THE

NATURAL HISTORY REVIEW.

THE

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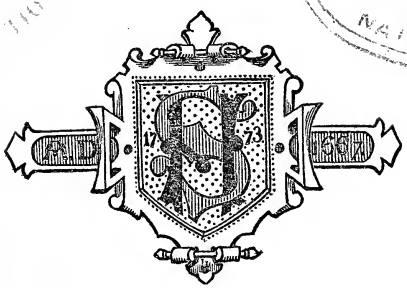

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OBITUARY.

THE

NATURAL HISTORY REVIEW.

Reviews.

Catalogue of the Coleoptera of Scotland. By Andrew Murray, M.R.P.S.E., &c., &c. Pp. 145. William Blackwood and Sons, Edinburgh and London. 1853.

The Entomologists' Annual for 1855, comprising Notices of the New British Insects detected in 1854. Edited by H. T. Stainton. Pp. 112. London: John Van Voorst, Paternoster-row. 1855. Price Half a Crown, with a Plate, coloured.

To every lover of nature, who has at heart the advancement of the study, and therein the glory of his Creator, the appearance of works such as the above cannot fail to give sincere pleasure, affording, as they do, an unmistakable index of the increasing amount of time and attention devoted to these pursuits by a large number of his fellow-countrymen.

The Catalogue of Scotch Coleoptera, which claims notice first, as being prior in order of time, has been the means of adding some twenty new species to our records of those indigenous to Britain; and of these, as well as of all the rare species mentioned, the localities and captors are fully detailed: moreover, Mr. Murray has rendered this book much more useful than such catalogues often are, by appending to the Latin names those of their authors, and to such species as are likely to appear of doubtful identity, the synonymes "generally in use on the Continent."

We could wish that other compilers of lists relating to extensive districts would follow the example here set before them, of rendering their works generally accessible, by publishing them in an independent form.

The Entomologists' Annual deserves a hearty welcome; the idea which it has embodied in a substantial volume, is to the Entomologists of these realms as novel and as acceptable, as it promises to be useful. A blank has been filled, more especially felt by those who were aware that the

zealous labours of Erichson and Schaum have, long since, given our Continental brethren the benefit of similar compilations year by year. Nor need this Annual in the least interfere with the utility of the "Zoologist" and kindred monthly publications; to *their* pages a paper is hardly admissible if not original, whereas to the Annual information will be all the more valuable after it has stood the test of public scrutiny unscathed. According to the editor—

"The idea of the present work is to supply these two main desiderata—to give, systematically, notices of all the new species found in this country in the past year, and, at the same time, to intimate which once rare species had been taken in any plenty. In the present volume, so much space being occupied by notices of the novelties since the last standard work on the subject, there was not room left for notices of the rare species which have become common, without swelling the book to a size which, by enhancing its cost, would have diminished its usefulness by limiting its circulation."

We must, however, tell our readers, that there is to the latter statement a pleasing exception, and that the notices of the Tineina (the recent publication of his complete work on which, has given Mr. Stainton an advantage over his brother writers, by reducing the addenda to a very small number), are as completely worked out as, we trust, those of the other insects will be hereafter.

The present number contains but three orders—Lepidoptera, by the Editor; Hymenoptera, by Mr. F. Smith, of the British Museum; and Coleoptera, by Mr. E. W. Janson, who is new to us as an author, though well-known to the members of the Entomological Society as curator of their museum and library.

The new Microlepidoptera and Tortrices are enumerated from the publication of Stephens's "Illustrations," in 1835, and number 153 species. The year 1854 has produced nine more, along with eleven of the Tineina—the latter of which thus form a supplement even to the recent standard work on that group. But there is here an omission—the Crambina seem to have been thought unworthy of notice, and the Pterophoridæ totally forgotten. Now, we are not conscious of any particular predilection for the unfortunate "snouts," as they are wont to be termed; yet, as lovers of impartiality, we must assert their claims to admission, and, likewise, those of the elegant-plumed moths—which, surely, are an interesting group.

In the Hymenoptera, the new bees (numbering fifty-nine species) date from Kirby's "Monographia," in 1802, and the new fossorial Hymenoptera, from Shuckard's "Essay," in 1836. These are followed by "Notes on the Myrmicidæ and Formicidæ," and "Notes in explanation of the New Species of Aculeate Hymenoptera, in Stephens's Systematic Catalogue."

To the Coleoptera the largest additions of all have been made, and Mr. Janson has been, of necessity, confined to little more than a bare enumeration of the technical names, and the authorities from whom he has quoted. Since 1839, the date of Stephens's "Manual," 230 species, new to Britain, have been discovered; and we are glad to see, that though the products of but a single district in Ireland have as yet been made public, *nine* of the novelties have been furnished by that district alone.

Want of space compels us to be thus brief, and we can hardly notice the coloured plate forming the frontispiece, which contains figures (accurately drawn from nature, by Messrs. Wing) of five of the new moths, with two of the new beetles; the most conspicuous of the Lepidoptera is our Irish Anthrocera Minos.

Well may the British Entomologists feel grateful to the spirited originator of this excellent undertaking, and to his able coadjutors; that their appreciation of its merits will soon be made evident, we confidently hope; and, with every wish for its success, its enlargement, and its permanency, we bid the new Annual no unmeaning farewell.

A Monograph of the Trochilidæ, or Hummingbirds. Dedicated, with permission, to Her Royal Highness the Princess Royal of England. By John Gould, F.R.S., &c.

Part VII. With Fifteen Coloured Lithographs. Price Three Guineas. Published May 1, 1854.

Part VIII. With Fifteen Coloured Lithographs. Price Three Guineas. Published October 1, 1854.

London: published by the Author, 20, Broad-street, Golden-square.

In introducing to our readers' notice Mr. Gould's splendid "Monograph of the Trochilidæ," we think we cannot do better than quote the words with which the enthusiastic Audubon commences the description accompanying his beautiful illustration of the exquisite and lovely northern hummingbird—

"Where is the person who, seeing one of these lovely little creatures moving on humming winglets through the air, suspended as if by magic in it, flitting from one flower to another, with motions as graceful as they are light and airy, pursuing its course onwards, and yielding new delights wherever it is seen—where is the person, I ask you, kind reader, who, on observing this glittering fragment of the rainbow, would not pause, admire, and instantly turn his mind with reverence towards the Almighty Creator—the

wonders of whose hand we, at every step, discover, and of whose sublime conceptions we everywhere observe the manifestations in his admirable system of creation? There breathes not such a person." And this query and answer are equally applicable to the whole of this numerous family.

