Avon protected the city on two sides, the walls being adapted to the bend of the river. From the fact of certain remains, believed to have belonged to boats, having been discovered close under this wall, it is supposed that in the Roman times the river actually touched it, and also that the tide was probably felt here; this, if precisely ascertained, would be a matter of great interest in a geological point of view. One of the four great Roman roads, the "Fosse Way," which connected Lincolnshire and Devonshire, passed through the city. These roads bore a strong resemblance to the great military ways of Peru, constructed by the Incas. In the reign of Henry Eighth, Leland, the Antiquarian, was authorized by the king to make a tour through the kingdom, in order to investigate the national antiquities. In the walls of Bath he describes having seen many Roman antiquities which now are for the most part obscured by buildings. In the year 1790, when digging for the foundations of the present Pump-room, there were discovered the remains of a temple, of which some fragments of columns of the Corinthian order, and hollow, are preserved in the Museum. Portions of the pediment, very beautifully sculptured to represent flowers and foliage, were also found, and on the

tympanum is carved a figure of a face evidently intended to represent the sun ; the rim of the shield is ornamented with oak leaves and acorns. But of the antiquities found in Bath, perhaps the most interesting is a bronze head of Pallas, of exquisite form and in perfect preservation, evidently broken off from a statue. Antiquarians are inclined to fix the date at about the year 180, in the reign of Marcus Aurelius. Stone coffins, or sarcophagi, have at different times been discovered. A few years ago, when digging for some foundations, workmen came upon two of these, one of them containing a small skeleton imbedded in a quantity of fine white sand, which on examination proved to be the same as that found in the mineral rivers, which produce lead ore in the Mendip Hills, about thirty miles off, none being found nearer. The discovery of stone coffins above the ruins of the baths has given rise to the supposition that after the destruction of the city, probably about 577, the site of the baths was used as a place of interment. The present level of the city varies from ten to sixteen above the Roman. Many altars have been found, generally about three or four feet high, and square. Unlike those from other localities, the sides of the inscribed altars in Bath are generally quite plain. It was in the year 1755 that the foundations of the Roman baths were laid bare. Some idea may be formed of the magnificence of this pile of buildings, from the fact of its being upwards of two hundred and forty feet in length, and one hundred and twenty in breadth, the walls from six to seven feet thick. The details are too long to enter into in this brief sketch. Of other antiquities there have been discovered coins, medallions, armlets, amphorœ, seals, rings, keys, and large quantities of Samian ware. The climate of Bath is extremely mild, and perhaps more like that of Italy than any other part of England. This fact, together with the healing properties of the springs, doubtless formed a strong inducement to the Romans to settle here.

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The Fourth Paper was one from Dr. Holden, of Glenarm, on Epidermis and Epidermal Appendages.

Analogies of structure may be traced throughout the entire

animal kingdom, from the lowest protozoa up to the highest vertibrata, man ; and even the extremes meet in some respects, as, for instance, the amæba has its investing membrane, which it tucks in, improvising a stomach when required to absorb its food. Man has also an investing membrane, or skin, and this is directly continuous with the mucous covering on lungs, stomach, and intestines ; it is the external lining pushed in to form the internal, and only changed so far as adaptation to its position requires.

In the structure of skin, two layers are well marked, viz., the scarf skin, or epidermis, and the true skin, or derma. The epidermis is without blood vessels or nerves ; the derma is well supplied with both, hence, the former is a covering of defence to the vascularity and sensitiveness of the latter. The growth of epidermis, and its nourishment, is by inbibition into the nucleated cells lying on the papillary eminence of the true skin ; as new ones form, the old cells are pushed to the surface, and are rubbed off as flattened scales. In some animals, as the snake, the entire epidermis is shed at once, and periodically. The physiological uses of skin in the economy was referred to and explained. The colouring matter of skin lies in the deep cells of epidermis, marking the distinct races of men, as much as the effects of climate. Heat tends to develop an increased growth of pigmentary deposits. As most living tissues secrete something for the use of the economy in which it is placed, so epidermis has its secretion in the shape of appendages, hairs, horns, hoofs, feathers, scales, nails, and claws. Though so varied, yet all are the same structure, and essentially the same as the membrane that produces them.

Hairs grow from little pouches in the skin of tucked-in epidermis; the accumulation of cells push out themselves in the form of a hair. The microscopic appearance of hairs differ in the various animals. The imbrication of the scales are best marked in the bat, approaching in one species to rudimentary feathers, which is remarkable in this flying animal, thus manifesting a continuity of form in these appendages. The medullary part of hairs is well seen in those of the mouse and hare. Such a variety in detail is presented by hairs microscopically, that it is quite possible to determine by it the species of animal from

whence it came. The blanching of hair suddenly from some nervous excitement or prostration was referred to as veritable, and instances given. As to how a cut hair grows again, some proof is still required; short hairs being near the source of nourishment get pointed, but long hairs, having less vitality at their extremities, often split. Hairs of some animals are so modified as to lose the character of hairs—such are the horny plates of armadillo, formed of hairs matted close together. Feathers at first grow like hairs, but the follicle is continued to some distance outside the skin, and the young feather is well formed before it is set free by rupture of the capsule, in which act the bird assists by picking at it.

Horns may be divided into four varieties. 1st, Solid horn, without osseous core, arising only from integument, as rhinocerous. 2nd, Osseous protuberances, covered by integument, as giraffe. 3rd, Osseous protuberances, covered by horn, as sheep, cow, &c. 4th, Osseous protuberances, without either integument or horn covering them; these grow to a large size, and are the antlers of deer, and, being bone, are not to be classed with true horns. Horns seem to be but a collection of hairs, united to give strength and durability.

Nails, claws, and hoofs only differ in shape. They grow from a depression in true skin, or matrix, in which the cells are aggregated over large and highly vascular papillæ.

Scales in the reptiles are true epidermic appendages, being developed upon the surface of the true skin; but scales of fish are not so, being imbeded in the substance of true skin, and covered over with a layer of it, as may be readily observed in the eel with the microscope. The otenoid and cycloid scales of the fish of our present seas are cartilaginous and calcareous more or less; while the ganoid scale of fossil fish is essentially bony, and the placoid scale of the shark and ray, with their fossil analogues, are of a dentine structure.

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At the Fifth Meeting of the Society the Rev. William MacIlwaine read an elaborate and well-considered paper on "The Continuity of Creation."

The lecturer commenced his address by remarking that, since the days of Butler's immortal work, the argument from analogy had been frequently employed, and that it was a popular one on many accounts. It was, however, always to be employed with caution. Unless founded on a real resemblance between the facts or things compared, it would mislead; and even when legitimately used, its conclusions never could attain to the certainty of mathematical proof, but at best only to a high amount of probability. These remarks were intended to introduce a subject which was of late much debated, and which he would name "The Continuity of Creation." Various theories had been advanced on this subject from the most remote periods, and of late the argument of analogy had been attempted by Mr. Darwin and his followers. The object of this paper was to point out the true channel wherein this analogical argument should flow, and to examine the statements made by those who had so employed it. The lecturer went on to take a rapid but extensive view of the laws which prevailed in the world which we inhabit, bearing on the matter of continuity, and, in so doing, examined at considerable length these laws, which were reduced to the following heads :—1. Uniformity with variety; 2. Stability and periodical mutation; 3. Continuity and segregation; 4. Origination and extinction. These features of nature were all prevailing, and along with their exercise was noted the links of connexion which bound into one whole the mineral, vegetable, and animal kingdoms. Life and death, arising from the last two named laws, characterised all known organism; but even in these the continuity of creation was preserved, inasmuch as whole generations became extinct only to re-appear—changed, yet in a sense the same in their offspring. Mr. MacIlwaine next proceeded to examine the Darwinian theory, as it had been most recently expounded by two of its ablest advocates in as many very remarkable treatises—viz., the inaugural address of the President of the British Association at Manchester—W. Grove, Esq.; and the opening address to the Belfast Natural History and Philosophical Society, by Joseph John Murphy, Esq. The lecturer spoke in high terms of commendation of these papers, both as regards their matter and the spirit that pervaded them,

while dissenting from their conclusions. The line of argument adopted in both was that of analogy, and the lecturer went on to examine the examples of this adduced. In so doing, he remarked on the known facts of Creation as it was presented to our immediate experience, and denied that throughout it a single instance could be produced of any individual departing from its special place and rising into another. On the contrary, he asserted that the law of segregation brought forward previously was rigidly enforced, as in the case of the sterility of hybrids, which might be looked on as a sort of penalty for any attempted transgression of it. The case of the great variety in the family of the columbidæ, all said to be derived from one original, the rock pigeon, which was so strongly insisted on by Mr. Darwin, in reality gave no countenance to his theory, while it confirmed the opposite one, inasmuch as all the varieties above referred to remained pigeons still. The question under consideration was reduced to a simple alternative, as Mr. Grove himself fully admitted and clearly stated. They had to choose between the existence of species by means of an original Creation, or else by means of development. Both Mr. Grove and Mr. Murphy, along with Mr. Darwin, argued for the high amount of probability which existed that all living beings, vegetable and animal, are descended possibly from one, certainly from a smaller number of simply organised original germs. Mr. MacIlwaine then proceeded to examine at length the arguments adduced in favour of this latter hypothesis, more especially the alleged analogy insisted on by its advocates. He showed that Mr. Grove had made a palpable mistake in demanding "ocular demonstration" in the proof required for the Creation theory. According to his own statements it was a matter of inference, and in pursuing this the lecturer showed that Mr. Grove, and Mr. Murphy also, left out of their consideration the only sufficient testimony in the case—this was revelation, both the possibility and necessity for which few could deny. Mr. Grove and Mr. Murphy, as well as Darwin, repudiated the Atheistic theory of spontaneous generations, and the origin of life by chemical action, while they all admitted the act of Creation. If this had taken place, a record of it was not only possible, but highly

probable, and he claimed for Moses the character of a historian in recording that fact. This reference to the Book of Genesis was made, the lecturer said, not in a theological, but in a purely historical sense; but, while so saying, Mr. MacIlwaine alleged that it was most unphilosophical, on the part of the advocates of the development theory, utterly to ignore the Mosaic record. It was the oldest in existence, and the only one deserving attention and respect. Why were not its claims and statements even noticed by Darwin and his followers? The lecturer next proceeded to apply the test of sound analogy to the arguments of Mr. Murphy, and showed that, in every instance adduced by that gentleman, no real resemblance existed. Thus Mr. Murphy argued that because individuals were marvellously developed, each from a cell, therefore species might be expected to develope in a similar manner. Mr. MacIlwaine showed that this development was of a totally different nature from that which Mr. Murphy could argue from, and that experience the most universal showed no such development of species to exist. He met the case of animals having aborted members, such as serpents with concealed legs and the apteryx, and Mr. Murphy's assertion that these appendages were useless, by stating his belief that such abnormal appendages could not be shown to be useless; and, moreover, that according to the attempted analogy, we had as much right to expect to see the animals in question developing into others more perfectly organised as to assert that they were the descendants of such. The paper closed with a reference to the admission of all the advocates of the development theory that there was as much difficulty in believing creative power to have been exerted in producing their primordial germ as races of fully organised beings, and in further commending to the society the adoption of the Mosaic account of the origin of the world in preference to the Darwinian hypothesis.

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The Sixth Meeting of the Society was held on Thursday Evening, 7th February. It is usual at the ordinary meeting to have a paper similar to the above read and discussed. On this

occasion, however, the evening was devoted to the consideration of "The Microscope and its Uses," without any formal paper. Dr. Holden, of Glenarm, and Dr. Burden, with Messrs. Anderson, Patterson, Ferguson, Gray, Murphy, and Smith, exhibited and explained their respective microscopes and microscopic objects. Of the latter there was a most extensive and varied assortment, consisting of—1st, Animal substance, including sections of bone, horn, hairs, &c., with animal tissues and injected preparations, shewn by Dr. Burden. Mr. Gray also exhibited insect remains from the submerged peat below the beach at Portrush. 2nd, Vegetable preparation, of which Mr. Ferguson had a most interesting collection, including sections of wood, dissections of flowers, and vegetable hairs. 3rd, Living forms, including the circulation in plants and living diatoms, shewn by Dr. Holden; and eels (*Vibrio Tritici*) obtained from grains of wheat, shewn by Mr. Gray. There was also a good exhibition of fossil deposits, such as the curious diatomaceous earths found near Toome Bridge, Lough Mourne, Stoneyford River, and the Mourne Mountains. Similar deposits from all parts of the world were also exhibited. Of opaque objects, there was also a good collection, and Dr. Holden, with Messrs. Anderson and Gray, had a series of most beautiful objects shown by the polariscope. A great variety of microscopes and microscopic apparatus was exhibited and compared. The instruments present were principally those made by Smith & Beck, and Charles Collins, of London. Collins's Bockett lamp was also shewn, and answered its purpose remarkably well. The simplicity and efficiency of Collins's apparatus were particularly noticed. In addition to the microscopic subjects, Professor Thomson, the chairman, exhibited a most excellent collection of specimens, showing very distinctly the glacial markings from the surface of the limestone of Castle Espie, County Down.

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The Seventh Meeting was held on Thursday, 21st February, when Mr. W. H. Patterson brought forward a short paper entitled, "Notes on a visit to Carlingford." The paper was

illustrated by an enlarged map of the neighbourhood, and by sketches of the scenery, including some views of the mountains and ruined castles that abound about there, and a drawing of Carlingford Abbey. Mr. Patterson described his ascent of the mountain above Rostrevor, as far as Cloughmore Stone, a huge boulder perched on a shoulder of the mountain, and from which point the views in different directions around Carlingford Bay are the most lovely that can be imagined. The tourist visiting this neighbourhood for a few days should make Warrenpoint his head quarters, as from this as a central point there are facilities for visiting, either by land or water, the surrounding places of interest in the Counties of Down and Louth. Mr. Patterson then gave an account of his visit to Carlingford, by boat from Warrenpoint, and described the ruined castles and other buildings, including the remains of the Abbey, &c., of that interesting old town. Mr. Patterson after giving a brief account of the history of this ancient borough, from the building of the castle, either by De Lacy or De Courcy, by order of King John, in A.D. 1210; the founding of the Dominican monastry by Richard De Burgo, Earl of Ulster, in A.D. 1305; the establishment of a mint by Act of Parliament in A.D. 1467; and the repeated burnings the town suffered from down to the year 1689; concluded by urging on the members of the club to arrange one of their excursions for the coming summer to this beautiful and interesting locality.

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On the same evening, Mr. J. W. Forrester read a very interesting paper on "Tintern Abbey."

Without apparent connection with the former paper, there was a certain interest in the fact that the founder of Tintern Abbey was an ancestor of the famous Strongbow, who established English supremacy in Ireland. Some allusion was made to the family of Strongbow, the De Clares, and the founding of Chepstow Castle—a fine specimen of the old Norman strongholds. A description of the drive from thence to Tintern Abbey, and the impression produced by the first glimpse caught in the sudden bend of the road of the interesting and

magnificent ruins, leading the visitor to doubt which he should admire most, the grandeur of the ruined pile or the wondrous beauty of the surrounding scenery, environed by mountains wooded to their summit, so interlaced and locked into each other as to leave no apparent egress from the valley. Amid a wild seclusion, singularly still, placed on a very gentle eminence, about one hundred feet from the river, stands Tintern Abbey, with all the accessories to the perfection of scenery, of wood, water, and mountain ; the graceful architecture of the ruins, enhanced in picturesque effect by a profuse drapery of the richest and purest ivy, has caused that eminent antiquarian, Sir Richard Colt Hoare, to declare that "this Abbey had exceeded every ruin he had seen in England or Wales." Through the praiseworthy care of the lord of the soil the ruins are kept in the neatest order. A detailed description of the present appearance of the Abbey, and the adjoining monastic offices, and the interesting archæological remains preserved therein, was then given. Tintern derives its name it is said from two Celtic words, Din, a fortress, and Teyrn, a chief. It is stated in Welsh history that a hermitage belonging to Theodoric or Tendric, King of Glamorgan, stood in the site of the present Abbey, and that the royal hermit, having resigned his throne to his son, led here an eremetical life amidst this wild and peaceful solitude.