The ancients knew nothing of the Trochilidæ—for they inhabited no part of the old world; and even Africa and India had only types—but those splendid ones—in their creepers and honeysuckers, of this class of fairy birds. Their habitation is almost confined to the tropical portions of the new world, and that great archipelago of islands between Florida and the mouths of the Orinoco, with the mainland of the southern continent, until it passes the Tropic of Capricorn. There, in the wild, uncultivated parts, they inhabit those forests of magnificent timber, overhung with lianas and the splendid bignonaceæ—the huge trunks clothed with a rich drapery of parasites; there,

> "Like fairy sprites, a thousand birds
> Glance by on golden wing,
> Birds lovelier than the lovely hues
> Of the bloom wherein they sing."

But, while some thus rejoice in the moist air of the denser forest, others are equally at home in gardens or in flowery glades; and, during recent years, the most notable discovery in this department of ornithology has been made at a vast height among the mountains. This fact is proved by the following extract of a letter from Professor Jameson, of the University of Quito, to Sir William Jardine, in which, referring to the *Trochilus Stanleyi*, he writes as follows:—*"I enclose a specimen of hummingbird which must be considered as very rare; and it is with much difficulty I procured a very few specimens. The most interesting point of its history is the locality which it inhabits—the snowy summits of Pichincha; feeding from the flowers of *Sida Pichinensis*—a charming plant, which springs from the barren, sandy surface surrounding the crater, and displaying large, violet-purple flowers. The plant has no branches, and the little bird, insect-like, flutters round the flowers, and is remarkably quick in its movements; it only appears when the plant is in full flower; and, probably, in a few weeks it might be impossible to procure a single specimen." Thus we see that these birds, while confined to the inter-tropical limits, are found at various heights—in the plain, well-nigh scorched beneath a glowing sun, where the palm-tree raises its lofty head; then, again, we see them higher up in the region where grow the graceful arborescent ferns; and, in the instance just quoted, we again

* From MS. in Jardine Hall Library, as given in "Excelsior," vol. ii., page 262—a most valuable and interesting journal, published monthly, price 6d. With illustrations. London: J. Nisbet.

find them up near the region where patches of recently-fallen snow begin to cover the last effort of vegetable life, before the line of eternal snow begins.

The dazzling beauty of these winged gems has, at all times, attracted attention, whether viewed amid the glowing scenery of their native forests, or seen (as it was lately the privilege of the inhabitants and visitors to the British metropolis) in the more artificial display of a collection. Every epithet which man's ingenuity could invent has been used to give an idea of the richness of their colouring—the lustres of the emerald and of rubies have been compared to them; but all fall short of the real brilliancy of some of the Trochilidæ, when seen hovering around the flowers of some tree, with their breasts flashing in the sun's rays. In the days of the "gentle Cortes," Prince Montezuma met the Peruvian conqueror clad in a superb garment, not glittering with gold and silver, but with the feathers of these birds; and even the Indian could appreciate their loveliness, and delighted to adorn his bride with gems and jewellery plucked from the starry frontlets of these beauteous forms;* and in his native language they are styled by no unapt metaphor, the "beams" or "locks" of the sun.

It has somewhere been flippantly said, that "in tropical countries, where brilliant and varied colours have been granted to the birds and flowers, song has been denied to the one and fragrance to the other." This is by no means a correct assertion; and even in this tribe of "brilliant and varied" coloured birds, we have a striking example of its impropriety; for the very smallest of all birds—as we are told by Mr. Gosse, in a charming passage in one of his works†—"The tiny vervain hummingbird (Mellisuga humilis), not larger than a schoolboy's thumb, utters a song so sweet, but of sounds so attenuated withal, that you wonder who the musician can be, and are ready to think it the voice of an invisible fairy, when, presently, you see the atom of a performer perched on the topmost twig of a mango or orange tree, his slender beak open, and his spangled throat quivering, as if he would expire his little soul in the effort."

The migration of these birds might at first appear strange; but the more one studies the works of a Supreme Creator, the more will he be struck by the admirable fitness of all things for the conditions with which they are surrounded; and beautifully is this exemplified in the present instance. Well may we in every case admire the wonderful works of God. It is true the hummingbird need not leave any of its accustomed haunts, because the

* "Hummingbirds," by Sir W. Jardine, vol. i., p. 96.
† "A Naturalist's Sojourn in Jamaica," p. 179.

earth is bound by an icy chain, or because the flowers on which it feeds have gone to rest for a short season, in spring to arise again in fresh loveliness; no—every day is spring, or summer, or autumn in those lands, and winter, in all its sternness, is unknown. Why, then, must they be away? Our swallows and summer birds leave us it is true; but, then, they love perpetual sunshine, and need perpetual supplies of insect food, which that sunshine calls into life; and equally good are the reasons that guide the migratory powers of the Trochilidæ. Beautiful though be the climes they live in, yet, as if it were to verify the vulgar saying, "that there is no part of the earth without its drawbacks," those countries are at seasons subject to perpetual rains, which drench, and almost inundate, their abodes, or to frightful hurricanes, that, in a few short moments, leave only a wreck of what was before so magnificent and luxuriant; and so, before any such disasters have happened, these birds pass over to other lands, where the reparation of a previous wreck is proceeding with all the magical rapidity of tropical vegetation. To enable them to accomplish in safety these journeys, often of a long duration, and during which they have sometimes to withstand a passing gale, showers, or even the rigour of a snow storm, we find them gifted with wings of a large size, and quills of a great strength, entirely out of proportion to our ideas of symmetry in a creature clothed with feathers, did we not take into consideration their migratory disposition, and, then, the utility and design of them become most obvious.

But the fascination which attaches itself to this "gay creation" has led us far from our original task; in resuming it we will enumerate the various works of importance that have been devoted to the history of these birds. We pass over the accounts of single individuals, given us by Wilson, Audubon, Bullock, and, lately, by Gosse, in his "Birds of Jamaica," and shall only notice those works that can be compared to the "Monograph" before us:—first, in 1820–23, M. C. J. Temminck published his "Nouveau Récueil des Planches Colorées des Oiseaux, pour servir de Suite en de complément aux Planches Enlumineés de Buffon." Quarto, with plates. In comparing this work with the one before us, we cannot but be struck with the unsatisfactory nature of the descriptions, while very little notice is taken of the habits of the birds. The plates also are a little too highly coloured, and would lead to the impression that they had been drawn from stuffed specimens. Secondly, in 1829, M. R. P. Lesson published his "Histoire Naturelle des Oiseaux Mouches," with 86 coloured plates; in 1831, his "Hist. Nat. des Colibres," with 66 plates; and, in 1834, his "Les Trochilides," with 70 plates. These are three most beautiful volumes; the plates are delicately executed; and, up to the date of the publication of Mr. Gould's "Monograph," were the

very best volumes on this subject. Lastly, in 1849, Mr. Gould commenced the publication of the present series, in parts, each containing fifteen coloured lithographs, with descriptions. The plates in this work are drawn with the greatest accuracy; we do not recognise in them stuffed specimens, but we could almost fancy we saw the birds themselves fluttering their little wings as they probe into the long corollæ of the flowers; these plates stand at the head of ornithological drawings. We cannot but tender our small meed of praise to the author, for his indefatigable patience in publishing so many and such splendid works on this subject. To dwell long on these "coloured representations" would be useless, as there are few who do not know them; and all our praises would not excite in our reader's mind that thrill of delight which is experienced in viewing these drawings of the birds themselves; second only is it, to visiting them in their own lovely paradise.

We cannot resist the pleasure of giving Mr. Gould's account of the Panoplites Jardini, so called after our distinguished British ornithologist.

"Panoplites Jardini.—This is one of the most beautiful of the Trochilidæ yet discovered. The means at my command are utterly inadequate to give in the plate more than an idea of this exquisite living gem, whose crown, back, shoulders, and chest-sides, are clothed with hues of metallic blue and green, of such resplendent brilliancy that it would be impossible to represent them upon paper; those, therefore, of my readers who may wish to view them, must seek an opportunity for attentively examining the birds themselves.

"The native country of this glittering gem is the temperate regions of Ecuador, where, in certain localities, it is tolerably common. It is still, however, a rare bird in Europe; there are few collections which comprise examples, and none, I believe, so fine as those contained in my own. For these I am indebted to my good friend, Professor Jameson, of Quito—a gentleman of high scientific attainments, and who has largely contributed to our knowledge of the zoology and botany of the rich district in which he resides. That he may still have a long life to enjoy, is, I am sure, the sincere wish of all his scientific friends and correspondents; among whom is included one whose name is familiar to every zoologist as that of an ardent lover of natural history, and who has spent the greater part of his life in the promotion of its cause—need I add that I allude to Sir William Jardine, Bart., after whom this lovely bird has been named by M. Bourcier, of Paris, as a just tribute to his merits as a naturalist.

"M. Bourcier, who first brought the species to Europe, states, that the bird inhabits the hot regions of the great forests in the environs of Nanégan. In the letter accompanying the specimens transmitted to Professor

Jameson he says—'Having, from time to time, procured from collectors a considerable number of fine species of Trochilidæ, from an extensive forest, about two days' journey distant from Quito, I could no longer resist my inclination to visit that part of the country; and, as I particularly wished to ascertain the precise localities frequented by the more interesting species, I determined at once to carry my project into effect, and only regretted you were not here to accompany me. You are aware that explorations in these countries are achieved at the expense of great bodily fatigue; the journey on foot usually commences at the upper boundary of the forest—say, at 10,000 feet—and is continued downwards to that of 4,000 feet above the sea level.

"'The Trochilidæ observed at the first-mentioned elevation were—*Eriocnemis Luciani*, *Aglæactis cupripennis*, and *Helianthea Lutetiæ*, all feeding on the flowers of *Syphocampylus giganteus*. A little lower down, another species, unknown to me, frequented the flowers of different species of fuchsia; and, at a station—6,000 feet—where I remained for the night, I saw, for the first time, that magnificent species named Jardini. It was by no means uncommon; and I shot a splendid specimen on a tree, belonging to the family Myrtaceæ, which appeared to be its favourite haunt. From the height of the tree I could not reach the blossoms, all I could do was to procure a branch with leaves, which are rather large.'"

In conclusion, we would suggest to Mr. Gould, that, as the expense of these parts precludes their existence in the libraries of a large number of naturalists, he would render one more service to ornithologists by publishing, in one volume, his account of all the species of the Trochilidæ; and if to each *genus* was appended an engraving of its type, we could hardly conceive a more useful work, and, we have little doubt, it would be preserved by every lover of a class of birds

> "In whose bright plumes the richest colours live,
> Whose dazzling hues no mimic art can give;
> The purple amethyst, the emerald's green,
> Contrasted, mingle with the ruby's sheen."

On the Colouring Matter of the Flower of Strelitzia Reginæ; from Report of the Botanical Society of Edinburgh; and

On the Occurrence of "Cinchonaceous Glands" in Galiaceæ. With a Plate. By George Lawson, F.R.P.S., F.B.S.E., &c., &c.

We know very little as yet of the anatomical conditions of the colouring matter of plants (Chlorophyll being excepted), and, therefore, are glad to see this subject made a matter of investigation. In the former of

these papers, Mr. Lawson confirms Mohl's view of the colouring matter in S. reginæ—viz., that the blue colour of the flower is not diffused colour, but appears in the shape of spherical granules; and that in the yellow leaves the pigment has, as Mohl expresses it, the form of slender, crescentically-curved, and irregularly-wound fibres, which swim in the cell sap. Mr. Lawson adds, that it, however, occasionally occurs in globular bodies. In the latter paper we have a very careful and detailed account of the occurrence of Cinchonaceous glands on the interpetiolar stipules of the Galiaceæ. Hitherto these glands were considered quite peculiar to the natural order Cinchonaceæ, and have even been employed as a character to distinguish that order from Galiaceæ. However, Mr. Lawson has discovered that they are present in every plant of the order he has examined—amounting, on the whole, to no less than twenty-seven species—and, we think, he may fairly conclude their general occurrence in the order. The paper concludes with reviewing the reasons for keeping those two orders separate. Both these papers are of exceeding interest to botanists, and we are glad to see them published in a separate form.

The Sea-weed Collector's Guide. By J. Cocks, M.D. With a Plate, coloured. Price 2s. 6d. London: John Van Voorst. 1853. 12mo. Pp. xvii., 120.

We have in these pages a really useful, because practical, guide for the collector of our Marine Algæ, and which we feel will be gladly welcomed by all who admire the elegant varieties of form to be met with in this most interesting and beautiful order. We can remember how gladly we would have hailed such a manual when, for the first time, we endeavoured to preserve some of our favourites for future examination, and saw how far our attempts were from keeping the characteristic features of those we were most anxious to preserve. With Dr. Cocks's name British Algæologists are already well acquainted; and few collections of our Algæ, of any size, are to be found, in which specimens put up by him may not be recognised by their exceeding beauty and perfection; and we only regret that their merits are not better known and appreciated. We, however, have some reason to hope, that in the course of the present year, Dr. Cocks will issue to subscribers, at a moderate price, sets of British Algæ, arranged in fasciculi, in accordance with the *Phycologia Britannica;* and we can scarcely conceive a greater boon to the student than such a companion to the noble Monograph of Professor Harvey, or one that would find a readier support from all who are attracted to our coasts in search of health and pleasure.