The Abbey of Tintern was founded for Cistercian or White Monks, and dedicated to St. Mary, by Walter Fitz Richard de Clare, A.D. 1131 or 1132, as an expiation for his sins. He was succeeded in his titles and estates by the father of Strongbow, who, succeeding to the throne of his father-in-law, Dermot Macmorrough, died, leaving an only daughter Isabel, who espoused William, Lord Marshal of England, conveying thereby to him the English possessions of her father. Her son William, the younger Earl of Pembroke, confirmed in 1223 to the abbot and monks of St. Mary de Tynterne, all the lands, possessions, and free customs heretofore granted by his predecessors, and founded the Abbey of Tintern in the South of Ireland. This nobleman and his five brothers all dying without issue, the large estates of William, the Marshal, came

into the hands of Hugh Bigod, Earl of Norfolk, by his marriage with Maud, his daughter, and it was his grandson, Roger Bigod, who erected the present structure, as mentioned by William of Worcester. From a charter, dated August 4th, 1301, we learn he too had some qualms of conscience for his past misdeeds, for he says, "Be it known to your community that I, in the sight of God, and for the health of my own soul, and the souls of my ancestors and heirs, have confirmed to you divers lands and possessions," which are then enumerated.

A story is told of this nobleman, very characteristic of the bold and insolent demeanour of the Norman nobles of that day. With another baron he had the temerity to refuse to go to the wars without the presence of his sovereign, alleging that his duty was to attend only on the king's person. An angry altercation ensued, in which the King, Edward First, swearing by his Maker, cried out he should either "go or hang," to which the other, repeating the oath, replied, Sir King, "I shall neither go nor hang."

The order of White Friars or Cistercian, for whom the Abbey was founded, opened in England about 1128. They professed to follow the stern simplicity of the rules of St. Benedict, only that some of the hours devoted to studies by the Benedictines were by them appropriated to manual labor. As they became possessed of immense revenues, and rose to power and eminence, a taste for luxury was cultivated, and in their splendid abbeys, where they lived like princes, the severity of their discipline became relaxed, until at last the stern, rigid, and professedly abstemious Cistercians became notorious for their depravity.

When the Abbey of Tintern was suppressed at the dissolution, there were only thirteen inmates, and the revenues were estimated by Dugdale at £192 1s. 4½d. per annum, and by Speed at £256 11s. 6d. It was granted by Henry Eighth, to Henry, second Earl of Worcester, and is now the property of his descendant, the Duke of Beaufort, with all the granges and other valuable property originally belonging to the Abbey.

The legend of the first foundation of the Abbey, by De Clare, was then given. The story runs that, actuated by remorse,

haunted by the ghost of his murdered wife, the founder sought to expiate his sins and enormities by the endowment of this monastry ; and in the seclusion thus afforded, endeavoured by a life of asceticism to atone for his previous misdeeds.

It is interesting to know that the founders of Tintern, in Monmouthshire, were connected with Ireland by family relationship, and that the Earl of Pembroke (son-in-law to Strongbow) founded a similar Abbey in the County Wexford, still known as Tintern Abbey. He was in very great danger of shipwreck off the coast of Ireland, in the year A.D. 1200, and made a vow that if he landed safely he would build and endow an Abbey, and his ship having been driven into Bannow Bay, Co. Wexford, he carried out his promise, built the Abbey, filled it with Cistercian Monks, and dedicated it to the Virgin Mary. Having been confiscated in Henry Eighth's time, it fell into the hands of the Colclough family, who are said to be under "the curse of fire and water" for holding what was once the property of the Church.

An animated discussion followed the reading of the papers, in which several of the members joined. The meeting was closed by an exhibition of objects of scientific interest, obtained since last meeting, and included specimens of iron found near Glenariff, County Antrim, glacial markings from the chalk rock quarry, west of Ballintoy, and a skull of a sheep almost entirely encrusted with stalagmite, as is usual with the remains found in the ossiferous caverns of the South of England and the Continent.

The Committee desire that the members should more frequently introduce short papers, so that two or even three could be read during the evening, as on the above occasion. By this means a greater variety of subjects could be discussed with less trouble to individual members.

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The Eighth Meeting of the Society was held on Thursday Evening, 7th March, when a paper was read by Mr. William Gray, on the "World's History in Stone." Mr. Gray stated that there were two records of the world's history in stone—

first, the geological, or the record written by the Creator; and then the architectural, or the record as written by man; and, dwelling more particularly on the latter, he gave an interesting account of the architectural monuments of past nations. Commencing with the architecture of the great Assyrian monarchy, he described its character as exemplified by the wonderful monuments disinterred by Layard and others. Mr. Gray described the magnificence of Babylon in the brilliant reign of Nebuchadnezzar, and its subsequent overthrow by Darius, Alexander, and the Romans, each in their turn spreading destruction in their path, and doing their part in bringing about the desolation spoken of by the prophets. Those gorgeous temples have lost their beauty, and the palaces of kings are now desolate ruins, which with heaps of brick-work, tiles, and pottery, supply by their decay the mould that buries them.

In Egypt, the large masses of stone which the granite quarries of Nubia readily afforded decided the system of statics adopted, which was the simplest mode of construction, and it was the policy of the priesthood to perpetuate those original simple forms, and they jealously endeavoured to realise in their works the idea of eternal duration. Among them the ordinary dwellings were considered merely as inns or places of sojourn, while the tombs were called the eternal abode. The architecture of Egypt was, therefore, ponderous and massive in construction, firm, enduring, changless in its character, producing astonishment and awe in the mind of the beholder, as manifested by those time-honoured monuments of human skill and human pride—temples, tombs, and palaces, that crowd the valley of the Nile.

In tracing the further progress of the history of architecture, Mr. Gray noticed the establishment of the Persian Empire, which having triumphed over Egypt, Media, Babylonia, and Lydia, extended its dominions from the Nile to the Tigris, and from the deserts of Tartary to the Colonies of Ionia. The progress of architecture was followed into Greece, where, during the incessant contests with Persia, it was brought to the highest degree of perfection. The increase of the revenues of Greece

by the success of her military enterprise, prompted the desire to enjoy what her victories had won. They, therefore, under the brilliant administration of Pericles, indulged in a perpetual scene of triumph and festivity, and reared the numerous temples that arose around the Acropolis of Athens. Architecture, with sculpture, became to the Greeks the medium through which the actions of the gods were presented to mortal view. The early history of the states, clothed with a garb of imagry, was the basis on which the poets founded their mythology. The genius of the sculptor removed the veil, and his chisel presented the multitude with visible forms of their faith. The Grecian artists yearned for the full realisation of the beautiful which they detected throughout nature. Her sculptors sought to interpret this by their efforts to give the charm of reality to the fanciful creations of her poets ; and, by their peculiar treatment, exhibited their intellectual pre-eminence, refinement, and beauty of execution. Greece having at length fallen into the hands of the conquering Romans, she became the mine from which the Romans drew their intellectual wealth. Vast numbers of statues, architectural embellishments, and works of art, were taken as spoil from the cities of Greece, and collected into Rome, so that she became an assemblage of superb buildings—a great architectural museum. But her works address themselves more to our admiration than to our judgment. Engineering skill, a display of costly materials, and a vastness of extent, chiefly characterised the architectural grandeur of Imperial Rome. As Greece fell before the Romans, so also the Romans were overrun by the northern barbarians, who, bursting like a flood along the northern boundary of the empire, poured into Italy, and destroyed, without reserve, its noblest monuments and its choicest treasures of art. Mr. Gray then described the establishment of the western empire, the spread of Christianity, and the influence of both on art—particularly architecture—until at length the modification of Roman architecture that prevailed in Normandy was introduced into England by Edward the Confessor and the followers of William ; and thus the Gothic architecture of England took its rise. Having traced the distinctive characteristics of the various styles of

Anglican ecclesiastical architecture, Mr. Gray referred to numerous examples, and stated that the study of those petrified ideas of the past, and the historical associations with which they stand connected, would embrace the whole history of the world, and that the peculiarities and national characteristics of all nations are impressed upon the architectural monuments they have left behind. Thus, the stern massiveness of Carnac and Luxor tells of the rigid rule of the Egyptian priesthood. The ruined temples of Greece reflect the intellectual refinement of the Greek. The ostentation, ambition, and vain glory of Rome may yet be perceived in her architectural remains; and the unrivalled compositions of Gothic art, show forth the romantic devotion of the mediæval Christian. Mr. Gray having thus traced the history of architecture from the earliest time to the present, and pointed out the peculiarities of style, construction, and expression, that distinguished the architecture of the several nations, closed his lecture by comments on the several modifications of former styles that now prevail.

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The Ninth Meeting of the Society was held at the Museum, on Thursday Evening, 21st March.

Mr. W. H. Ferguson, one of the secretaries, read a paper on "The Flora of Ireland, with special reference to Ulster," communicated by Ralph Tate, Esq., F.G.S., F.A.S., Associate of the Linnean Society, &c. Mr. Tate stated the object of his paper to be :—

1. To give a short review of the *Cybele Hibernica*, a very important work on the flora of Ireland, lately issued under the auspices of the British Association, and to submit his own criticisms thereon.

2. To lay before the club some ideas as to the origin of the Irish flora.

3. To direct the attention of local botanists to additions that have been made since the publication of the *Cybele*.

The British Association, at the meeting held in Bath, appointed a committee of seven gentlemen, for the purpose of in-

vestigating the distribution of plants in Ireland, with a grant of money at their disposal towards the expenses incurred. This resulted in the publication, last autumn, of the "Contributions towards a *Cybele Hibernica*," under the editorship of Dr. D. Moore and Mr. Alexander G. More, both of Dublin. This work was stated to be a great advance on Mackay's *Flora Hibernica*, published thirty years previously, many species being now added, the range of a large number much extended, whilst others again have come to be better understood.

A highly instructive sketch was laid before the meeting of the several types of British vegetation, as given by Mr. H. C. Watson, in his great work, the *Cybele Britannica*, and by the late Professor Edward Forbes, in his masterly essay on the sources whence the flora of Great Britain and Ireland was derived. The prevalence and range of these types were shown, and some leading forms enumerated. One of these types of vegetation, appropriately designated by the authors of the *Cybele* the Hibernian type, numbers twenty-two species, some of which ally the Irish flora to that of Western Europe. Some other species—the name of which were given—point to a former connexion of our plants with the North American flora. As might be expected, these species are found only on our western coast. Other groups of plants derived through England or Scotland connect Irish vegetation with that of France, and that of Scandinavia, while the great mass of the common forms are the same, and had the same origin as the general flora of Great Britain.

By an outline map of Ireland improvised on the black-board, Mr. Tate's plan for dividing the island into botanical provinces was shown. These provinces would not be merely arbitrary divisions of the country into so many areas, but would correspond to those regions where certain well-defined groups of plants prevail—these groups being in the main those of Professor Forbes—these botanical provinces to be sub-divided into smaller districts. By such an arrangement the numerical value of the districts in which any species is found would be a better expression of its prevalence, than that obtained by the plan adopted in the *Cybele Hibernica*.

Mr. Tate gave the names of a large number of plants recently added to the local lists by members of the club, several of which, in fact, were new to the flora of Ireland. He announced that since the publication of the *Cybele* two more plants not hitherto observed had been found in Ireland—one of these, the "sweet flag" *(Acorus calamus)*, was discovered by members of the Belfast Naturalists' Field Club, growing in profusion not very far from this town.

The paper, which was one of great interest to Irish and to local botanists, referred at length to the necessity of considering the geological features of a country in connexion with the spread of its flora, and expressed the writer's disappointment on account of the authors of the *Cybele Hibernica* having ignored such an important element in discussing the range of our plants.

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On Thursday Evening, 4th April, the last ordinary meeting of the Society was held. On this occasion Mr. William Gray read a paper on "The Flint Flake Foundation of the pre-Adamite Theory." Mr. Gray commenced by referring to the great variety of tastes, dispositions, and qualities of mind that existed, and contended that all were necessary for the investigation of truth. If all minds were similarly constituted, our very existence would become monotonous, and the progress of knowledge would be retarded. It is by the differences in mental qualifications that man is enabled to sweep the universe, and gather knowledge from every source. Difference of taste, then, must necessarily create difference of opinion, but this should not be made a blemish. The rainbow is all the more beautiful by the variety of its tints, and so man's intellect is all the more useful by the variety of its manifestations; and as it requires the blending of all the rainbow tints to form white light, so also it requires the concurrent testimony of different minds to elicit the pure light of truth. Difference of opinion, then, on scientific subjects should be respected, no matter how opposed to each other, or how contrary to our own. We should not allow the discrepancies that our ignorance discovers to

shake our confidence in the Scriptures, or to shut our eyes to the marvellous unfoldings of scientific facts. In the broad daylight of truth no doubts will arise to clog our understanding; but it is in the darkness of ignorance we become startled and affrighted by our own groundless imaginings. Mr. Gray noticed the progress of science, and the contentions with the theological school, and noted some of the disputed questions, particularly that of man's antiquity. All the processes of nature by which the geologist is enabled to account for the formation of the several strata of the earth's crust are still in operation, producing, in a limited degree, similar results. Where those operations effect man or his works the geologist must investigate them hand in hand with the archæologist, but in the absence of written records, neither can determine with certainty the element of time. The order of the deposition of strata can be ascertained, and their thickness measured; but as the energy of deposition is unknown, the time required for their production cannot be calculated. Nor is the archæologist furnished with any better data to enable him to correctly estimate the age of the works he examines, when they confessedly are ignorant of the origin of such important works as our own Round Towers, or the celebrated ruins of Stonehenge, and many other similar remains, we can understand how difficult it must be to form correct theories upon such rude implements as the flint flakes under consideration. Written history itself is often ambiguous and doubtful. Tradition is necessarily more mysterious, and when we go behind history and tradition to gather from the rude works of a primitive people a knowledge of their condition, our efforts must at best be theoretical and unsatisfactory. For these reasons, and with our present limited knowledge of the nature and origin of those flint flakes, Mr. Gray contended that it was premature to attempt forming a correct opinion regarding them. He then described the classification of stone implements generally, including celts, hammers, arrow heads, knives, &c., of which a large variety was exhibited, and explained the distinction between those of the early or Paleolithic age, and those of the later or Neolithic age, shewing that the chipped and rubbed

implements, unquestionably manufactured, belong to the later age, and the mere flakes of doubtful origin belong to the early, or what is called the Paleolithic age. Both kinds of weapons are found frequently in mounds, graves, tumuli, and other works of ancient man, and both kinds are still used by certain tribes in many parts of the world; but flint flakes and articles of the Paleolithic age are sometimes found in drift gravels, and associated with the remains of extinct animals, thereby indicating a remote antiquity for their origin, and, consequently, an equally remote antiquity for man their supposed manufacturer. Mr. Gray then described in detail the Swiss Lake dwellings, the Irish Crannoges, the Danish kitchen heaps, and the mounds of Scotland, and explained the classifications of the various remains found in them. He explained that the antiquity of man, as proved by the Swiss Lake dwellings and Danish kitchen heaps, rested upon certain changes that had taken place on the earth's surface since the deposition of the remains recently discovered; but contended that those changes may have taken place within the generally-received chronology.