Should Dr. Cocks carry out his present intentions, we can assure him of our most cordial co-operation, as we have from experience learned to value the luxuriant beauty of the specimens of Algæ which he has already arranged for distribution among his friends, and in which all the characteristic features are most prominently preserved, while the graceful habit of the plants is never sacrificed.

In the present little work our author's object is merely to assist the collector, by such judicious directions, as will enable him to collect and preserve his specimens for future examination. These directions (which also include instructions of how to mount specimens for microscopic examination) are followed by a systematic list of the British Marine Algæ, while the volume is concluded by an alphabetical list of them, with localities and times of appearance. We with difficulty refrain from extracting some directions for the management of the more delicate species, and those for the preparation of specimens for the microscope, which we had marked for that purpose; but, on reflection, we will, in justice to their author, content ourselves with strongly advising our algæological readers to *purchase, read, and practice* the directions of Dr. Cocks for the preservation of these ocean flowers, and we will assure them that the increased beauty of their collections will amply repay the time and money expended.

Wanderings among the Wild Flowers; How to See and How to Gather Them. With Two Chapters on the Economical and Medicinal Uses of our Native Plants. By S. Thomson, M.D., F.R.C.S.E. With upwards of 170 Engravings. Pp. 338. 8vo. Price 5s. London: Groombridge and Sons. 1854.

This little work contains a pleasing epitome of botanical science; not, it is true, very scientifically expressed, but sufficiently so, we think, to serve as a stepping-stone to a work like Balfour's Botany. We have, in Part I., a popular treatise on the organs of plants. Part II. contains—Classification of plants, its necessity and use. We need not dwell upon either of these chapters, but will hasten to the next, which is the most original part of this volume. It opens with an account of a student's botanical excursion in Scotland. This is interesting, and we append it—

"The rendezvous for one of the Saturdays of July, 1835, had been fixed at the village of Currie, six miles from Edinburgh—not then, of course, as now, a railway station; and, as botanists do not ride, it was walking distance. The trysting-time at the inn, eight o'clock, and breakfast ready; six, therefore, must be the time to start from town. As bright a July morning as ever dawned it was, as the author, with one friend—now the Madras editor, Dr. Alexander Hunter—started for the meet. Parties of twos, threes, and fours soon gathered, all tending towards the

same destination; and before the quarter after eight had elapsed, upwards of fifty young men were gathered in the large room of the inn, eagerly looking for the advent of the rolls, the eggs, and all etceteras which were to satisfy appetites sharpened by a six-mile walk. Fearful would have been the consternation of our host had this inroad come upon him unprepared; but two days' notice, and a previous knowledge of botanical appetites—by no means vegetarian, however—had served to allow ample provision, testified by the clothes-baskets heaped full of rolls, the huge wickers of eggs, the beef, and the hams.

"Almost we hear now the merry laughter of that breakfast-table, almost see the air of *bonhommie* with which our good professor, after himself diving to the kitchen, re-appeared with another basket of eggs, when all were thought to be exhausted ere appetites were satisfied. Almost can we see the grave humour beaming in the genuine Scottish face of 'old Macnab,' known far and wide in Europe as the skilful manager of the Botanic Gardens, the professor's lieutenant, and whose walking powers of three score could tire out many, if not most, of the younger limbs then present. Now and then would the laugh become doubly hearty as some laggard straggled in late, and looked ruefully around at the almost cleared board. But, breakfast over, then came the start for the hills and moorlands which were to be the scene of the day's explorations. Most of the band were really practical botanists, were well shod for the purpose, wore the light shooting-jacket and light cap, and carried boxes which would hold good store of plants; not a few with good, stout hand-spades slung to the waist or button-hole; some only evidenced their novitiate by appearing in white trousers and natty boots, of whom more hereafter.

"A short two miles, and the first exploring ground is reached—an extensive bog, where grew not only most of our common bog-plants, but a few rarer species; one, more especially, of the orchis family, the *spurless coral-root*, found only in a very few situations in Scotland. No sportsman can feel more eager interest than the enthusiastic botanist in search of a rare plant; the plant was soon found; but well was that bog searched over, and more than once did eagerness or ignorance lead some to venture on treacherous surfaces, to find themselves, without warning, sunk up to the middle in the black bog-water. To the men of strong shoes and rough trousers this was but a small calamity; but woe betide the well-cut boot and white inexpressibles, whose luckless owner had the laughs of the entire party to meet. By high noon, the bog having been exhausted, the hills had to be breasted, and more than one covey of grouse whirred off from among the patches of the mountain cloudberry (*Rubus chammæmorus*), to reach which formed the outside limit of the excursion. Then, along the dry, open moorlands, gathering on our way the small, white butterfly orchis (*Habenaria albida*), the curious little fern-moonwort (*Botrychium lunaria*), and many others, till we came to, in a small hill-bog, the thread-like stems of the cranberry (*Vaccinium oxycoccos*), resting on the surface of the white sphagnum moss, and bearing its rose-coloured blossoms and berries together. But the sun of this July day has shone fiercely, and, by three o'clock, thirst oppresses many who have not had a sip from a pocket-flask of cold tea, or wine and water. There, on the side of 'the black hill,' a line of fresh green tells that a spring rises no far way up, and sure enough we find it, clear and pure as only these hill-streams are—cold too, almost too cold for safety; but many a thirsty one drinks from the 'diamond of the desert' notwithstanding. Thirst quenched, e'er long something tells that the stomach has long since disposed of the ample supplies of the morning. Some had been careful enough to provide a biscuit, or to pocket a roll from the breakfast-table, and some were happy enough to own such a provident friend willing to share with them; but the supplies were sadly scanty.

"There is the professor—his tall, handsome form was ever distinguishable—striding off to that hill farm-steading (or, rather, on Scottish ground, "farm-town"), and soon his hearty call is heard. He has bought up the whole of the good wife's dairy store—and milk, food, and drink together, is there for the whole party. We wonder if the good woman ever had her milk-pans so thoroughly cleared before—they were then.

"Another stretch across the moorland, a search down the narrow glen of the

bonny burn which makes its way through it, in alternate stream, cascade, and pool, stream and cascade again, and seven o'clock in the evening finds most of the party —some few had deserted early in the day—at the scene of the morning breakfast. But, alas, our host had not calculated upon an evening foray, as well as a morning raid, and the late furnishing of comestibles was but scant compared with the early —actually there was not enough. One of the party we detected—we almost think it was our friend of Madras—laying violent hands on some rather musty beef-bones in the pantry, which the host had been ashamed to bring out.

"Then came the dispersion. Some, unused to the exertion, must stop at the inn; some lagged on the road; some stopped at the half-way village; and a few only, with the professor and his veteran lieutenant, marched into town at ten o'clock, well tired, but well satisfied, and one at least of the party to remember the day as one of the green spots in life's retrospect, which, like a thing of beauty.

'Is a joy for ever.'"

Then we have "Monthly Illustrations," which will be a guide to the tyro botanist as to what plants he may find in each of the twelve months. Lastly, we have a chapter on the economic properties of British wild plants; one on "Native Medicinal Plants" used in regular medicinal practice, and on those chiefly employed "popularly," in which we find that the herbalists and old wives go in direct opposition to the saying, "that what is *sweet* to the mouth is *good* for the stomach;" for we do not find one plant in the list given that is not a most disagreeable bitter. This our readers can be made practically aware of by tasting the "tansey," "wormwood," and several others. We doubt not but that this little work, unpretending though it be, will be a great help to many a beginner in the delightful study of our "wild plants and flowers."

A Popular History of British Mosses; comprising a General Account of their Structure, Fructification, Arrangement, and General Distribution. By R. M. Stark, F.B.S. Royal 16mo. Price 10s. 6d. Pp., 324. With 20 Plates, coloured, representing 55 species. London: Lovell Reeve. 1854.

Strange though it may appear, this is the first work on the British mosses which tells us about them in a popular and pleasant style, and, at the same time, gives us the important and scientific descriptions of them, without which we would be unable—however much we might be attracted by their beauty—to distinguish one from the other. We purposely omit mentioning W. Gardiner's "Lessons on Mosses," which, though a delightful little work, did not, we think, sufficiently combine the *utile cum inutile*—freely rendered, the scientific part with the popular.

The introduction contains a very interesting account of the uses of the mosses, which are more than, at first sight, one would imagine. Mr. Stark gives them very little credit for usefulness in a medical point of

view; and, even in treating of the well-known Marchantia, he forgets to tell us, that for curing a "cold," or "binding of the heart," it is the sovereign'st thing on earth. Whether this be the case or not, we think there are few of our readers who will study this introduction but will unite in saying, with an eminent botanist—"In the economy of man they form but an insignificant part; but in the economy of nature, how vast an end!"

We have the greatest pleasure in strongly recommending this work. Let our readers but obtain a copy of it, together with a penknife and a good Codington lens, and they will be enabled to find fresh interest in their daily walks—whether they be on the mountain-tops, or by the river's side—yes, even on the wall-top, and on the garden-walk, they will find plenty to instruct both their eye and heart. They will, doubtless, have a large field open to them, as there is no spot on the surface of our globe more highly favoured with the mosses than the British Isles; and some of them may be found all the year round. If they be collected in boggy ground—a favourite locality—the collector should beware lest he "fall into a peat-hole," and come home in a most deplorable plight, with a loss of all his mossy treasures, and a great addition to his accustomed weight. We have instructions for raising some of the Musci by seed; but, by some mistake, we have none for preserving them—however, this is very easily done.

We think naturalists, in general, should thank the publisher of this series of popular natural history, and we think botanists, in particular, should welcome this charming addition to its numbers. The plates are drawn by Fitch, and represent 55 different species. With their aid, we have no doubt, beginners will be able to make good progress in naming their collections.

Catalogue of British Marine Polyzoa in the British Museum. With Plates. Parts I. & II. 8vo. By George Busk, F.R.S., &c., &c.

Since the publication of Dr. Johnston's Monograph, which must ever be valued by the student of our native zoophytes as *the* authority to which he will most naturally refer, the naturalist has received no so welcome boon in connection with these but too long neglected classes as the present work, for which we are indebted to the zeal and liberality of the Trustees of the British Museum, and we gladly hail it as a proof of the rapid advance which has been made, within the last few years, in zoophytological science, and as

a noble earnest of what the entire catalogue, of which these form a portion, will be when completed.

In calling them "a catalogue" a slight error in nomenclature, resulting either from that *ignis fatuus* love of uniformity, or from a, perhaps, more pardonable excess of modesty, has, however, been committed by their able and judicious compiler; to give any just idea of the contents, he should have called these parts a *monograph* and not a catalogue, containing, as they will when finally completed, a catalogue of *all* the marine Polyzoa in the British Museum, accompanied by figures and descriptions, not merely of the genera, but also of *all the species* contained in their pages, and which, being drawn up from the typical specimens, will give them an additional value, more especially to the British student, as they refer to the specimens, in many cases, used by Dr. G. Johnston and others when describing the species recorded in their writings. A sound discretion has been exercised in the selection of their compiler. Mr. George Busk—who has also made the drawings, with which they are so plentifully enriched—has long been known as a laborious student of the lower forms of animal life, while his skill, as a practical observer, has given a facility in the use of the microscope, which is apparent on even a cursory examination of the plates, which are all drawn *to scale*, with the camera lucida; so that the absolute and relative proportions of each object are at once evident. In the two fasciculi now before us, are contained the suborder *Cheilostomata*, in which are included such of the *Infundibulata* as are characterized by having the "aperture of the cell filled with a thin, membranaceous or calcareous velum, with a crescentic mouth, and provided with a moveable lip." Under this head are contained the following fourteen families with their contained genera:—Catenicellidæ, Salicornadæ, Cellulariadæ, Scrupariadæ, Farciminariadæ, Gemellariadæ, Cabereadæ, Bicellariadæ, Flustradæ, Membraniporidæ, Celleporiadæ, Escharadæ, Vinculariadæ, and Selenariadæ.

In drawing up the characters of the species contained in the foregoing families, very considerable use is made of the *Avicularian* and *Vibracular organs*—the possession of which appears to be, as Mr. Busk justly observes, peculiar to this suborder; and a very able though brief analysis of his views on this point is subjoined to the conclusion of Part II., with the purpose of indicating the present state of our knowledge on this subject, and also of directing attention to their importance in affording diagnostic or systematic characters. To these views we have already directed the attention of our readers, when they appeared in the Transactions of the Microscopical Society. Since that period, we ourselves have more carefully examined these strange organs, and we do not hesitate in expressing our

conviction of the importance of a more close and attentive observation of, and would suggest to our fellow-students carefully to examine, them, as they undoubtedly merit the statements made by our author, not only as they appear in print, but also by the test of actual observation. Much still remains to be done upon this subject, which, however, requires patient industry, joined to many independent observations, before any theory, however plausible, can be finally adopted. We annex the summary we refer to, and we trust that it will cause some of our sea-side readers to commence an accurate and uninterrupted series of observations on these puzzling appendages.