The ossiferous caverns were next described as they occur in various parts of the world, including Ballintoy, Rathlin, and Carrickarede, in the County of Antrim. Mr. Gray described more particularly the caves of Devonshire and Dorset, examined by himself, and also the caves of the South of France and Belgium. In some of these caves a vast quantity of the remains of extinct animals are found, and in some cases the bones of man. Man's bones, and the undoubted evidence of his handiwork, are only in questionable association with the extinct mammalia; they are not mixed with them, but rest upon them, and may not, therefore, be of the same age, more particularly as the contents of those caverns are admitted to have been washed into them by rivers, &c. Flint flakes are, however, found intermingled with the bones of the lion, elephant, hippopotamus, hyena, wolf, and other animals, in the caves and drift gravels, but the human origin of the flakes must be first proved, and then that they were contemporary with the extinct animals, before any theory of man's remote antiquity is rendered acceptable. Mr. Gray protested against the inferences frequently

drawn from insufficient facts ; as, for example, when it is said that the absence of corn, or the remains of domestic animals in Danish kitchen heaps, prove that they were unknown to the depositors of the heaps. If the absence of the remains of certain animals or plants from those deposits, prove that they were unknown, or did not exist at the period of the formation, then both the Danish kitchen heaps and the Swiss Lake dwellings must be pre-human, *as there are no human remains found in them.* He then exhibited a large quantity of the flint flakes gathered around Belfast, from Toome Bridge, Lurgan, Larne, Holywood, and Carrickfergus, and wherever flint gravels occur ; and suggested the probability that they were natural flakes, and not manufactured—first, because they are always found in flint gravel ; secondly, because they are found of all forms and sizes, and graduate from a mere lump up to a finished flake ; thirdly, because the best formed are mere flakes, while the badly shaped are chipped all over ; fourthly, because, to manufacture the shapes found, intentionally, would require such skill as would lead to the formation of a far more perfect implement. The constancy of character was very remarkable. All the specimens had one flat side, the other being formed of two or more faces, with a central ridge. At the blunt end on the flat side there occurs a bulb formed by the conchoidal fracture of the flake, whatever may be the size or shape of a specimen, it had those well marked characters. All the flakes from the Bann, at Toome Bridge, were the natural colour of the flint, and were rather sharp and well shaped. The specimens from the gravels at Larne and Kilroot (near Carrickfergus) were irregular in form, and a white surface like porcelain. In each case the flakes occur in large numbers. At Toome Bridge they are found in the river, the bed of which is a submerged peat bog, and celts and other wrought forms are found with them. At Larne and Kilroot they occur in the gravel of a raised beach near to, but several yards higher than, the shore. A great variety of the specimens were exhibited to illustrate the paper, and included two splendid stone hatchets and a beautiful cinerary urn from the collection of Samuel Barbour, Esq., found last summer at Notting Hill, Belfast ;

a large number of flint flakes found by Mr. Gray in various localities around Belfast; also, some of the pierced fossils *(Coscinopora globularis)* from the Valley of the Somme.

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The foregoing abstracts will enable the members of the Club to form an idea as to the character of the papers expected from them, and as the Committee have no other resource but the members, the latter are reminded that they should record the result of their Summer's observations, with the view of bringing it before the Society at their Winter meetings. The Committee do not expect long papers on every occasion. On the contrary, they prefer a number of short papers, embodying the result of the writer's study or observation on some special point of scientific interest.

The Committee obtained the assistance of Professor Thomson, Robert Patterson, Esq., F.R.S., and Mr. Ferguson, in awarding the prizes for the collections sent in for competition; and on the recommendation of those gentlemen, Mr. George Donaldson was awarded the prize for Land and Fresh Water Shells; Mr. William Gray, the prize for a collection of Archæologic objects; and Mr. Samuel Stewart, Mr. Plimmer's prize, for the best collection of objects collected at the Excursions or Field Meetings of the year.

## COLLECTION OF S. A. STEWART.

### BOTANICAL SPECIMENS.

| | | | |
|---|---|---|---|
| I. | Flowering Plants, ... | 73 species, | 91 species. |
| II. | Ferns, ... ... | 5 ,, | |
| III. | Mosses, ... ... | 13 ,, | |

### GEOLOGICAL SPECIMENS.

| | | | |
|---|---|---|---|
| I. | Cretaceous Fossils, ... | 22 species, | 32 species. |
| II. | Liassic do., ... | 7 ,, | |
| III. | Palæzoic do., ... | 3 ,, | |

### ZOOLOGICAL SPECIMENS.

| | | | |
|---|---|---|---|
| I. | Marine Shells, ... | 38 species, | 62 species. |
| II. | Land and Fresh Water, | 24 ,, | |

## MR. GRAY—ARCHÆOLOGICAL.

Several Hundred Flint Flakes and Celts from Toome Bridge.
Several Dozen Flint Flakes from Larne.
Do. do., from Carrickfergus.
Do. do., from Lurgan and Holywood.
A beautiful stone cup, and several other bronze and stone articles.

## MR. DONALDSON—LAND AND FRESH-WATER SHELLS.

64 species, and 6 varieties.

Prizes similar to those of last year will be offered for competition during the next year.

The Committee hope to have the pleasure of meeting the members and friends of the Club at the Annual Conversazione, which is arranged to take place on the 2nd May next.* Arrangements have also been made for the Summer Excursions.

In carrying out those arrangements, and in all other efforts to further the interests of the Club, the Committee desire the co-operation of the members, as the surest means of attaining ultimate success.

W. H. FERGUSON, } Hon. Secs.
WILLIAM GRAY, }

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* According to arrangement, the Conversazione was held on the 2nd May. The Committee issued a large number of invitations, and about one hundred and sixty members and friends assembled on the occasion.

These interesting re-unions are set on foot by the members for the purpose of giving the public an opportunity of witnessing the result of the operations of the club during the year, and the articles exhibited—the majority of which belong to the members of the club—have particular reference to the papers read during the session. Last year, besides the papers read in the winter season, the members had six field excursions to places of interest in the neighbourhood of Belfast and throughout the country, as will be seen by the Report, and the specimens exhibited were collected at the excursions, which made the exhibition more interesting

The Conversazione was held at the Museum, College Square. The upper room was tastefully decorated for the occasion, and in the room where the articles were exhibited tables were placed round the walls, which were covered with specimens of general interest. From the centre of the ceiling festoons were suspended to each corner of the building, and a star made of yew hung from the centre of the festoons. The tables were profusely ornamented with pots and vases of flowers, most of which were kindly supplied for the occasion by Mr. W. Hooker Ferguson, curator of the Botanic Gardens. The flowers were all in full bloom, and in the gas-light produced an agreeable and pleasing effect. The specimens laid on the tables by the members of the club were much admired during the evening, and great care and attention had been apparently bestowed on the several collections. On the front wall Mr. S. A. Stewart displayed a number of flowering plants, including ferns, grasses, orchidaceæ, lichens, &c. He also exhibited 74 species of shells, collected at the new docks during the recent excavations. Mr. Stewart obtained the Plimmer prize for the best collection during the season. In addition to those already referred to, he displayed a number of recent and fossil shells, which were carefully selected. Mr. Wm. Gray, one of the honorary secretaries, exhibited a collection of flint-flakes and celts from Toome Bridge, and flint-flakes from Larne and Kilroot. These specimens, owing to their number, occupied the greater portion of one of the tables; and such a collection is rarely to be met with. Eminent geologists have spoken of seventy or eighty being collected in one place; but Mr. Gray has been fortunate enough to collect the flint-flakes in hundreds. Mr. George Donaldson displayed a number of land and fresh water shells, which obtained one of the prizes from the club. Mr. Hancock exhibited a beautiful collection of corals and marbles. Some specimens of fossil wood, from Lough Neagh, were exhibited by the same gentleman. Some elegant specimens of coral from the Navigator's Islands were contributed by Mr. Tomlin, and the different varieties tastefully arranged presented a pleasing appearance. An interesting and rare specimen in the fossil department was presented from the Castle Espie Lime Works, in the form of the *Actinoceras gigantea*, which is on its way to the Museum of the Queen's College, but was kindly lent by the authorities of that institution to the Naturalists' Club for exhibition. The fossil is very large, and, in the raising of it, it has been broken up in pieces, but each piece presents the appearance of the shell. Mr. H. Morrison showed a specimen of quartz conglomerate, or "pudding-stone," from the vicinity of Bradford. In connexion with the large fossil to which we have adverted, Mr. Swanton exhibited a large ammonite, about two feet in diameter, found in the limestone quarries at White Head, on one of the excursions. Mr. Young, C.E., exhibited a number of bones, marine shells, antlers, and ox horns, which were found at a depth of fifteen feet below the surface of the earth, while excavating the reservoir for the Northern Spinning Company, in July, 1866. Mr. Walshe, of Dromore, contributed a great variety of

archæological specimens, consisting of bronze spear-heads, flint arrow-heads in great variety, flint spear heads of superior workmanship, jet and bronze ornaments, and a great variety of glass and amber beads, found in the vicinity of Dromore. Professor Wyville Thomson, LL.D., kindly furnished some specimens of the glass sponges, regarding which he read a paper during the session. Mr. Murphy supplied some large photographs of architectural and other scenery, and Mr. Young exhibited some beautiful water-colour drawings. The members of the club brought their microscopes, and displayed some interesting specimens of animate and inanimate life. This department showed one of the advantages of the club, as persons who would never have thought of the instruments have, by their connexion with the club, been induced to purchase microscopes. Messrs. Ward, Magill, and Mayne contributed stereoscopes and appropriate views of British and continental scenery for the occasion, and Mr. Mayne, in addition, lent a large album with photographic views of Belfast, and interesting scenes in the North of Ireland. Mr. Walker, of Bridge Street, supplied the refreshments on the occasion.

## Dr. BELFAST NATURALISTS' FIELD CLUB IN ACCOUNT WITH TREASURER, 1866-7. Cr.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| To Balance from 1865-6,... ... ... ... | £15 | 1 | 3 | By Prizes, ... ... ... ... ... ... | £1 | 0 | 0 |
| " Sixty-one Subscriptions, 1866-7, ... ... | 15 | 5 | 0 | " Use of Museum, ... ... | £5 | 0 | 0 |
| " Five Subscriptions, 1865-6,... ... ... | 1 | 5 | 0 | " Gratuity to Curator, ... ... | 3 | 0 | 0 |
| " Mr. Plimmer for Prize, ... ... ... | 0 | 10 | 6 | | 8 | 0 | 0 |
| " Committee's Contribution to Conversazione, 1866, ... ... ... ... ... | 2 | 15 | 0 | " Delivery of Circulars, ... ... ... ... | 1 | 10 | 0 |
| " Tickets for do., ... ... ... ... | 3 | 16 | 6 | " Stationery, ... ... ... | 2 | 4 | 6 |
| | | | | " Printing and Advertising, ... | 7 | 3 | 9 |
| | | | | " Postage Stamps, ... ... | 1 | 0 | 0 |
| | | | | | 10 | 8 | 3 |
| | | | | " Expense of Conversazione, ... ... ... | 7 | 16 | 5 |
| | | | | " Balance,... ... ... ... ... ... | 9 | 18 | 7 |
| | £38 | 13 | 3 | | £38 | 13 | 3 |

Audited and found correct,

WILLIAM GRAY.

# Belfast Naturalists' Field Club.

FIFTH SEASON, 1867-8.

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George Donaldson, Academy Street
Samuel M. Dill, Fisherwick Place
John Darragh, Museum
Robert Day, Cork
William Hooker Ferguson, Botanic Gardens
James Forgan, Botanic Road
J. W. Forrester, Windsor Terrace
Michael Fitzpatrick, The Cottage Ballynafeigh
Wm. Gray, Office of Public Works
Rev. John Grainger, M.A., Blackrock
Miss Greer, Henry Street
George C. Hyndman, Howard Street
H. Greenhill, Wilmount Terrace
Mrs. Greenhill, Wilmount Terrace
W. H. Greer, Newtownards
Alexander Hunter, Northern Bank
John S. Holden, M.D., Glenarm
Henry Holden, Holywood
W. H. Greer, High Street, Belfast
John Harbison, Newtownards
A. F. Herdman, J.P., Chichester St.
Miss Sarah Herdman, Donegall Sq. South
William Hancock, Carlisle Street
Alexander Hall, Mountpleasant
H. S. Harland, Sydenham
Miss Anna Sophia Henderson, Windsor
James Henry, Crumlin Road
Professor Hodges, M.D. Mountcharles
Miss M. S. Hodges, Mountcharles
Dr. Hill, Ulsterville
Harry Hardy, Howard Street
Thomas Hunter, Holywood
W. D. Henderson, Victoria Street
Miss Johnston, Dalriada House
H. H. Jamieson, Waring Street
Dr. Keown, Dundela Terrace Sydenham
Henry Knight, Falls Road
Rev. J. A. Kerr, A.B., Whiteabbey
James Kindall, Victoria Street,
John Love, Donegall Square West
W. W. Lamb, Devis View
Miss Lamb, Devis View
Alderman Robert Lindsay, J.P., Sans Souci
Miss Lindsay, Sans Souci
John M'Crea, M.D., Alfred Street
Wm. MacMillan, Regent Street
Thomas M'Clure, J.P., Belmont
Miss M'Clure, Belmont
Dr. Wm. Macormac, Howard Street
John Mackenzie, Malone
Joseph J. Murphy, President Belfast Natural History Society, Oldforge

J. W. Murphy, Stranmills
George M'Auliffe, Whiteabbey
Daniel M'Kee, Adela Place
Robert M'Kee, Adela Place
Rev. Wm. M'Ilwaine, A.M., Windsor
Greer Malcomson, Shamrock Lodge
James Mortimer, Donegall Street
Hugh Morrison, jun., Trinity Street
Alderman William Mullen, J.P., Willowvale
Alexander Moore, Prospect Terrace
William Mackey, Windsor
John Musgrave, Drumglass, Malone
John Miller, Lisburn
Miss Miller, Lisburn
T. M'Ilroy, I.N.S., Belfast North
Wm. Miller, Institution Place
Robert Patterson, F.R.S., College Square North
Wm. H. Patterson, Dundela Terrace
David C. Patterson, Holywood
Thomas Plimmer, Bangor
William H. Phillips, Lemonfield, Holywood
George Phillips, Sydenham
Francis Ritchie, Mountpottinger
Malcolm Ritchie, Mountpottinger
Miss Robinson, Thorndale
R. Ross, M.D., Wellington Place
Wm. A. Robinson, Donegall Square
Hugh Robinson, Donegall Street
Ninian Robinson, Donegall Street
Philip F. Richardson, Knock
R. S. Smyth, Londonderry
Wm. Swanston, University Street
Miss Mary Swanston, University St.
Samuel Symington, Landscape Terrace
S. Alexander Stewart, North Street
Robert Smith, Hughes's Buildings
George K. Smith, Whiteabbey
Wm. S. Simpson, Crescent
William Scott, Prince's Dock
J. Stelfox, jun., Gasfield House
John Shelly, Whiteabbey,
Wm. Shepherd, Holywood
Bryce Smyth, B.M.
A. O'D. Taylor, Murray's Terrace
Ralph Tate, F.G.S., A.L.S., London
Professor Wyville Thomson, LL.D., &c., Queen's College
Professor James Thomson, C.E., Queen's College
Miss Thomson, University Square
Henry Thomson, Windsor
Mrs. Thomson, Windsor
Robt. K. Tomlin, University Square
Alexander Threlkeld, Botanic Road
George Thomson, Woodburn
Jas. W. Valentine, Fortwilliam Park
William Valentine, J.P., Glenavna
Thomas Workman, Windsor
T. K. Wheeler, Clarendon Place
John Ward, Hillbrook, Holywood
Robert Workman, B.A., Windsor
Edward Weldon, Linen Hall
E. Wren, Model School
H. J. Wright, Donegall Street
T. R. Walkington, Sydenham
W. Wylie, Mountpleasant
Robert Young, C.E., Richmond
Samuel Young, Roselands, Belfast

# Belfast Naturalists' Field Club.

## FIFTH YEAR.

THE COMMITTEE offer the following Prizes, to be competed for during the Session ending March 31, 1868 :—

| | | | | | |
|---|---|---|---|---|---|
| I. | For the Best Herbarium of Flowering Plants,... | ... | £1 | 0 | 0 |
| II. | For the Second Best, do., ... ... ... | ... | 0 | 10 | 0 |
| III. | " Best Collection of Mosses, ... ... | ... | 0 | 10 | 0 |
| IV. | " Best do. Seaweeds, ... ... | ... | 0 | 10 | 0 |
| V. | " Best do. Ferns, ... ... ... | ... | 0 | 5 | 0 |
| VI. | Best Collection of Cretaceous Fossils, ... ... | ... | 0 | 10 | 0 |
| VII. | Do. Liassic do., ... ... | ... | 0 | 10 | 0 |
| VIII. | Do. Palæozoic do., ... ... | ... | 0 | 10 | 0 |
| IX. | Do. Marine Shells, ... ... | ... | 0 | 10 | 0 |
| X. | Do. Land and Fresh-water Shells, ... | | 0 | 10 | 0 |
| XI. | Best Collection of Archæological Objects, ... | ... | 0 | 10 | 0 |
| XII. | Mr. Plimmer offers a Prize of 10/6 for the Best Collection of any or all the above, collected at the Excursions or Field Meetings of the year. | | | | |

All Collections to be made personally during the Session, within the Province of Ulster. Each species to be correctly named, and locality stated. The Flowering Plants to be collected when in flower, and classified according to the natural system. The Prizes to be in books, or suitable scientific objects, at the desire of the successful members.

## SPECIAL PRIZE.

Professor James Thomson, Chairman of the Club, offers a Prize, open for competition to all members of the Club, for the best satisfactory exposition of any way in which flint flakes can be made, having all the special features of configuration which are remarkable for their frequency of occurence together in the same flake among the Toome flakes already well known to the Club, and called unwrought flakes, and among similar ones found at Belfast. The Prize to be ONE GUINEA, if the best candidate shall exhibit to the Club the making of such flakes without the use of

metallic tools, or of any tool, implement, or means, other than that what could be available to savages unaided by civilsation ; and to be half a guinea if the best candidate shall exhibit the making of them by aid of steel tools, or in any way whatever.

## THE FOLLOWING EXCURSIONS HAVE BEEN ARRANGED FOR THE SESSION.

On first week of June to TOOME BRIDGE.
On third week of June to CUSHENDALL and CUSHENDUN, by the Coast Road.
On second week of July to PURDY'S BURN.
On first week of August to WOODBURN WATERWORKS.
On third week of August to CASTLE ESPIE.
On second week of September to DOWNPATRICK.

Due notice will be given to the members as to the day and object of each Excursion ; and the members are invited to avail themselves of the arrangements to be made at each meeting for giving information to inquirers.

W. H. FERGUSON, } HON. SECS.
WILLIAM GRAY, }

BELFAST, 1*st May*, 1867.

# FIFTH ANNUAL REPORT

OF THE

# BELFAST NATURALISTS' FIELD CLUB:

WITH

# STATEMENT OF ACCOUNTS,

AND A

# LIST OF THE OFFICE-BEARERS AND MEMBERS,

FOR THE YEAR ENDING 31ST MARCH, 1868.

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BELFAST:
PRINTED BY PHILLIPS AND SONS, BRIDGE STREET.
1868.


BRITISH MUSEUM
NATURAL HISTORY

# RULES

OF THE

# Belfast Naturalists' Field Club.

I.

That the Society be called "The Belfast Naturalists' Field Club."

II.

That the objects of the Society be the practical study of Natural Science and Archæology.

III.

That the officers of the Club be a Committee of twelve members, a Treasurer, and two Secretaries. The Committee, on their first meeting, will appoint a Chairman to preside at their meetings.

IV.

That every candidate for membership shall be proposed and seconded at any meeting, and, on paying the subscription, become a member.

V.

That the subscription be Five Shillings per annum, payable in advance.

VI.

That the members of the Club shall hold at least six field meetings during the year, in the most interesting localities, for investigating the Natural History of the district. That the place of meeting be fixed by the Committee, and that eight days' notice of each Excursion be communicated to members by the Secretaries.

VII.

That fortnightly meetings be held for the purpose of reading papers; such papers, as far as possible, to treat of the Natural History and Archæology of the district. These meetings to be held during the months from November to April, inclusive.

VIII.

That the Committee shall, if they find it advisable, offer for competition Prizes for the best collection of scientific objects of the district. The details of this Rule to be left to the discretion of the Committee for the time being.

IX.

That the Annual Meeting be held during the month of April, when the Report of the Committee for the past year, and the Treasurer's Financial Statement, shall be presented, the Committee and Officers elected, Bye-laws made and altered, and any proposed alterations in the general laws, of which a fortnight's notice shall have been given, in writing, to the Secretaries, considered and decided upon.

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NOTICE TO MEMBERS.—*The* TICKET OF MEMBERSHIP, *accompanying Treasurer's receipt for the Annual Subscription, entitles the holder to free admission to the Museum of the Natural History Society.*

# THE FIFTH ANNUAL REPORT

OF

# The Belfast Naturalists' Field Club.

SINCE the Annual Meeting, held on the 18th April last year, the numerical strength of the Club has been considerably augmented, the number of Members now enrolled being 156. This increase is chiefly due to the growing popularity of the Club, and the interest excited by the Summer Excursions and the Annual Conversazione. This success, it is to be hoped, may also be considered as a proof that the Officers of the Society have efficiently discharged their duty.

The following places were visited by Members of the Club during the past year:

| | | |
|---|---|---|
| Toome Bridge and Church Island, | ..... | on the 1st June. |
| Cushendall and the adjoining Glens, | ..... „ | 19th and 20th June. |
| Mr. Valentine's Fernery, at Whiteabbey, and the Duncrue Salt Mine, | ..... „ | 20th July. |
| Purdy's Burn, | ..... „ | 3rd August. |
| Castle Espie and Reagh Island, | ..... „ | 24th August. |
| Downpatrick, | ..... „ | 28th September. |

During the Winter Session the following Papers were read at the ordinary meetings of the Society:

5th Dec., 1867.—"Notes on the Remarkable Discoveries of Eugene Conwell, Esq., M.R.I.A., in the Megalicthic Chambered Tumuli, on Slieve-na-Caillighe, Co. Meath," by Mr. G. V. Du Noyer, M.R.I.A.

19th Dec.—"Scientific Nomenclature," with some suggestions for its improvement, by Rev. W. M'Ilwaine, D.D.

30th Jan., 1868.—"Notes of a Visit to the Peak of Derbyshire," by Mr. W. H. Patterson.

On 13th February, a Meeting was held for the Exhibition of Microscopes and Microscopic objects.

27th Feb.—Three Papers were read, namely:

"A run through Galway with a Vasculum," by Mr. S. A. Stewart.

"Vegetable Parasites," by Mr. W. H. Ferguson.

"A notice of recently observed Glacial Markings near Belfast," by Mr. William Gray

12th Mar.—"The Isle of Wight: its Natural History, History and Advantages as a Health resort," by Mr. H. Knight.

20th Mar.—"A Gossip about Old Belfast," by Mr. J. W. Forrester.

16th April—"The Iron Mines of Antrim," by J. Holden, M.D.

A detailed account of the Excursions, and abstracts of the Papers read before the Society, is appended.

Your Committee desire to acknowledge the kindness of the Council of the Natural History Society, in having granted the Club the use of the Rooms at the Museum, for the past Session, upon very moderate terms, as heretofore, and hope that circumstances will allow the continuance of those arrangements so favourable to the interests of your Society.

Your Committee would again remind the Members, that one of the chief objects of the Club is to cultivate Scientific observation, and to record its results; and that every member should consider himself and herself bound to bring before the meetings of the Club, either verbally, or in the form of a short Paper, such information as they may from time to time acquire, in the several branches of study, which it is our province to investigate.

This year there were two competitors for the Prizes offered by the Club for collections. The Prize for the best collection of Cretaceous Fossils was awarded to Mr. Swanston, who collected, during the year, 61 species and 4 varieties*; and the Prize for the best collection of Marine Shells was awarded to Mr. Donaldson, who collected 126 species.

Considering the excellent opportunities existing in the neighbourhood of Belfast for making those collections, your Committee

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* In awarding this Prize, the Judges desire to state that Mr. Swanton's collection not only deserves the award as a good representative of the local Cretaceous Fanna, but also merits special commendation for elegance of arrangement.

are of opinion that very many more collections might be made, with direct advantage to those who engage in the work, and with no small aid towards the advancement of Science.

Your Chairman, Professor James Thomson, C.E., has kindly offered a special Prize for the best satisfactory exposition of the way in which Flint Flakes can be made. This Prize will be adjudicated upon at this meeting.

The Treasurer's report shows a balance of £4 18s. 8d. to the credit of the Club.

Arrangements have been made for the Annual Conversazione, which your Committee, now retiring from office, must leave to their successors to carry out.

W. H. FERGUSON.
WILLIAM GRAY. } Hon. Secs.

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## THE SUMMER EXCURSIONS.

On Saturday, 1st June, the Excursion Season was opened, by a trip to Toome Bridge, on the River Bann. A number of ladies and gentlemen left by the Northern Counties Railway, and reached Toome a little after eleven o'clock. Having employed some of the flat bottomed boats of the place, they proceeded to Church Island, in Lough Beg, and examined the ruins of the church, the old graveyard, and the "Rag Tree." The latter had a great number of rags of all kinds tied to its branches, the votive offerings of the faithful who came to pray around a curious stone, with a hollow, or sort of well, on its surface, beneath the shade of the Rag Tree. The party returned to Lord O'Neill's cottage, beautifully situated on the river bank, but utterly deserted. Art seems long ago to have ceased its efforts to beautify the place, but Nature has asserted its sway, and more than makes up for the neglect around. A brisk walk brought the party again to Toome bridge, and they examined the locality where the flint flakes occur in such large quantities; they are found in the bed of the river, at the point where the lower Bann leaves the Lough, and over a deposit of peat; they are

very well formed, and are sharper than those found at Larne, &c. From the number of celts and other implements found with them, it is supposed that this must have been the site of an ancient manufactory of flint weapons. The members and friends also examined the weirs where the Toome eels are captured by the ton; for the Belfast, Liverpool, and London markets. The district is also remarkable for the extensive deposit of fossil earth that occurs there, extending over several square miles, and is several feet thick; yet it is made up of the silicious frustules of Diatomaceæ, *Gaillonella*, *Surirella*, &c., &c.; when properly prepared, it makes beautiful slides for the microscope, and specimens of it are found in every microscopic cabinet. The day was all that could be desired, and the few botanists of the party had nothing to hinder their rambles through woods and fields. This district is well known in botanical circles as yielding many plants of exceeding rarity, and on this occasion several of these species were found. Here is the only station in Great Britain for the hoary sedge *(Carex Buxbaumii)*, and even here it occupies only a few square yards. It is almost a pity that it should be so scarce, it being, perhaps, the most elegant of our sedges. Those who dread the extinction of our rare native plants need not be apprehensive on account of the visit of the Belfast Field Club to Toome—only two specimens of this rarity were brought away as *souvenirs* of an interesting excursion. Many other species of carex were observed in full flower, including the hoary sedge *(Carex curta)*, and the tufted sedge *(Carex stricta)*.

The Northern bed-straw *(Galium boreale)* was found just coming into flower, and also the spindle tree *(Euonymus europeus)*, once prized on account of the toughness of its wood. The purple sandwort *(Lepigonum rubrum)* was gathered on the shores of Lough Beg, only two other stations have been previously recorded for this plant in Ireland; growing along with the sandwort was *Leontodon taraxicum var. palustre*, a scarce form. A search over the extensive peat bog close to Toome brought to view the tiny, thread-like stems and elegant crimson flowers of the cranberry *(Vaccinium oxycoccos)* here occurring in abundance, and here also was found the crowberry *(Emptrum nigrum)*, called in the vernacular of the district "monnox

heather." The berries of this species, which only ripen in autumn, were found to be in some cases already well formed. In the moors of North Britain, where the crowberry is produced in profusion, its fruit affords a coveted food for the grouse and ptarmigan, as well as for the bird whose name it bears. Though used in several ways by the people in sub-Artic regions to supplement their scanty list of luxuries, it is little valued by those more favourably situated. It is said to be productive of headache and other unpleasant consequences when used.

Many plants of less note were obtained, and, had the season been further advanced, several other botanical rarities might have been collected. As it was, however, the results were eminently satisfactory.

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## EXCURSION TO CUSHENDALL,

*On Wednesday, 19th June.*

Last year this excursion (fully described in the last report) gave such general satisfaction, it was again selected for this year's programme, and was conducted with equal success. The weather for the two days was as fine as it was possible to desire it, and the programme of arrangements made by the stewards was equally interesting. The party was conveyed by a special carriage on the Northern Counties Railway to Larne. Here Mr. M'Neill had a well-horsed van in readiness, and, starting soon after eleven o'clock, the party took the entire day to examine the several points of interest along the road, particularly the various geological sections exposed, and which clearly illustrate the geology of the North-East of Ireland. Several formations were examined *in situ*, including the New Red Sandstone, the Lias, Greensand, Chalk, Trap rock, and Tertiary gravels in several localities. From those beds the ladies as well as the gentlemen of the party collected some very good specimens of the characteristic fossils. Some vertebræ, bones, and other Saurian remains were collected from the Lias near Glenarm; and some very good specimens of the *Lima gigantea* were obtained at Waterloo, near Larne. The party arrived at the Glens of

Antrim Hotel, Cushendall, for dinner, at about seven o'clock, and during their stay at the hotel, Mrs. Martin, the hostess, with her usual attention, did all she could to promote the pleasure and secure the comfort of her visitors. After breakfast, next day, a special two-horse van was engaged to convey the party to Glendun; and some time was spent in the enjoyment of its magnificent scenery. Nothing could surpass the beauty of this locality. Along the mountain slopes the members of the club collected a good number of ferns, and found the *Lastrea Oreopteris* in great profusion. Several dozen plants of the latter were stowed away in the car, to the astonishment of a native, who exclaimed—"I will gie a poond to ony on' who will rid yon field of the dirty brack'n." Having returned to the hotel for lunch, the party again set off for Glenariff, when several other specimens were added to the collection. With a most beautiful evening, a comfortable conveyance, and a thoroughly gratified company, the drive home was rendered very agreeable, and, arriving in good time for the train at Larne for Belfast, the party were soon safely landed at the Belfast station, where they separated until the next field day.

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## EXCURSION TO Mr. VALENTINE'S FERNERY AND THE DUNCRUE SALT MINES,

*On Saturday, 20th July.*

A good number of members and friends having assembled at the Bank Buildings, left town, and drove along the Antrim Road, so as to trace the course of the New Water Works. The numerous terraces, villas, parks, and pleasure grounds that line the Antrim Road, and which seem to grow with marvellous rapidity, tend to make this one of the most fashionable outlets of the town. The bluff cliffs of Cave Hill shelter it from the north, and, with its planted slopes, add considerably to the charm of the landscape towards the south. The magnificent view over the lower road, the Castle of Carrickfergus, the towns of Bangor, Holywood, and the numerous residences that line both shores, unite to form a scene of the rarest beauty, which is best

seen from the head of Carnmoney Valley. At this point of the road the party alighted to examine the Whitewell spring, which was our best supply during the recent water famine. This spring is one of many that arises from a formation known as the Greensand; indeed it is worthy of remark that nearly all, if not all, the springs that occur along the slopes of the hills from the Woodburns to Belfast come from this Greensand bed, which underlies the chalk, and rests upon the Lias marl or shale. Unfortunately the bed dips northwards, otherwise it would afford a very large supply of water all along the escarpment of the hills. Still the present yield might be greatly increased by cutting into the bed, and driving galleries in different directions over the Lias shale.

Passing the Carnmoney River, the party went down Carnmoney Valley to Whiteabbey, and visited the beautiful grounds of Glenavna, the residence of W. Valentine, Esq., J.P. Mr. Valentine, as a member of the club, received the party most courteously, and conducted them through his place, explaining every point of interest—the rosery, rustic bridge, rockery, ponds, and fountains. Every visitor was delighted with the arrangement of the grounds, and the tasteful disposition of the various ornamental trees and shrubs in every direction. Amongst these the golden arborvitæ (*Thuja aurea)* claimed much attention, as well as several specimens of the *Cupressus macrocarpa, Picea nobilis*, and *P. nordmanniana*, all of which were in excellent condition. But the most interesting point of all was the fernery, which is a masterpiece of taste and skill. It occupies a site of about fifty feet square, and is approached by a serpentine grotto; being the effect on entering that of a ruined abbey, where foliage supplanted drapery, and Nature triumphed over art. The strange hue of tempered light, the bright red sandstone of its rocky arches contrasting with the delicate green of its varied plants, is most pleasing and grateful to the eye; while its shady nooks, and caverned recesses, refreshed by the spray of jets and fountains, and the falling water of its miniature cataract, make it the very home of ferns, lycopodiums, and mosses, which are here in endless variety—the tiny, filmy fern of Killarney, and the gigantic tree fern of New Zealand; our own Royal Fern, and the *Woodwardia radicans* of Japan—all healthy and

vigorous, in the full enjoyment of the very conditions best suited to their growth and development. In the centre of the building is a unique fountain, called a "ferndelabrum," combining a jet d'eau with convenient nitches for growing ferns; and the rockery is composed of Red sandstone from Dundonald, and Greensand from Cave Hill.