"The organs in question are of two kinds—the one forming a sort of pincers, and the other consisting of a long, slender, moveable seta, and the muscles, by which it is moved, contained in a special receptacle or cell. To the former set of organs, of whatever form, the term *Avicularian* is here understood to be applicable, and the latter are termed *Vibracula*. With the respect to the structure of these organs of either class, it is sufficient to remark, that however diverse their appearance may be, they are all constructed upon the same general type—that is to say, the organ consists of a hollow cup, containing two sets of muscles for the movements of the motile portion—the *mandible*, as I have termed it, in the one case, and the *seta* in the other.

"The *Avicularian*, besides the moveable *mandible*, which varies extremely in form and length, always has a more or less well-marked corresponding fixed *beak*—the opponent, as it were, of the *mandible*, and serving to constitute the organ an instrument of prehension.

"This beak is necessarily absent in the *Vibraculum*, which appears to be merely a defensive organ, or, perhaps, in some cases (as in the *Selenraiadæ*), having a locomotive function; and its absence in cases when the moveable part of the organ is detached, would serve to distinguish the one kind of organ from the other. It is to be regretted, however, that, in the instance of fossil species, when such a character would be of extreme value, this beak, which is, I believe, always constituted of a horny or chitinous substance, is removed with all other vestiges of the animal tissues. The presence of the beak also serves to determine, in some cases, the Avicularian nature of the organ, when, as in several species of the *Lepralia*, the setose form of the mandible might indicate that it would be more correctly referred to the Vibracular type.

"1. As regards the *Avicularia*.

"These organs, which appear first to have been noticed by Ellis, have been investigated and described by many subsequent authors, among whom are particularly to be noticed Mr. Darwin, Dr. Van Beneden, the late Professor John Reid, and especially Nordmann and Krohn.

"In some observations upon the structure of the Polyzoary, and other points in the economy of the *Notamia bursaria*, published in the Transactions of the Microscopical Society for 1847, I described more particularly the structure of the curious and unique form presented by the Avicularian presented in that Polyzoan, pointing out, I believe for the first time, that the muscles were divisible into two distinct sets—one for the closing, and the other for the opening of the mandible; I also indicated that the mandible and beak were constituted of a different substance from the rest of the organs before referred to; and that besides the two sets of muscles, the cup contained a 'peculiar body of unknown nature.'

"I have, in addition, to remark, that since then it has occurred to me to notice a circumstance hitherto overlooked, and which may eventually serve to throw some light upon the 'peculiar body' contained in the cell, to which I adverted in my observations upon *Notamia*. It was in that species also that I first noticed the fact, that when the mandible is thrown back, or, in other words, when the Avicularian is open, a slight prominence comes into view, covered with delicate setæ, which do not

seem to be of the nature of *cilia*, because they exhibit no motion. These minute setæ appear to be seated on the 'peculiar body,' or, at all events, to be moved with it, and the latter, again, seems to be so connected with the muscles by which the mandible is closed, or rather, perhaps, to be a membrane by which the opening of the cell is covered, when the mandible is thrown back, as to be protruded, simply by the throwing back of that process. The *setæ* then project beyond the level of the cup, and are withdrawn into it as the mandible closes. I have noticed this arrangement, at present, only in three species of Polyzoa—viz., *Notamia bursaria*, *Bugula plumosa*, and *B. avicularia*. In *Scrupocellaria scruposa*, the only other species I have had sufficient opportunity of examining in a living state, I failed in detecting, and am, therefore, not prepared to state that it obtains universally; the *setæ* might be supposed to constitute a tactile organ, the object of which would be to apprise the occlusor muscles of the contact of any minute floating object, upon which the mandible is then suddenly closed.

"With respect to the function of the *Avicularia*, several circumstances, independent of their conformation, conspire, I think, to show that they are probably organs of prehension.

"Their structure so obviously indicates an aptitude for prehension, that the supposition of such being their function has long been entertained. The prehension of objects may be either for purposes of defence, or, more probably, for the procuring of food; for, as Dr. Johnson observes, 'although they are too short to hand the prey to the mouth, yet retained, in a certain position, and enfeebled or killed by the grasp, the currents set in motion by the ciliated tentacula may then carry it within reach.' The prehension of living objects by these organs has been repeatedly observed; and, on one occasion, I have witnessed the capture of a minute vermicle, by two of the *Avicularia*, simultaneously, on opposite sides of a branch of *Scrupocellaria scruposa*, and its retention by them for several days, notwithstanding the continuous and vigorous efforts of the victim to escape.

"With respect to the *Vibracula* that they consist of a cup containing the muscular apparatus, and of a movable *seta* articulated to the cup, and which appears to be moved in the same way as the mandible of the *Avicularia*, this *seta* is, in most cases, simple and terrete; and in others, as in the family Selenariadæ, the seta is very variously and curiously formed—in some being bifid or trifid at the extremity; and in one (*Selenaria maculata*) it is spirally contorted and minutely annulated, so as very closely to resemble the proboscis of a butterfly.

"As to the function of the Vibracula it would appear, in most instances, to be simply defensive. The *seta* may be observed in almost continual motion, sweeping slowly and carefully over the surface of the polyzoary, and removing what might be noxious to the general inhabitants of the cells when their tentacula are protruded.

"Another circumstance, however, often to be observed with respect to these organs is this, that each presents inferiorly a perforation sometimes rounded, as in *Scrupocellaria* and *Canda;* sometimes channelled, as in Caberea, which indicates the point of attachment of a radical root or fibre. But that this connection with a radical tube is not an essential attribute of the vibracular organ is sufficiently obvious from the circumstance, that those tubes are frequently found where no such organs exist; while, on the other hand, where there are *Vibracula*, the tubes invariably enter them, and not the cell itself. This is especially evident in the genus *Canda*.

"In the case of the *Selenariadæ*, or Lunulites, I think it not improbable, as above remarked, that the Vibracula may be subservient to locomotion. This point would form a most interesting subject to those who may be so fortunate as to obtain these remarkable creatures in the living state.

The *Avicularian* and *Vibracular* organs appear to be of very considerable importance in a scientific point of view; and although, from our imperfect knowledge of them—and, in fact, of many points in the economy and structure of the *Polyzoa* in general—the supposition can only be regarded as highly problematical—it seems not unlikely that their presence or absence, especially of the *Avicularian*, may be connected more directly with the intrinsic nature of the

species upon which they are found, than has hitherto been supposed. It may, for instance, be the case, that those furnished with those offensive weapons live upon a kind of food different from that of the others, who do not require such an aid in the capture or weakening of their prey. The *Polyzoa* may, perhaps, be thus divided into vegetable and animal feeders; or into feeders upon the dead and those which subsist upon living organisms. One thing, however, may be affirmed, that these organs afford, in many cases, excellent and available systematic characters, of which application this Catalogue will afford abundant evidence. With respect to this part of the subject it will be, therefore, unnecessary here to add more than a few words.