The party were with difficulty withdrawn from the attractions of the fernery, more particularly the winding gallery of rocks, from which the best view of the whole is obtained. Leaving the fernery, they entered the house by the conservatory; and, having partaken of refreshments, kindly provided by Mrs. Valentine, they drove off to the salt mine at Duncrue. It is not always that searches for coal are rewarded like Lord Downshire was for his search at Duncrue: expecting coal, he some few years ago sunk a shaft for the purpose, and, to his surprise, came upon a bed of rock salt of great commercial value. Salt generally occurs in isolated irregular patches in the New Red sandstone, the formation so largely developed at Belfast and around the margin of the Antrim trap rocks. Several attempts have been made near Carrickfergus to reach salt, as yet without success. At Duncrue the principal bed occurs at a depth of about six hundred feet, and affords constant employment for about forty miners. The greater number of the hands were left work when the members of the Naturalists' Field Club visited the mine, but owing to the kindness of one of the directors, W. Valentine, Esq., J.P., every preparation was made for a descent, and a party of about sixty, including twenty ladies, availed themselves of the opportunity, and were let down some 620 feet, three at a time, in a bucket, and only laughed at their fears when they were landed below. Having expected to get into a dark, confined, and dirty wet pit, they were agreeably surprised to find a most extensive series of lofty chambers, extending in every direction for hundreds of yards, and from fifteen to thirty feet high. Mr. Valentine had the whole place thoroughly illuminated for the occasion. Lights were fixed all round the sides of the mine, and on the great square columns of salt that supported the roof; and a succession of coloured lights, crackers, Roman candles, and other fireworks combined to produce the most magical effect. The arrival of each group of friends by the down shaft was

announced by enthusiastic congratulations, and the whole scene was one of the greatest animation and novelty. A large number of gunpowder explosions were prepared to exhibit the mode of winning the salt, and at every discharge—sometimes eight or nine blasts at a time—the reverberations through the mine were awfully grand, surpassing the fiercest cannonade of artillery, and, continuing for several minutes, died away in panting throes, like the rumbling echoes of distant thunder. After one of those discharges the members of the club were called together under the presidency of Professor James Thomson, C.E.; and John Miller, Esq., of Lisburn, moved a vote of thanks to William Valentine, Esq., for his kindness and attention to the members and friends of the club during the day, and having been seconded by Charles Bagnell, Esq., C.E., Castle Espie Works, it was passed by acclamation, and the most enthusiastic cheers were given to Mr. and Mrs. Valentine, and the best wishes expressed for the success of the Salt Mine Company. Under the guidance of the good-natured foreman of the pit, the ascent was as safely accomplished as the descent, and the party left the mine thoroughly gratified with their visit.

## EXCURSION TO PURDY'S BURN,

*On Saturday, 3rd August.*

On this occasion a large van was engaged to convey the members and friends to the demesne of Purdy's Burn, visiting other points of interest *en route*. The first halt was called at the Gas Works, for the purpose of examining a very large excavation now making, intended for a gasholder, capable of containing about a million cubic feet of gas. The excavation exposes a very good section of the tertiary beds of the locality, which are here about 18 or 20 feet thick, and rest upon the New Red Sandstone ; the latter is also cut into a depth of about 10 feet, making a total of about 30 feet. The cutting is circular, and is about 160 feet in diameter. The earth is removed by barrows worked on a very novel and ingenious plan: the runs are almost perpendicular down the sides of the excavation, yet the barrows of earth are wheeled up the

runs with ease—a chain being fastened to each, which is drawn by a horse on the level bank above. The geological structure of a district invariably affects its architecture, and hence the tertiary beds here exposed, and which occupy a considerable area around Belfast, influences to a very great extent the character of our architecture. In the absence of stone—at least, proper building stones—this tertiary formation yields the clay for making bricks, of which the bulk of Belfast buildings are constructed; further on the road, the party had the very best opportunity of seeing the process of manufacture. On the hill above Ormeau Bridge there is a regular colony of brickfields. Mr. Moore's works were selected, as his name seems to be invariably associated with the "perforators," and the party were anxious to see how they were turned out. The foreman conducted them over the works, and explained "all the latest improvements," the foremost of which was the new kilns on Hoffman's principle, by which bricks can be better burned, with less fuel, and with greater rapidity than by any other process. There is no heat lost; the fire is kept up night and day; and, as each kiln of bricks is burnt, the heat is transferred to an adjoining one; and thus the fire travels from one chamber to another in a circle, each becoming filled, burnt, and cooled in turn. Leaving Mr. Moore's extensive brickworks, the party drove to Purdy's Burn through Newtownbreda. Having walked through the grounds, they were shown over the gardens and pleasure-grounds, which were in excellent condition. The most remarkable feature in the gardens were the fine old yew hedges which, it is said, were old in Cromwell's time; they are, therefore, more worthy of veneration than admiration. Passing through the grounds, the party had a smart walk to the ever-interesting neighbourhood of the Giant's Ring—all the more interesting because so little is really known of the origin of those structures that here attract the attention of the antiquary, and call forth so many learned, but still unsatisfactory, diquisitions. The persistency of Nature's operations furnish some data for successful speculation, but the strange vicissitudes and varying fortunes of the human family only multiply the difficulties of historical research. Strange that such structures as this cromleac at the Giant's Ring should be found all over the world—in Chinese Tartary, India, and Africa, and yet we cannot ascertain with certainty

their object or their use. After spending a very agreeable afternoon, the ladies and gentlemen of the party drove home to town by Shaw's Bridge and the Lisburn Road.

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## EXCURSION TO CASTLE ESPIE AND NEIGHBOURHOOD,

*On Saturday, 24th Aug.*

Proceeding to Comber by railway, cars were then engaged to convey the party to and from Castle Espie. The country looked beautiful, and the several tidy farm-steadings along the route, nestling amid surrounding crops, seemed smiling in the anticipation of an abundant harvest. Arriving at the extensive lime-works at Castle Espie, the party examined the kilns, quarries, and new works in progress. The Mountain Limestone occurs here below the New Red Sandstone, and lies uncomformably on the Silurian rocks of the County Down. Though not hydraulic, it is, nevertheless, valuable for the manufacture of lime, and, being the only outcrop within an extensive area, has to supply a considerable demand. It is capable also of being largely employed as a building-stone, and for many ornamental purposes, for which its durability, texture, and colour admirably fit it. In the same locality deposits of sand and clay occur; the latter does not seem to be available for pottery of any kind, but answers very well for the manufacture of bricks and tiles. The zone of the Carboniferous system represented here by the limestone, is too low for the occurrence of the fireclay or ironstone of other localities; but the extensive buildings and machinery erected by Messrs. Murland will be fully employed in developing the capabilities of the other materials above mentioned. Besides the peculiar conditions under which the limestone occurs here, the locality is also interesting to the geologist as exemplifying in a remarkable manner the effect of glacial action. The limestone is covered by a considerable thickness of drift, sand, gravel, clay, and boulders, made up of materials principally carried by ice from the County Antrim during the glacial period. Even some of the fossils from the Lias of the coast of Antrim are found in this

accumulation of *débris*. A specimen of *Cardina ovalis*, common near Larne, was picked up in the drift at Castle Espie, and all those fragments are more or less scratched, grooved, and polished by the movements of the glaciers. The surface of the limestone, also, over which the glaciers passed, is scratched and polished in a similiar manner—all the scratches being in the direction of the moving glaciers. Several good hand specimens exhibiting these phenomena were procured. It would be very desirable if good large specimens could be deposited in the Belfast Museum and Queen's College. Leaving the Castle Espie works, the party visited several of the Islands that occur in Strangford Lough. On Reagh Island a gravel deposit was examined, and a large quantity of the well-known flint-flakes were collected—indeed the fields were full of them over an extensive area. The deposit in which they are found is not the same as the true drift of Castle Espie, but seems rather to be a raised sea beach. Passing the question as to whether these flint flakes are natural or artificial, it is evident that this district all round Strangford Lough was the scene of some of the earliest events of Irish history. Here on a now lonely island stand the last remnants of one of our famous round towers, protected by the overshadowing arms of friendly ivy, and around its base lie the scattered fragments of forgotten buildings. The beautiful landscape, varied by the broken outline of the Lough, and enriched by scattered islands, rounded hillocks, and cultivated farms, was once the battle-field of contending chieftains, when Sir John de Courcy, in 1177, struggled for the mastery of Ulster. The ruins of many of the twenty-seven castles with which he surrounded Strangford Lough still remain, as witnesses of the zeal with which he executed his mission. Sketrick, and Mahee Castles were visited by members of the club, and sketches taken of both. Interesting as the excursion was to the geologists and archæologists, it was not less so to the botanists, who added to gatherings, formerly reported, specimens of a rare bramble *(Rubus thyrsoideus)* not hitherto recorded as occurring in County Down; and at Ardmillan was found one of the rarer species of smokeworts *(Fumaria pallidiflora)*, hitherto supposed to be a plant mainly of the South of England, but collected by members of the club last summer on the occasion of their visit to Cushendall. On the muddy wastes

of the shore at Drum Hill, near Castle Espie, were found the elegant and lasting flowers of the sea lavender *(Statice bahusiensis)*. The winding shores of the Lough and its numerous islets would doubtless repay a more extensive examination by the persevering botanist. After enjoying a most agreeable day, the whole party returned to town by the 5.22 train.

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The year's series of Excursions was brought to a close, by an

## EXCURSION TO DOWNPATRICK AND NEIGHBOURHOOD,

*On Saturday afternoon, 28th September.*

THE party left town by the 1-40 train, and were rewarded by as beautiful and pleasant an afternoon as they could have desired. They were received at Downpatrick by Thomas Galway, Esq., Secretary of the Downpatrick Literary Society, and a deputation of four or five other members, who did all in their power to entertain their Belfast friends, and conduct them to the various places of interest in the locality. Having engaged cars, the party went first to visit the fine old Cathedral, one of the few of the ancient ecclesiastical edifices of Ireland still used for its original purpose, after surviving the vicissitudes of more than fourteen hundred years. It was one of the many Christian buildings erected soon after the landing of St. Patrick at Ringbane headland, County Down, in the year 432. It frequently suffered during the ravages of the Danes from 940 to 1111. It was enlarged and dedicated to the honour of St. Patrick, by the pious zeal of Sir John de Courcy, and Bishop Malachy III., soon after the former made himself master of that part of Ulster. It was subsequently burned by Edward Bruce, in 1316, previous to his being crowned King of Ireland at Dundalk. Having been improved and beautified by Tiberius, Bishop of Down, it was again destroyed by Leonard, Lord Gray, Lord Deputy of Ireland, who converted the Cathedral into a stable. Several efforts were afterwards made to repair it, but it was not finally restored until 1789, by the Earl of Hillsborough and the Very

Rev. William Annesley, the then dean. A few years ago it was again thoroughly repaired, and made suited to the wants of the present age; and now, with modest architectural pretentions, it stands a monument of the piety and liberality of successive ages. It would be honourable to the nation if the same could be said with reference to Cashel, Holycross, Muckross, Greyabbey, and many other noble piles now in ruins, and some of which are suffering from neglect. Having been shown through the Cathedral, several remains of former architectural ornaments were pointed out, all mutilated and destroyed, including images of St. Patrick, St. Briget, and St. Columb, and even a fragment of one of Ireland's old crosses. All these may be considered just representatives of the period when the old Puritans endeavoured, as Swift said, to "chisel Popery out of the very stones." It is to be hoped that this spirit is dead. Yet the carelessness with which those sacred memorials are treated is almost as bad as wanton destruction. Part of the old cross of Dromore is used as a base for a horse trough, and another portion of the same cross has within the last few months been built into the foundation of a dwelling-house. In addition to the statue of St. Patrick, his grave was also shown; he was buried here with St. Bridget, and St. Columb. There is no monument, stone, or other record. A large hole only marks the spot. From this hole the earth is constantly removed and carried to all parts of the country, where it is valued for its supposed healing and other virtues. The demand for the earth is sufficient to remove the entire grave many times over, and would probably do so, were it not that the grave is kept covered by earth supplied from other places. A similar superstitious demand and supply exist with reference to the sand of Banagher, County Derry, and St. Declan's grave at Ardmore, County Cork. One of the celebrated round towers of Ireland once stood within about forty feet of the western end of the Cathedral, but was taken down to prevent it falling on the Cathedral. If such danger was reasonably apprehended, which is doubtful, it is to be regretted that some portion of the tower was not left, if only sufficient to show that the entrance door was on a level with the ground line, which was a very unusual feature. Leaving the Cathedral, the party visited in an adjoining field the Dun or Moat of Celtain, from which probably Downpatrick

had its origin and name. This moat, the remnant of pre-historic time, is one of the largest in the kingdom, being nearly 900 yards at the base, with three surrounding ramparts. The south side, fronting the town, is about 90 feet high. How often has this witnessed the gathering of warlike men?—the old Irish chiefs, when resisting the inroads of the Danes, the heroic band who fought under the leadership of De Courcy, the bold Scots who followed the banner of Bruce, and the leaders of the many contests that subsequently occurred around its base.

Coming down the more gentle slope of the northern side of the moat the party assembled on the banks of the Quoile, and a boat having been provided by the kindness of the members of the Downpatrick Literary Society, all were conveyed across to visit the ruins of Inch Abbey, erected in the twelfth century by John de Courcy. A few of the lancet-headed windows still remain, which, with some mouldings, are characteristic of the architecture of that period. The ruins are now covered with ivy, and are surrounded by fine old ash and other trees. The detached blocks of masonry indicate the extent of the original building, and the great dimensions of the trees now growing *out of the masonry* show how long the building has been in ruins.

Recrossing the Quoile the party regained their cars and drove off for Slieve-na-Griddle, stopping by the way to examine Mearns' Well, and Saul Abbey. Near the latter a large sculptured stone, with 12th century ornaments, was noticed built into the yard wall of a roadside cottage. Near the road, at the foot of Slieve-na-Griddle, there occurs a good example of the so-called Druid's Ring. It is composed of large stones from the locality set on end, and placed so as to form a circle; at the north side, a double row for the length of 35 feet forms the entrance or passage to the ring. Such remains of antiquity should in all cases be properly enclosed to prevent injury by cattle. On the very top of Slieve-na-Griddle there is a large flat stone, supposed to be a cromlech, and although the time was very short, several members of the party had a run up to report upon it, overcoming the steep ascent, the rocky path, and the occasional barriers of furze. Their exertions were more than rewarded by the examination of the stone and the splendid view they obtained of the surrounding country. The whole sea coast could be traced from Strangford

Lough to the foot of Slieve Donard, and the country westward to Slieve Croob, and northward to Scrabo Hill. Descending the hill with accelerated speed, the party drove off to the celebrated Struell Wells. A considerable spring rises here, the water from which flows through four exceedingly rough small houses, each of which is supposed to possess certain virtues, and are most potent on the eve of Midsummer day. Then at midnight are collected from all parts crowds of the diseased in body and mind, who struggle promiscuously for first flow of the waters, and then adjourn to the adjoining "publics," under the vow of "We, won't go home till morning." The entire series of buildings are in the rudest and most dilapidated condition, even the room in which the pilgrims undress—when they can pay the fee demanded—is without a window, its roof is falling in, and the only seats provided are benches formed of stones from the roadside. Leaving Struell there was barely time to reach the station in time for the last train, so there was no time to visit the new and extensive Lunatic Asylum passed on the way. Owing to the advanced period of the year few good botanical specimens were to be expected; but, nevertheless, several scarce plants were observed. Near the old graveyard at Inch Abbey the Danesblood *(Sambucus ebulus)* grew profusely. It is usually found near old abbeys and graveyards, and is supposed to grow from the blood of the Danes. Although there can be no doubt that the Danes' blood was frequently shed here, the probability is that the plant was introduced. In the Quoile River, near the Abbey, the hornwort *(Ceratophyllum demersum)* was noticed growing in plenty, with several other aquatic plants of less note. The hornwort is an exceedingly rare species in this country; only some half-dozen localities have hitherto been recorded for it in Ireland, most of these being in the North. The rugged summit of Slieve-na-Griddle was rendered still more difficult by a profusion of the dwarf furze *(Ulex gallii)*, which was in full bloom. This species does not occur about Belfast, and is not known further north. The yellow toadflax *(Linaria vulgaris)* occurs abundantly in fields about the base of the hill. This plant, better known in the country by the suggestive name of "butter and eggs," is, like the last-mentioned, absent from the neighbourhood of Belfast. A visit to the banks of the Quoile and vicinity at an

earlier season, with more time at command, would, doubtless, well repay the botanical collector, and such a visit will be looked forward to with equal interest by the antiquarians of the Belfast Naturalists' Field Club.

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## ABSTRACT OF PAPERS READ DURING THE WINTER SESSION.

The Winter Session was opened on the 5th December, when a Paper was read by Mr. Geo. V. Du Noyer, M.R.I.A., entitled "Notes on the Remarkable Discovery by Eugene Conwell, Esq., M.R.I.A., of Sepulchral Megalithic Chambers in Ancient Tumuli on the Hill of Sleive-na-Caillighe, in the County Meath."

The paper was illustrated by a series of about 130 water-colour sketches of the various carvings on the stones forming the chambers.

Mr. Du Noyer remarked that Mr. Conwell's discoveries have increased our knowledge of the pre-historic remains existing in Ireland in a most remarkable degree, and his labours have tended to give an impulse to our inquiries in this hitherto much overlooked field of archæological research.

Our Scottish friends have for some years back been performing great deeds in rescuing from oblivion those pre-historic sculpturings either existing on pillar stones, or megalithic chambers, on the walls of natural caves, or on natural rock surfaces.

The publications of the Spalding Club, and those of the Society of Scottish Antiquaries, Professor Wilson, Sir James Simpson, George Tate, Esq., of Alnwick, and the late Duke of Northumberland, have given this subject a world-wide celebrity; yet so far but little has been done by us in this branch of our national antiquities at all commensurate with its ethnological value or the richness of its stores.

Mr. Conwell is desirous of publishing an exhaustive memoir on the pre-historic antiquities of the County Meath, but the funds of the Royal Irish Academy are so prescribed that a sufficient outlay for that purpose from them could not be obtained

to accomplish this much-desired object, and private subscription is too theoretical a basis to hope that from it such a substantial superstructure as he meditates could be erected.

The lecturer went on to say he hoped that the day is not very distant when a patriotic spirit like that evinced in Scotland will arise amongst us, and we shall have a society whose *sole object* should be the elucidation of our *pre-historic remains;* and he believed there is a field for research in Ireland in this respect of greater magnitude, richness, and importance than in any equal area in the whole of Europe.

Every facility was given to Mr. Conwell in his laborious researches by the lord of the soil, James Lenox Naper, Esq., D.L., of Loughcrew, who, acting on the advice of the agent, Charles W. Hamilton, Esq. (a gentleman well known to science), placed as much manual labour at Mr. Conwell's disposal as he might need, and the result was the exploration of a Celtic necropolis, in which the antiquarian tourist may now study a series of sepulchral remains, which, in point of magnificence, number, and quaint ornamentation, surpass anything of the kind as yet discovered in Western Europe.

When decorative carving, such as these sketches illustrate, is attempted by any semi-civilised people, as the builders of these sepulchral cairns must have been, we naturally expect to find amongst it some representation of objects commonly known or familiar to the builders, as well as indications of their particular kind of worship, and if they had a written language, some of its letters. With this view, if we allow some play to our imagination, we may suppose that the circle surrounded by short rays and enclosed in a circle represented the sun. The flower-like ornamentation, also enclosed in a circle, portrayed the moon, while the numerous dots and hollows indicated the stars.

It is remarkable that one of the groups of small hollows very closely resembled the constellation of the Plough or *Ursa Major*, when viewed at evening, the similitude to which would be perfect if we omit one dot in the centre of what would be the southern side of the constellation, and suppose that the most westerly star was placed much too far to the north.

With regard to letters, I find what I believe is a short Oghamic inscription; and this is a point the determination of which is of

the utmost importance, for up to the present the Ogham letter has been regarded as early Christian, while its occurrence here would lead to the belief that it was clearly Pagan.

With regard to the several subjects found by Mr. Conwell in the various cists, I shall mention but one. I allude to leaf-shaped flakes of bone formed of slices taken from the large bones of animals, on some of which was delicately engraved that peculiar grouping of parabolic leaves known to Irish antiquaries as the *trumpet ornament*—a pattern which, once seen, can never be forgotten or mistaken.

In the collection of the Royal Irish Academy there are the remains of several circular bronze dishes of the most exquisite workmanship, ornamented by *repousée* work of this pattern—each dish having a central hollow or cup.

The late Mr. Kemble, the well-known antiquary and Saxon scholar, informed me that this trumpet ornament was essentially Irish, and that it is never found on the Celtic bronzes discovered on the Continent, and he pronounces the design to be true *opus Hibernicum*. How interesting to find this very ornament so local, and yet so well known in its character on bone flakes from the cists of these Pagan burial chambers.

What are we to suppose from its occurrence amongst these remains? Is it that the fabrication of the most exquisite bronze pateræ and fibulæ is due to the builders of these rude pyramids, and that the use of bone, stone, and flint with unbaked pottery synchronised with that of this metal? Were the chisels used in carving the stones of these rude sepulchral chambers formed of bronze? It may be so; and the discovery of this peculiar ornament on the bone flakes buried in these rude rock chambers may aid in determining this interesting and yet undecided point in archæological research.

The lecturer concluded by these remarks:—"Such is the brief outline of one of the most interesting discoveries in the field of pre-historic Celtic research made in Ireland during the present century; and I regret to say, that in the course of a few succeeding years many of the marvellous remains of our pre-historic races, who peopled Ireland at a time long prior to the birth of our earliest traditions, will find their Nemesis from their neglect; and frail sheets of paper, which feebly record, either as a sketch

or a description, what was once in being, will alone remain to give to future generations an idea of what we were happily permitted to see before they lost all the beauty of their rude magnificence.

"Impressed with this suggestive thought, let us endeavour to aid in the mental development of those who will succeed us, by illustrating and describing these remains in a way worthy of their importance. Let it not be said that the intellect of the latter part of the nineteenth century, though highly scientific and practical, was exerted merely as a means of accumulating wealth, while the monuments of our pre-historic races were either wantonly destroyed or allowed to crumble to decay from a spirit based on mere utilitarianism."

A very interesting discussion followed the reading of the paper. The several speakers strongly urged the revival of the *Ulster Archæological Journal*, and, if possible, the establishment of a society in Ireland to publish sketches of our Irish antiquities, such as Mr. Du Noyer brought before their notice that evening.

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On the 19th December, a Paper was read on

## SCIENTIFIC NOMENCLATURE,

BY REV. W. M'ILWAINE, D.D.

THE Lecturer introduced his subject, by remarking that it embraced two species of knowledge, too frequently viewed separately, though in reality closely allied, viz., *Natural Science* and *Philology*, the latter having been of late properly admitted to the rank of a science. The advantage and importance of an ability to give expression to the knowledge possessed by an individual is apparent. Without this ability, no amount of acquired wisdom would be available for the instruction of others, but would exist in the mind of its possessor, often in the state of a chaos, unless stored therein, and issuing thence under the heads of a correct nomenclature. What was true of an individual case was applicable to any science generally, and proved the importance of correct scientific nomenclature.

In proof of the fact that much incorrectness existed under

this head, reference was made to the appointment of a committee from among the members of the British Association, at its meeting in 1842, embracing such names as those of Owen, Henslow, Jarrold, Darwin, and Westwood. A memoir was issued by this committee, pointing out the many defects which exist in the nomenclature employed in Zoology, and suggesting remedies.

Proceeding with his subject, he laid down some general positions, the first of which was, *that science ought not only to have a nomenclature of its own, but that this should be, as far as practicable, a universal one.* This consideration arose from the true catholicity of science. Scientific men formed a species of brotherhood, and were naturally led in consequence to adopt a language as universal as was attainable.

The *languages of Greece and Rome* were stated to be the proper vehicle of thought in this case, and several reasons adduced. The language of ancient Greece was the climax and perfection of the Japhetic tongues, and still lives in the productions of the poets and orators of that wondrously gifted race. Latin was its complement, and from its marvellous copiousness is peculiarly fitted to be the medium of philosophic thought and discovery. Its universality, like that of the Roman Empire at one period, is another great advantage.

The arguments of those who would substitute our own tongue, or that of Germany, for the learned languages, in science, were met by examples. Such terms in Botany, for example, as Endogens and Exogens, Cryptogamous and Phænogamous, Cotyledonous and Acotoledynous, Hypogonous and Epigonous, &c., while singularly expressive in their original state, if expressed in equivalent English terms would appear absurd, the English tongue being unsuited to the formation of such compound words.

The advantages of employing the languages of Greece and Rome for scientific purposes were next enlarged on. It forms a badge, so to speak, and an expression of the universality of science, and promotes the fraternity existing among men of science. Hence the manifest advantage of such works as Baron's *Novum Organon*, and Newton's *Principia*, being found originally in a Latin form.

Another advantage was found in the intimate relation and connexion existing between correct nomenclature and accurate

scientific knowledge. These are in a great measure correlative. If things are called by inappropriate or misapplied names, confusion of ideas is almost certain to ensue. The earliest recorded case of names assigned to objects was that of our first parent, who named the animals brought to him for that purpose by the Great Creator, and it was remarkable that even many of the letters of the Hebrew alphabet were borrowed from sensible objects, and in many cases bore a visible resemblance to them.

A further advantage from such a mode of scientific nomenclature was *the aid thus afforded to memory*. This was evidently in the mind of the great Danish naturalist, Linnœus, the leading idea in whose system of nomenclature was, that each object should be designated binomially, that is, by two terms, the one of which expressed the genus, and the other the species, to which it belonged. This is exemplified in the Linnœan classification of plants by means of their stamens and pistils, so well known. Cuvier adopted a similar system of classification in the animal kingdom, and with equal success.

If care be taken in the original choice of classical terms for scientific purposes, not only is the memory aided, but correct knowledge may be imparted. Examples of this may be found in such terms as *Volvox globator*, or *Phytelephas macrocarpa*.

In contrast to such properly chosen terms, several faulty methods of nomenclature were instanced and disapproved, as, viz. :—

1. *Names derived from persons.* In some cases such may be allowable, such as the well-known genus of plants named *Banksia*, from Sir Joseph Banks. In the family of the *Naviculeæ* we find a genus *Dickieia*, from our former townsman D. Dicky, and a species of the algæ named *Hincksia*, which we may tolerate, or perhaps approve, yet the practice, generally, should be avoided.

2 Names derived *from chance*, or formed from classical terms, in defiance of rule and custom. The well-known case of the flint boulders in the chalk formation, and such terms as Craxirex, Huhua, Yuhina, and Escholtz, not to mention such monstrosities, as—

*Chirostrongylostonos, Opetiorynchus, Brachypodioides, Thecodontosaurus, Enaliolimnosaurus, Crocodilocephalioides.*

3. *Hybrid names*, partly Greek and partly Latin, or compounds of any two diverse languages, such as *Dendrofalco*, *Gymnocorvus*, *Arborophilus*, *Flavigaster*, *Monoculus*, &c.

While strenuously advocating correct terminology, derived from classical sources, we should not attempt to discard from scientific use many terms which have become well established. Such are some which may be styled *Onomatopœic*, as *Pee-weet*, *Wet-my-Foot*, *Humming bird*, &c., which have become household words.

The Lecturer next proceeded to apply such general principles, by adducing some practical rules for the formation and employment of scientific terms, and, in so doing, strongly urged the necessity of at least an elementary knowledge of the classical languages forming a part of all popular education. This is by no means difficult of attainment, and should be placed within the reach of all.

By means of such an acquirement, scientific language, otherwise often nearly unintelligible and uninteresting, becomes a vehicle of instruction and delight. Examples of this may be found in such terms as *phanerogamic* and *cryptogamic*, in the vegetable kingdom; or *malacopterygii* and *acanthopterygii*, in the animal. To any one, even moderately acquainted with the languages whence such terms are borrowed, they are full of instruction, and readily explain themselves. A great many other similar terms were adduced as examples.

*Correct classification* in alliance with correct terminology is an absolute necessity, for the purposes of adequate scientific knowledge. A comparison of the divisions of mammalia, by Cuvier and Owen, respectively, was adduced to illustrate the incorrect nomenclature adopted by the latter, whose leading divisions, founded on the convolutions of the brain, are nearly all misnamed. These are the well-known *archencephala*, *gyrencephala*, *lissencephala*, and *lycucephala*, which present an example of singularly faulty nomenclature, founded, too, on an equally lax division.

An illustration of an equally correct division and nomenclature is to be found in Harvey's concise and beautiful division of Algæ in the Phycologia Britannica, where the three subclasses of *Melanospermeæ*, *Rhodospermeæ*, and *Chlorospermeæ*,

exactly comprehend and designate the *olive, red,* and *grass-green* sea weeds.

The Lecture was brought to a close by some useful remarks on the pronunciation of classical terms, and some rules for guidance therein, which the limits of this abstract prevent us from specifying. The fact of a difference in pronunciation existing in the English, Scottish, and Irish portions of our fellow countrymen was pointed out, and some valuable suggestions offered for the attainment of uniformity, much to be desired in the case.

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On the 30th January, 1868, Mr. W. H. Patterson read a Paper, entitled—

## NOTES OF A VISIT TO THE PEAK OF DERBYSHIRE.

Mr. Patterson, in giving some account of a visit to the peak district of Derbyshire, in the Spring of 1867, drew attention first to the physical characters of the country. The constant succession of picturesque hills and romantically situated dales, the emerald green verdure, and grey cliffs of the mountain limestone, present to the tourist an ever-changing variety of beautiful scenery. The geological peculiarities of the country render it one of the richest collecting grounds in the kingdom to the mineralogist and geologist, while, from the extent and variety of the flora of Derbyshire, the botanist would be amply repaid for the trouble of a visit. The county was early known to the Romans, who resorted to Matlock and Buxton for the use of the tepid mineral waters; and Roman remains, such as roads, camps, &c., are to be seen in different places. The student of pre-historic man will find interesting matter for his investigations in the stone circles and Celtic barrows on the moors and hill sides.

Mr. Patterson described his visit to the town of Buxton, with its crescent, baths, and fashionable promenades; the town of Bakewell, famous for its old Parish Church, founded before the Norman conquest, and interesting from the number of quaint and curious monuments, one of which is a recumbent figure in

alabaster of Sir Thomas Wendesley, in plate armour, who was killed at the battle of Shrewsbury in 1403. In one of the porches is a collection of upwards of fifty old tombstones, with sculptured crosses and other emblems, but without any inscriptions. These are supposed to belong to the thirteenth and fourteenth centuries.

Mr. Patterson described Haddon Hall, a large Elizabethean mansion, no longer inhabited, but kept in repair, the property of the Duke of Rutland. It is beautifully situated on the River Wye, and is a famous haunt of artists. Many romantic histories cling to the old walls of Haddon, which, at the time of the Domesday survey, belonged to Henry de Ferrars, of the family of the great Earls of Derby; afterwards was given by William the Conqueror to William Peveril, the famous "Peveril of the Peak." It afterwards belonged to the Avenalls, and finally passed into the possession of the families of Vernon and Manners.

Mr. Patterson next gave some description of Chatsworth, "the Palace of the Peak," with its park, woods, gardens, conservatories, fountains, sculptures, pictures, curios, all equally unrivalled. The master-pieces of art to be seen here would alone repay one for the trouble of a visit to Derbyshire.

The caverns for which Derbyshire is famous were next described by Mr. Patterson, three of which he visited: viz., Poole's cavern, near Buxton, and which has the advantage of being lighted with gas; the Blue John cavern or mine, from which the fluor spar, or *Blue John*, is obtained, of which the beautiful ornaments are made; and the great Peak cavern at Castleton, the entrance to which is in a deep gorge below the ruins of the square keep of Peveril's Castle. In exploring the two latter caves, the guides and visitors carry candles; and blue lights, pistol shots, &c., are fired at certain places to produce effects, which are sometimes very startling. In the Peak cavern, which is said to be a mile long, a river, sometimes seen and sometimes only heard, springs from the remote end, finds egress at the mouth of the cave, and flows through the village. The Blue-John mine is much more perpendicular;—the visitor descends from one great natural chamber to another by steps cut in the rock, sloping passages, or ladders. These caves are all in the limestone rock, and are more irregular in form than can be conceived. They are, of course, lined with stalactites, and the floor

heaped with fragments of rock, cemented by stalagmitic deposits. In some places the floor and roof almost meet, and in others the roof is so lofty that the candle-light fails to reveal it, and all that is seen is a great black, empty dome overhead.