"Of the two sets of organs the *Avicularia* are found by far the most extensively; existing, in fact, in the majority of genera constituting the cheilostomatous Polyzoa. In applying these appendages for the purposes of classification, it is necessary to divide them into three classes—1, the *pedunculate;* 2, the *sessile;* 3, the *immersed.* The two latter classes, however, run insensibly into each other, while the pedunculate form is obviously quite distinct, inasmuch as it presents an additional feature in the shape of a basal joint. It is to this form of Avicularian that the term 'bird's' or 'vulture's heads' is more properly applied. It occurs in *Bugula avicularia*, *B. plumosa*, *B. flabellata*, *B. dentata*, and *Bicellaria ciliata;* while it is wanting altogether in *Bugula neritina*, *Bicellaria grandis*, and *B. gracilis*—species, therefore, which it is very desirable should be examined in the fresh or living state, for the purpose of examining whether the inhabitant of the cell does not afford characters sufficient to cause these species to be referred to genera distinct from those to which, from consideration of their skeletons alone, they are now regarded as belonging. A modification of pedunculate Avicularian, where it assumes the form of a long, trumpet-shaped, or 'infundibuliform' organ, exists in *Bicellaria tuba;* with the exception of this latter organ the pedunculate *Avicularia* are always placed on the anterior surface of the cell, on one side, below the level of the aperture.

"The *sessile* form of *Avicularian*, distinguished from the immersed, occurs pretty extensively, though not so abundantly as the latter form. With a single exception, *Amastigia nuda* is almost invariably placed upon the front of the cell, below the aperture, as in *Alysidium Lafontii*, most species of the genera *Meniphea*, *Scrupocellaria*, and *Canda*, and in many of the genus *Cabarea*—in some (as in Serupocellaria ferox) attaining gigantic dimensions. It is distinguished from the immersed form of *Avicularia*, not only by its greater projection, but also, and, perhaps, more essentially, by its being composed of a more or less flexible material; while in the latter form, where it is even somewhat prominent, the cup is always calcareous and rigid.

"The immersed form of the Avicularian occurs in a great number of genera and species, and, in many instances—as in the genus Lepralia—affords excellent specific characters. The variety of appearances and position afforded by this form of Avicularian will be best appreciated upon inspection of the figures."

We have extracted these observations at full length, with the hope of engaging the *eyes* of many who have already, perhaps, barely noticed these curious appendages; and, we trust, that a Catalogue, drawn up with such care and fidelity, will soon prove its utility by increased exertions on the part of many a solitary student, who, without such aids and encouragements, would be almost tempted to abandon, as fruitless, the field of research he had marked out. Two points in the Catalogue we notice with regret—one the frequent change of nomenclature, in some instances different even from that recently adopted in the "List of British Radiata," another publication of the British Museum Trustees; in extenuation of this,

its able compiler may, with great propriety, plead the almost infant state of our knowledge of the *Cheilostomata*, and the abundant and accurate lists of synonyms which he has in every case appended; the other is the price at which they are published. This we would not, perhaps, dispute if they appeared as publications emanating either from the pen of Mr. Busk or any other similar source; but when they are ushered into existence with the pompous announcement that they are *printed by order of the Trustees of the British Museum*, we would have hoped that the price of the Catalogue might be such, that, when completed, even the poorest student could have been in possession of it as a welcome addition to his previously scanty store.

We, however, will look with impatience for the future parts, and hope that these two, comprehending so many puzzling genera, will be succeeded by others in which the same care and accuracy of description will be maintained, and that their talented author will be spared to see them valued, as, sooner or later, they must be by *all* who are capable of duly appreciating the laborious research which every page bears evidence of.

We also regret, that in the conclusion of Part II. a Concordance of Synonyms, similar to that appended to other lists published by the British Museum, was not attached. We hope, however, to find it with the last part, as we can speak from experience of the great facilities it affords the student, who, perhaps, is only acquainted with the nomenclature of some British Monograph; and this is the more necessary, as in some genera of the *Cheilostomata* the specific distinctions are often so trivial as even to puzzle a practised observer to recognise them with certainty.

Of the illustrations of every species catalogued we cannot speak too highly; they far surpass anything of the kind we have yet seen for rigid accuracy and fidelity of execution, and will be prized by all whose good fortune it may be to possess so valuable and welcome an aid as "Busk's Catalogue of British Marine Polyzoa."

A Monograph of the sub-class Cirripedia. With figures of all the species. By Charles Darwin, F.R.S., F.G.S. Volume I. 8vo. The Lepadidæ. London: Printed for the Ray Society. 1853. With 10 Plates. Volume II. 8vo. The Balanidæ, The Verrucidæ, &c., &c. London: Printed for the Ray Society. 1854. With 30 Plates.

Until comparatively recent years, the Lepadidæ and Balanidæ—commonly known by the names of "barnacle," and "acorn shells"—were supposed to

belong to Cuvier's second division of the animal kingdom—viz., the Mollusca —and came under the denomination of multivalve shells; which term was applied by the great Swedish naturalist, not only to those animals which really belonged to the Testaceæ, but also to the Cirripedes, which have nothing whatever to do with shells, properly so called. It was not, however, until Mr. V. Thompson's splendid discovery of the larva in the last stage of development in the Balanus, that this sub-class received its proper place in the third division of Cuvier—namely, the Articulata—and in the class Crustacea. This error in classification is not surprising when we consider the fixed condition of their shell, and the degree of external resemblance between, on the one hand, Lepas and Teredo, and, on the other hand, between Balanus and a Mollusc, compounded of a patella and chiton. It is remarkable that Cuvier, although aware of their internal structure, allowed the external false resemblance to the Mollusca to counterbalance the opinion which his knowledge might have arrived at.

Straus, who was an eminent and philosophic writer, remarkable for his bold deductions and able generalizations, was supposed to have been the first who, in 1819, maintained that the Cirripedes were most nearly allied to the Crustacea; but this view was disregarded until Mr. Thompson's discovery, just alluded to, about eleven years afterwards; since that time, with trifling exceptions, the Cirripedes have been almost universally admitted among the Crustacea.