It is right the Field Naturalists should know that these caves are all explorable by ladies, and that the guides are very attentive. At each cavern there is a printed tariff of the prices charged for admission.

Mr. Patterson described a visit to the Lead-Mining district of Sparrow Pit. Derbyshire is exceeding rich in the useful minerals, building-stones, marbles, &c. Mr. P. exhibited a number of specimens of these, together with Photographs of buildings, scenery, &c.

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On the 13th February, a meeting was held for the

## EXHIBITION OF MICROSCOPES, AND MICROSCOPIC SPECIMENS.

This meeting was well attended, and several of the members, including Rev. Dr. M'Ilwaine, Messrs. Wright, Anderson, Tomlin, and Gray, brought their microscopes, and a great variety of objects for exhibition. Mr. Gray also gave some practical illustrations of the several methods of mounting objects.

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On the 27th February, the following papers were read:—

[FIRST PAPER.]

## A RUN THROUGH GALWAY WITH A VASCULUM.

By Mr. S. A. Stewart.

In this Paper an account was given of a hasty botanical tour, made last Summer, in the County of Galway. The time occupied was four days, and the itinerary embraced Galway, Outerard,

Clifden, Roundstone, Ballinasloe, and Portumna. While proceeding on the railway to Galway, a list was made of the rare plants occurring in that county, which might be expected to be found in flower at that season. This list included thirty-three species. Specimens were shown to the members present, of fourteen of these plants, none of the remaining nineteen having been met with in this very hurried search. This most Westerly portion of the British islands has for a long period excited very great interest amongst naturalists; and in accounting for this interest, a brief sketch was given of the peculiar plants found there.

The "Run" had included an unsuccessful search for two species that have been lately added to the lists of British plants on the strength of specimens found at Portumna and Woodford. These plants—the Willow-Leaved Inula *(Inula salicina)* and the "Blue Grass" of North America *(Sisyrinchium anceps)*—appear to be of great rarity in the very restricted area in which they occur. Mr. Stewart was not satisfied with the evidence on which the plants in question had been admitted as indigenous, and thought it probable that both had been accidentally introduced, and had taken a slight hold on the soil. As to the *Inula*, it must be an exceedingly scarce plant. A whole day's search at Portumna did not suffice to procure a single specimen. The *Sisyrinchium* is a rather frequent plant of the Northern States of America, and it is not at all surprising that some American plants should accidentally be introduced and propagate here, seeing that the channels of communication between the two countries are so numerous. The North American flora contains many European species that have been casually introduced by emigrants, and per contra, we may expect to receive in exchange some American plants brought by returning emigrants. That the *Sisyrinchium* originated in Ireland by this means was more probable than the supposition that it was an ancient native that for ages had escaped the prying eyes of Irish and of British botanists. In accounting for the occurrence in the West of Ireland of an isolated group of plants that belong to the flora of the South-West of Europe, the reader accepted the theory of the late Professor Edward Forbes. Those who believe with Forbes hold that in times—pre-historic, but geologically speaking, recent—the

land was continuous from the West of Ireland to the North of Spain, across a large area where now rolls the Atlantic Ocean and the Bay of Biscay, and that the plants of the type known to British botanists as the "Hibernian" type are the remains of an ancient flora that once covered this area now depressed below the sea level. This period of depression, when the land connecting "Old Erin" with the Iberian peninsula was broken up, was also attended by a glacial climate, in which none but sub-alpine or hardy species could exist. Thus Ireland was originally clothed with vegetation of a type different from that which now adorns our country; and we owe it to the disruption of the land, and the rigorous climate that for a time prevailed, that so few species have survived to represent our original flora: that geological agencies have been very efficient in the diffusing or limiting of plants is undeniable: that the geological epoch antecedent to the present was in this country a glacial period is now well established. To glacial action we owe the main features in the contour of our landscape. That great fluctuations of sea-level have taken place is also past dispute. In our own locality it can be shown that since our valleys were scoped out, since our hills were fashioned into their present shape, the sea—now a thousand feet down below—rolled over the Cave Hill and Black Mountain. It has made its mark, and left its waifs to be seen by any who doubt. Forbes advanced no rash hypothesis. There is sufficient evidence of the geological movements on which he relied, and it may be assumed that they satisfactorily account for the so-called Hibernian type of plants found in Galway and the counties adjoining.

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[SECOND PAPER.]

## VEGETABLE PARASITES.

BY MR. W. H. FERGUSON.

THOUGH the general laws which govern the structure and economy of Vegetables be now tolerably understood, there are many deviations from them which offer to the philosophic botanist subjects peculiarly worthy of his study and investigation. Perhaps the most striking exceptions to the prevailing laws are to

be found in the tribe of parasitic plants, whether they be Phænogamous or Cryptogamous. True Vegetable Parasites are plants which not only grow upon others but live at their expense, and those belonging to the flowering division may be divided into two sections: 1st. Those having green foliage; and, 2nd. Those destitute of green foliage. Of Flowerless Parasites, the most important are the various Fungi, such as "dry-rot," "blight," "smut," "ergot," "mildew," and "potatoe disease." The actions of these lower forms of vegetable life are not well understood; we can understand and have control over the higher organised forms, but the lower are often incomprehensible and uncontrollable. We see them, but know not how or whence they came, and, being ignorant of their origin, we are also ignorant of their exit.

The section of Flowering Parasites having green foliage is typified in this country by the Mistletoe, found growing upon the Apple, Poplar, Lime, and many other trees. The order to which the Mistletoe belongs *(Loranthaceæ)* contains a large number of genera and species which are natives of the East Indies, Central America, and Africa. Many of them bear branches of most beautiful flowers. The only other orders of Leaf-bearing Parasites is the extensive one of *Scrophulariaceæ*, and the small one of *Santalaceæ*. The former contains a considerable number of partial parasitical genera; the more remarkable cases are those of the *Pedicularis*, *Melampyrum*, *Gerardia*, *Euphrasia*, and *Rhinanthus*. The first of these has some representatives in the Himalayas, which are surpassingly lovely, but the degree of parasitism is too great to admit of their successful cultivation.

In the second section, viz., Parasites having no leaves, we are astonished to find the largest flower in the vegetable kingdom,—the gigantic Rafflesia, a plant composed of a single flower three feet in diameter. In addition, there are the Broom Rapes *(Orobancheæ)*, the Yellow Bird's Nest *(Monotropa)*, and the "Dodders" *(Cuscuta)*, which latter are perhaps the best known and understood; they are leafless, climbing herbs, of annual growth, the seeds of which are introduced with foreign seeds, such as Flax and Clover, in the cultivation of which crops they are a serious impediment.

The mode of growth of the latter was then explained, and specimens of the various plants remarked upon were exhibited by Mr. S. A. Stewart.

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[THIRD PAPER.]

## GLACIAL MARKINGS RECENTLY OBSERVED AROUND BELFAST.

BY MR. WILLIAM GRAY.

GEOLOGISTS have observed a certain superficial accumulation of clay, boulders, gravel, &c., commonly distributed throughout Ireland, England, Scotland, and many other places: it is of various thickness, from one foot to hundreds of feet, and is very irregular in its stratification; this is called the glacial drift: it is supposed to have been deposited at the close of the Tertiary epoch, and its peculiarities of structure and position are attributed to the agency of Ice, either as glaciers or icebergs, passing over the land in one general direction. Commonly too, the contained boulders, &c., are scratched and groved to a certain extent, and rubbed smooth: and what is still more remarkable, all the rock surfaces over which the drift occurs are rubbed, polished, and deeply scratched, in the direction of the supposed glacial currents. Mr. Gray exhibited hand-specimens of those marked boulders and rock-surfaces from several localities—from the Carboniferous Limestone of Castle Espie, County Down; from the Chalk Cliffs at Ballintoy and Islandmagee; and from a Trap Dyke in the New Cemetery, on the Falls Road, Belfast. The general direction of the markings is, in all the cases, from the North-East.

Mr. Gray referred to several instances of the transporting power of the glacial currents: as, for example, the Chalk of Antrim found in the drift of the County Down, and the Lias Fossils of Islandmagee found in the drift at Castle Espie, and urged that every instance of the kind should be recorded, as it was only by the multiplication of correct observations and recorded facts we can hope to arrive at sound general conclusions.

On 12th March, Mr. H. Knight read a Paper on

## THE ISLE OF WIGHT: ITS NATURAL HISTORY, HISTORY, AND ADVANTAGES AS A HEALTH RESORT.

Mr. Knight gave a most interesting description of the Island, dwelling more particularly on its Natural History. He minutely described its geological features, and, taking his hearers on an imaginary excursion all round the Island, he introduced them to the several points of interest, either to the Botanist, Geologist, Archæologist, or the ordinary tourist, and illustrated his Paper by Diagrams and a profusion of Photographic views.

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On 26th March, Mr. J. W. Forrester read a Paper, entitled—

## "A GOSSIP ABOUT OLD BELFAST."

As it was intended to have this very interesting review of the History of Belfast published in another form, it was considered that the short abstract which could only be included here would not do justice to the subject.

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On the 16th April, the Session was closed by Dr. Holden, of Glenarm, who read a Paper on

## THE IRON MINES OF ANTRIM.

The Iron Mines of Antrim occur in the two extremes of the geological formations of the county—viz., the Basalt above and the Carboniferous Limestones below. The intermediate strata under the Basalt are: the Hard White Limestone, then the Greensand, the blue clays of the Lias, the Keupar Marls, and a small appearance of the Coal measure.

In an economic point of view all these rocks have been more or less utilised. The Basalt, from its decomposition, forms the

prevailing producting soil over all Antrim; it is also used for building, and entirely for the macadamising of our roads. The Limestone is triturated into whiting, and burned, to add to the farmers' manure and the builders' mortar. The Greensand being rich in phosphate of lime, has often been a desideratum with manufacturers of artificial manures. The Lias has been of little value to any except the palæontologist. The Keuper Marls of the New Red Sandstone period form the main site of Belfast, and have yielded the salt mines of Carrickfergus, while the Tertiary deposits constitute the brickfields about our neighbourhood. The carboniferous rocks are, unfortunately, either absent, or else impracticably below our reach; they show at the north of the County, and there are fruitful with coal and iron.

Though we economise to the best advantage what rocks we have, it must be confessed that Antrim has not the repute of a mineral county. The valuable ores which have so materially contributed to England's greatness are either absent or else out of the miner's reach; or, perhaps, the search for them has neither been diligent nor well directed. The latter, I believe, and hope to show, has been the real misfortune—a misfortune which extends not alone to Antrim, but to all Ireland.

In 1855, the annual return of mineral products in Great Britain and Ireland showed England yielding 7,000,000 tons of iron ore; Scotland, 2,400,000; and Ireland only 576, none of which came from Antrim. Surely this return is very far from indicating the relative proportions of the mineral wealth of the three countries.

All basaltic rocks contain some proportion of iron in their essential composition, averging 9 or 10 per cent.; sometimes small veins or crystals of the magnetic oxide of iron occur—(Specimens shown from the Isle of Muck). Ferruginous clays, as yellow ochre, are not unfrequent in the glens and hills of Antrim, as well as chalybeate springs. These indications testify to wide diffusiveness of iron throughout the Trap districts; but not until lately was it known to exist in such an accumulated form as to invite extensive mining.

When the railway to Ballymena was in course of construction, a bed of ochre and lithomarge was cut through near Ballypallady. This has been quarried and shipped to England by

Dr. Ritchie for the past six or seven years. The percentage of iron is small, and would not repay working if it were not for the facilities of transist to Belfast which the rail affords.

The clay is useful to mix with superior ores, the silicate of alumina forming a valuable flux, as well as protecting the inner casing of the blast furnace.

There are two quarries at Ballypallady, which in section exhibited some interesting lithological characters. The one on the North bank shows a band of slaty lignite 18 inches thick, above which are 12 feet of decomposing basalt, and below ochre, with boulders passing into lithomarge to a depth of 25 or 30 feet. On the South bank, further down the line, the same arrangement occurs, with the important exception that above the lignite the basalt is here replaced by ochre containing plant remains, and topped with boulders of the drift period showing glacial markings.

About twelve miles North-East of this, and at a height of 500 feet, a much richer iron ore is at present worked. This mine is at Kilwaughter; the Basalt overlies it for twenty or thirty feet; at the line of contact the ore is much better than further down, as the seam approaches the underlying basalt, the thickness of the seam being nine to twelve feet. The top ore consists of a hematite clay, with imbedded kidney-shaped nodules of magnetic iron ore, with traces, on analysis, of titanic acid; this more or less is present in all the basaltic iron, and adds much to its value, as it increases the facility of puddling, and lessens the loss of the metal, while it improves the quality, and especially of steel.

This mine was first worked on the face by quarrying, but now by mining, level drifts being run in fifty or sixty feet. The ore is carted to Larne, from whence it is shipped to England. Nearer Larne a similar deposit has lately been found at Antiville.

Passing Northward along the coast several indications of iron crop out, waiting exploration. At a height of 700 feet, in the mountains above Carnlough, a very fine ore appears, being almost entirely the nodular or pisiform hematite stone; it should yield about 50 per cent. of metallic iron. Nothing has been done in the way of mining here.

At Bay Hill, Glenariff, eight hundred feet high, an extensive seam of the pisiform hematite ranges through the Basalt rocks;

it is laid bare upon the face of the out-crop for about seventy yards. The strike is East and West. The seam is from twenty to thirty inches in thickness; it is worked both by quarrying and mining, the ore, as excavated, being shot down the cliff in a wooden trough, and then carted to Red Bay Quay for shipping. The analysis of this hematite shows it to be a magnetic titaniferous iron ore, and would yield from 50 to 60 per cent. of the metal.

The bold, precipitous cliffs of the picturesque Glenariff, heretofore barren, are now becoming fertile sources of mineral wealth. At Parkmore, Mr. Hassard has opened a seam of very superior ore.

Further on, about six miles from sea, and a thousand feet above it, in Glenravel, Mr. Fisher has been, with much enterprise, working for the past year and a-half the most extensive of the basaltic mines. The out crop is laid bare for more than a mile East and West along the slopes of Slievanee mountain. Four or five level drifts run in for nearly three hundred feet, rising with the seam slightly Northwards, the basalt, for six or seven hundred feet, resting above. The ore varies in thickness from twelve to thirty inches, an iron clay of two or three feet underlying. This rich pisiform ore yields as much as 60 to 65 per cent. of metallic iron. It is carted from the mine to Red Bay Quay.

There can be little doubt that these mines and out-crops indicate the existence of a layer of valuable iron ore ranging through the heart of the basalt floor of our country, and extending over a wide area.

From Ballypallady, at a height of 300 feet, to Sleivanee, at a height of 1,000, there is not only a gradation of altitude, but of mineralogical character; the ochreous clays change in their northward ascent into pisiform magnetic ores.

This metamorphosis can be, I think, traced to its origin by the comparative examination of the mines referred to. When trap rock is long exposed to air and water, it crumbles into a rotten friable mass, while mechanical and chemical forces segregate and alter its constituents; the protoxide of iron is changed into the red peroxide, giving the ochre type to the bed, soluble ingredients being washed away, This conversion may be ob-

served in any fragments of decaying trap, but on a large scale at Ballypallady, where the basalt above the lignite in the north quarry passes into ochre at the south.

In order to account for the pisiform ores, I would offer the following explanation:

We know that, towards the close of the secondary period, successive volcanic eruptions of large quantities of basalt overspread the cretaceous rocks before they entirely emerged from the sea. This was followed by a pause or quiet interval, of duration sufficient to allow the surface basalt to undergo the ochreous decomposition, and even on some volcanic islands permit the growth and decay of plants. But again the slumbering fires awoke and belched forth fresh sheets of molten lava, pouring them from their craters in the North of the country over the wide ochre districts Southwards. The probable result of this would be the natural roasting and smelting of the metal in the ferruginous clay wherever it came in contact with this lava furnace; and we would expect that that lying nearest the volcanic centres would present the purest and most refined metallic ore, having undergone the longest and fiercest action of the molten torrent, as well as the aggregate pressure of each outflow. The examination of the four mines at present worked, together with the out-crops, tend to support this theory of their origin. The following is a comparative table of the mines:—

| | Elevation of Mine. Feet. | Superincumbent Basalt. Feet. | Metallic Iron. Per cwt. | Pisiform Ore. Inches. | Iron Clay. Feet. |
|---|---|---|---|---|---|
| Glenravel, | 1,000 | 500 | 65 | 21 | 24 |
| Red Bay Hill, | 800 | 100 | 55 | 18 | 30 |
| Kilwaughter, | 500 | 25 | 32 | 12 | 12 |
| Ballypallady, | 300 | 0 | 25 | 0 | 25 |

This shows the richest ores are at the highest elevation, and have received the greatest amount of overflowing Basalt.

Excluding the Ballypallady clays, the other ores have been mined for a year and a-half, during which time about 13,000 tons of the raw material have been shipped to England, and that at an expense of 4/- to 5/- per ton for freight alone. The want of facilities for its removal are a present drawback; but the ex-

cellence of the quality, and the vastness of the quantity, will, before long, bring an increase of capital and energy to the surmounting of all difficulties.

It is much to be regretted that the local absence of coal prevents our own country reaping the full benefits arising from these iron deposits; if otherwise, soon would smelting furnaces spring up and prosper around us, still something might be done by the substitution of dried peat, which is so abundant on the Basalt hills.

The Carboniferous Iron Mines lie between Fairhead and Ballycastle, and are the equivalent of the English and Scotch systems. These are, perhaps, among the most ancient of coal mines in the British Isles. A century ago, when the miners were pushing forward an adit, they suddenly came upon some galleries, with pillars supporting the roof, and among the *débris* were found rude implements for mining, tipped with iron, also remains of baskets. The oldest inhabitants at the time and the oldest records are both silent as to when this working took place.

The line of coast exhibits a most interesting stratification of alternating Sandstone, Limestone, Slates, and Coal. The strike of the beds is east and west, and the dip about 1 in 12 southward. These beds are surmounted with toppings of Gravel or Basalt, and rest upon Mica Slate.

The Iron Mines of Antrim are a most important branch of the industry of our country, and one, I think, hitherto little known, when we recollect that, twelve years ago, Ireland only yielded little more than 500 tons, none of which came from Antrim, and that now fully 50,000 tons were shipped within the past year; and there is no reason why this may not be increased tenfold.

There is no better test of the welfare and prosperity of a country than the amount of iron produced and used. Silver and gold pale before the importance of this the noblest of metals. It has crowned civilisation after its long struggle upward through the rude periods of stone and bronze, and places first among nations the people who utilise it most.

The mining history of Antrim has been that of all Ireland—deposits of mineral wealth lie hidden throughout the land, waiting the revelations that follow the miner's pick. It is not by Fenianism, Repealing of the Union, or revising the tenure of

land, or even disendowing the Established Church, that the evils which haunt Ireland will be banished.

But what she does need is the development of manufactories, and the utilisation of her mineral products.

After the usual discussion, and election of new members, the meeting—the last for the session—closed.

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## THE ANNUAL COVERSAZIONE WAS HELD ON THE 14th MAY.

*(The followiny is extracted from the local papers.)*

HITHERTO these reunions have been marked by success in every respect, and this formed no exception to the general rule. The Museum, where the meeting was held, presented an exceedingly gay and animated appearance, and it is a circumstance worth notice that this gaity and animation were due in a very large measure to a cause intellectual as well as ornamental—we refer to the decorations of the rooms, which embraced articles of vertu, and curiosities and antiquities, both illustrative and suggestive. The company was very select, and comprised a large number of ladies who graced the scene with their presence. The evening was spent in a manner both agreeable and instructive. This flourishing society has been in existence five years, and during that period its members have devoted themselves with great energy and attention to the investigation of the Botany, Geology, and Archæology of the neighbourhood, and, indeed, have left nothing undone that could promote the object of its founders. The Summer Excursions—a very instructive and delightful part of the Society's operations—are arranged so as to enable the members to acquire information on scientific matters in the most agreeable manner, while the Winter Meetings are calculated to call public attention to the scenes around this neighbourhood that would otherwise be unappreciated. Its successful management is such as to secure for it a growing popularity, which was exhibited by the large increase in the membership last year. The *conversazione* last evening was the fifth which has been held in connection with the Society. The rooms were tastefully decorated for the occasion by members of the club. The room to the right of the entrance was fitted up as a ladies' cloak-room, and that to the left as a refreshment-room. The large room on the first landing was the apartment in which the reception took place, and was tastefully, not to say lavishly, decorated with bunting. At the door a large Union Jack, suspended from poles, formed a handsome porch. It was surmounted by evergreens, which contrasted well with the bright scarlet

bunting, and produced an agreeable effect. A large number of banners and bannerets, and handsome miniature shields, were suspended at intervals along the walls, and the windows were tastefully draped with scarlet. At one end of the room there was a large flag, bearing the Ulster Arms, and at the opposite a similar one, with the Belfast Arms; while at each of the sides there were other Union Jacks suspended of smaller dimensions. At each of the corners there was also a large flag, which hung down in graceful folds and considerably enchanced the appearance of the apartment. Indeed, from the manner in which the Museum was fitted up it had more the appearance of a private residence than of a building used merely for scientific purposes. In addition to the ornamentation which has been already mentioned, there was a rare display of flowers and evergreens. Several large azaleas, in pots, attracted much attention, while some rare cinerarias and rhododendrons from the Botanic Gardens were the objects of much curiosity. No device had been overlooked that could give effect to the rare and interesting display made by the committee who had charge of this important item in the programme of the *conversazione*. The lights were arranged so that all the articles were shown to the best advantage, their peculiarities being brought out with striking relief. Several paraffin lamps were placed at intervals along the tables so as to afford an opportunity of profiting by the microscopes, of which there was a large number, and some of them, too, with very powerful lenses. In the upper room Mr. Malcomson exhibited a stand of British ferns, and Mr. W. D. Henderson a rustic *terra cotta* stand of small ferns, which was rendered very effective by an ingeniously contrived fountain playing from the centre, and thus watering the plants. The central table in the principal room was occupied by a large book of Piranesis etching, specimens of early typography, and other books, contributed by Rev. Dr. M'Ilwaine. Several first-class microscopes were on view, and there was a beautiful and ingenious instrument sent in by Mr. Wright by which the circulation in the tadpole was fully displayed. This attracted great curiosity. Dr. M'Ilwaine, Mr. Patterson, Mr. Gray, and Mr. Tomlin also contributed microscopes, together with a large number of objects that served to display the endless and inexhaustible variety of the microscopic world. Among the curiosities were several cases of Archæological objects, including a most valuable and interesting collection of stone implements from Denmark, sent for exhibition by Robert Day, Esq., of Cork, a Member of the Society, and a gentleman who seems to have an enthusiastic desire to possess relics of past races; indeed, he bids fair very shortly to have the honour of being the owner of a rich and most valuable collection of Irish antiquities. This group of objects was much admired, especially by the more scientific of the company. Dr. M'Ilwaine, and Mr. Gray, who seems to have a passion for Archæological research, exhibited a large collection of Irish Stone

Weapons, from the rough flint flake up to the highly-finished Arrowhead. We understand that Mr. Gray has found these flakes in very great abundance in County Antrim, and also over the entire surface of The Plains, near the Queen's College. He has met with several specimens at the Ormeau Bridge, and all along the shore from Belfast to the Causeway. Several also have been discovered at Holywood and Bangor, in the County of Down. The specimens found by Mr. Gray in Antrim and Down were almost indentical with the flakes from Denmark exhibited by Mr. Day, thus establishing an undoubted connection between the countries. In some places, as at Toomebridge, Belfast, Larne, Glenarm, Torr Head, and Ballymoney, the *cores* from the flakes had been struck off were found, as well as specimens of wrought Implements, Celts, &c.; and almost all the Arrow-heads, so very abundant in Ulster, have been evidently manufactured from these flakes. In Dr. M'Ilwaine's collection there are several specimens in process of manufacture, some half and others almost finished. Mr. Gray also showed a large variety of Irish Bronze Weapons and Implements—Celts, Swords, and Spears. In connection with these specimens, there were several of a similar character purchased by Mr. Day from the late Mr. Stephenson's collection, and others purchased elsewhere by the Rev. Canon Greenwell, Durham. It is needless to say that these interesting relics were examined with great interest, and monopolised a large share of the attention of the ladies. After this *conversazione*, these interesting collections will be scattered, in all likelihood never to return to Ulster, where it is highly probable they were originally manufactured. Another of the tables was occupied by two collections of cretaceous Fossils and Marine Shells, for which prizes had been awarded by the Club. Mr. George Donaldson obtained the first prize for the best collection of Marine Shells, of which he secured 126 species, belonging to 40 families. They were all collected by himself during the past Summer in Belfast Lough. Mr. William Swanston obtained the prize for the best collection of cretaceous fossils. He exhibited fossils embracing sixty-one species, with four varieties, all collected from the limestone and greensand of Antrim during the past year. A fine collection of water colours was contributed by Dr. James Moore. They were all from his own pencil, many of them illustrating scenes of old Belfast long since passed away, and all in every way worthy of the reputation this gentleman has earned for himself as an amateur artist. Dr. Holden, of Glenarm, exhibited a series of photographic views of Glenarm and the neighbourhood, taken by himself, and also indicative of very high artistic abilities. In his collection there was a neat little photograph of a child asleep, which was not only clear and distinct but excited very considerable interest, as it was taken by the magnesian light. It was really a very fine piece of workmanship. There was also a number of fine views of the Giants' Causeway, taken from different aspects, exhibited by Mr. Mack, of Coleraine. This collection embraced

some first-class photographs. Mr. Mack's views are remarkable for clearness and accuracy, and those exhibited were proofs of a series taken within the past few weeks. A tastefully-arranged platform was erected at one end of the room for the accommodation of the musicians. At nine o'clock, the first part of the programme, consisting of the following selections, was performed by a number of amateur ladies and gentlemen in almost unexceptionable style:—Pianoforte duet, Overture to "L'Italiana in Algieri" (Rossini); Glee, "O, bird of eve" (Lord Mornington); Song, "On wings of music" (Mendelssohn). The second part of the programme was commenced at ten, and was gone through with very great acceptance. It was as follows:—Duet, "As I saw fair Clora" (Haydn); Glee, "Ye spotted snakes" (Stevens); Piano Solo, "Chanson d'Amour" (Henselt); "Hunting song" (Schumann); Song, "My Queen" (Blumenthal). It would be invidious to single any of the fair songstresses for special remark, as all exhibited musical talent of a high order of merit. In addition to the curiosities which have been already mentioned, Mr. Phillips exhibited a snake—a Coluber natrix—which was an object of great interest. The animal is about three feet long, and very slender. It is an English reptile, but not poisonous. It escaped from Mr. Phillips's fernery in Holywood about six months ago, and was only captured on Wednesday last by some boys while at play. There were also a number of axolotls, exhibited by Professor Wyville Thomson: this is a curious specimen of reptile, and has the gills outside: in the tadpole of the newt tribe the gills are situated in a similar manner while the animal is young, but as it grows they become absorbed, but in the axolotls they always remain outside. This animal seems a stage between the tadpole and the frog. In the upper room, Mr. Donaldson gave several electrical experiments. There were also revolving stereoscopes and zootropes exhibited by Mr. Magill and Mr. Mayne. These latter attracted the attention of the young ladies, and created much amusement. Mr. Hugh Robinson displayed a fine collection of post pliocene fossils from the basin of the Clyde, and Mr. Malcolmson also sent in some fine specimens of native ferns.

Not the least interesting department was the refreshment-room, where refreshments were provided throughout the evening by Mr. Wm. John Walker, of Dublin Road. The style in which everything was served, as well as the excellence of the viands, was highly creditable to Mr. Walker's establishment.

The following gentlemen were the stewards:—Professor Jas. Thomson, C.E.; Mr. W. H. Patterson, Mr. Jas. Wright, Mr. Anderson, Mr. Forrester, Mr. Stewart, Mr. Malcomson, Mr. W. H. Phillips, Mr. H. Robinson, Mr. S. Symington, Mr. M'Millan, Mr. W. H. Ferguson, and Mr. W. Gray.

The company separated about eleven o'clock, after having spent a most agreeable evening.

## Dr. The Belfast Naturalists' Field Club, in Account with Treasurer, 1867-68. Cr.

| | | | | | |
|---|---|---|---|---|---|
| To Balance from 1866-7, ... ... ... | £9 | 18 | 7 | | |
| " Mr. Plimmer's Prize, ... ... ... | 0 | 10 | 6 | | |
| " Conversazione Tickets and Subscriptions, | 4 | 9 | 6 | | |
| " Subscriptions 1867-8, ... ... ... | 32 | 0 | 0 | | |
| " Arrears, ... ... ... ... ... | 1 | 10 | 0 | | |
| | £48 | 8 | 7 | | |

| | | | | | |
|---|---|---|---|---|---|
| By Expense of Conversazione, ... ... | £9 | 5 | 0 | | |
| " Postage, ... ... ... ... ... | 5 | 10 | 0 | | |
| " Delivery of Circulars, ... ... ... | 1 | 10 | 0 | | |
| " Advertising and Printing, ... ... | 13 | 17 | 11 | | |
| " Stationery, ... ... ... ... | 3 | 16 | 6 | | |
| " Prizes, ... ... ... ... ... | 1 | 10 | 6 | | |
| " Use of Museum, ... ... ... ... | 5 | 0 | 0 | | |
| " Gratuity to Curator, ... ... ... | 3 | 0 | 0 | | |
| " Balance, ... ... ... ... ... | 4 | 18 | 8 | | |
| | £48 | 8 | 7 | | |

Audited and found correct,

WILLIAM GRAY.

# Belfast Naturalists' Field Club.

SIXTH SEASON, 1868-9.

## LIST OF OFFICERS AND MEMBERS.

### Committee.

PROFESSOR JAMES THOMSON, C.E. (CHAIRMAN).

W. H. PATTERSON.
J. W. FORRESTER.
HUGH ROBINSON.
SAMUEL A. STEWART.
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# BELFAST NATURALISTS' FIELD CLUB.

## SIXTH YEAR.

THE COMMITTEE offer the following Prizes, to be competed for during the Session ending March 31, 1869:—

| | | | |
|---|---|---|---|
| I. | For the Best Herbarium of Flowering Plants,... | ... £1 | 0 0 |
| II. | For the Second Best do. ... ... ... | ... 0 | 10 0 |
| III. | " Best Collection of Mosses, ... ... | ... 0 | 10 0 |
| IV. | " Best do. Seaweeds, ... ... | ... 0 | 10 0 |
| V. | " Best do. Ferns, ... ... | ... 0 | 5 0 |
| VI. | Best Collection of Cretaceous Fossils, ... ... | ... 0 | 10 0 |
| VII. | Do. Liassic do., ... ... | ... 0 | 10 0 |
| VIII. | Do. Palæozoic do., ... ... | ... 0 | 10 0 |
| IX. | Do. Marine Shells, ... ... | ... 0 | 10 0 |
| X. | Do. Land and Fresh-water Shells, | ... 0 | 10 0 |
| XI. | Do. Coleopterous Insects, ... ... | ... 0 | 10 0 |
| XII | Do. Lepidoptera, ... ... ... ... | 0 | 10 0 |
| XIII. | Do. Best Set of 25 Microscopic Slides,... | 0 | 10 0 |
| XIV. | Best Collection of Archæological Objects, ... ... | 0 | 10 0 |

XV. Mr. Plimmer offers a Prize of 10s. 6d. for the Best Collection of any or all the above, collected *at the Excursions* or Field Meetings of the year.

All Collections to be made personally during the Session, within the Province of Ulster. Each species to be correctly named, and locality stated. The Flowering Plants to be collected when in flower, and classified according to the natural system. The Prizes to be in books, or suitable scientific objects, at the desire of the successful competitors.