In the present able Monograph Mr. Darwin divides the Cirripedia into three orders—viz., the Thoracica, Abdominalia, and Apoda—between which the fundamental difference consists in the limbs or cirri being thoracic in the first, abdominal in the second, and entirely absent in the third. The Cirripedes are commonly bisexual or hermaphrodite; but in some genera the sexes are separate. The males in these genera are minute—often exceedingly minute—and, consequently, more than one is attached to a single female. In several species they are short-lived; for they cannot feed, being destitute of a mouth or stomach. In those genera it is the females which retain the characters of the genus, family, and order to which they belong—the males often departing widely from the normal type. Perhaps among all the wonders that we occasionally hear of in natural history, none are so strange or so startling as the description of the males of the Cirripedes. In some cases they are rudimentary to a degree, unequalled in the whole animal kingdom, so as to exhibit, in fact, nothing but mere bags of spermatozoa. For example, the male Alcippe has no mouth, no stomach, no thorax, no abdomen, and no appendages or limbs of any kind! After such a surprising amount of abortion, Mr. Darwin

supposes it very likely that he may be asked, how he knows that these rudimentary epizoons are really the males of the Cirripedes to which they attach themselves, and answers—" that even if the whole course of the metamorphoses had not been known in three of the cases, the mere fact of these epizoons being cemented by the three terminal segments of their peculiar, pupal antennæ, would have been sufficient to have shown that they belonged to the class of Cirripedes." He was also able to demonstrate, in nearly every case, that these epizoons were males; and as in several cases the spermatozoa were developed, and in no instance, notwithstanding, was there a vestige of ova or ovaria, it may safely be concluded that they were not hermaphrodites, and, therefore, required females of some kind. And who would, under these circumstances, conclude that they had no special or sexual relation to the female Cirripedes to which they are attached? This subject is most fully treated of in the text; but we give the above interesting, though curious facts, hoping it may be the means of making some of our readers take an interest in this strange class of creatures. In speaking of the metamorphoses of the Cirripedes, Mr. Darwin says as follows:—

" I have reason to believe that the metamorphoses undergone can be reduced into three principal stages or heads, and that these three include all the main changes. *First*, larvæ in first stage—Their shape is oval and the whole dorsal surface is evidently covered by a carapace; the body exhibits no distinct articulations; the eye varies considerably in the state of its development, and is of different shapes. In Scalpellum vulgare we see arising posteriorly to the eye a pair of minute curved horns directed backwards. These horns are very difficult to make out, and probably could not be seen previous to first moult in any larva of smaller size than that of S. vulgare; but after the first moult these appear to enclose the first pair of antennæ; the second pair are not found until the pupal state. The mouth is more or less proboscidformed, differing considerably in this respect in different species of the Lepadidæ; during its very early stages there are no jaws; but the labrum is furnished with some short, thick, sharp spines and some hairs. We come now to the three pairs of natatory legs; the first has throughout the order only one ramus, whereas the two succeeding pairs are biramous. After the first moult these limbs are furnished with plumose spines, some curved and some straight and strong, which are most probably prehensile. Lastly, behind the natatory legs on the ventral surface, the body is much produced and terminates in a horny fork, which, after the first moult, becomes much elongated; after the first moult the posterior end of the carapace becomes much elongated and serrated on both sides. Situated under this posterior prolongation of the carapace there is a swelling which apparently lies on the dorsal surface of the spinose and forked abdomen; here, when the larva is compressed, the cellular and oily contents of the body burst forth; and I suspect that this swelling is the anus. *Larva second stage*—Only one specimen has hitherto been observed of a larva in this stage. The carapace has now greatly altered its character. The small internal and anterior pairs of antennæ are, it would now appear, aborted; the eye has commenced becoming double; the mouth is proboscidformed and does not differ much from its condition in the first stage; the first pair of legs is uniramous, and the two other pairs biramous; the abdomen has become much shortened, but still space is left for the development in the pupa of the three posterior pairs of legs. *Larva* in the *third* or *pupal stage*—On comparison with the larva in the second stage, the changes in external appearance and structure are not very great;

the prehensile antennæ are freed from their cases; the two eyes stand further apart; the three posterior pairs of legs have been developed, and a small abdomen has become distinctly separated from the thorax. When the due time for the act of the metamorphosis has arrived, the pupal carapace splits along the dorsal edge and is cast off, together with the acoustic sacks, the basil segments of the two antennæ, and the great, black, compound eyes, hanging to the UU-like apodemes. The exuviæ usually continue for a time united to the cemented antennæ, but are finally washed away."

We need hardly say that the above extracts are only a tithe of the account given by the author, which extends over many pages, and that in several species slight modifications occur. We have a long account of the structure of the shell and of the anatomy of the various parts of the body of the Cirripede. In speaking of their nervous system, we have some interesting remarks on their sensitiveness, which we subjoin—

"I found the following three species—viz., *Balanus balanoides*, *B. crenatus*, and *Chthamalus stellatus*—very sensitive to shadows—that is, to an object like my hand, passing even quickly, and at the distance of about a foot between them and the source of light. They were indifferent to a gradual change from bright to obscure light; but instantly perceived and drew in their cirri, when my hand was passed between the basin in which they were kept and the window, even when this was tried rather late on a dusky evening, and, likewise, when my hand was passed between them and a single candle. I took, of course, the precaution of passing my hand in other directions, but this never produced any effect. These species are moderately sensible to any vibration in the vessel in which they were kept, but they were indifferent to noises made in the air, or in the water. I found it impossible to touch, under water, an individual shell ever so lightly with a needle without all the immediately surrounding individuals, when several adhered together, perceiving it and retracting their cirri; it made no difference whether the one touched had withdrawn its cirri and was motionless. From this fact, and from seeing that a similar, but slighter effect was produced by touching the rock on which the specimens adhered, I infer that the perception by the others of the one being touched, is communicated by vibration. When an individual was touched under water, not by a needle but by a pointed camel-hair brush, it generally withdrew its cirri; but the neighbouring specimens took no notice; when touched by a single hair of the brush no notice was taken, unless the skin of the orifice leading into the sack was so touched."

With respect to the geographical range of this sub-class, the results arrived at have no very peculiar interest, owing to the species not being sufficiently distinct, and, what is still more adverse, the genera, with unimportant exceptions, range over the world. Sessile Cirripedes are found in every sea, from lat. 74° 18′ north, to Cape Horn. Mr. Darwin divides the globe into four provinces and one sub-province. First, the North Atlantic Province, to lat. 30° north, contains 31 species, of which 22 are confined to the province; if the West Indies be included, the numbers will be 42 and 28. Second, sub-province of South Africa, total number of species, 11; peculiar to the province, 5. Third, second province, west coast of North and South America, total number of species, 22; peculiar, 15. Fourth, third province, East Indian Archipelago, total number, 37; peculiar, 24. Fifth, fourth province, Australia, total number, 30;

peculiar, 21. Total number of species enumerated, 122, which, with 18 excluded, owing to their being attached to floating or swimming objects, or to their habitation being unknown, make 147, which is the total number of known existing Cirripedes.

Wonderful as is the present history of the barnacle, yet our forefathers believed in fables which, certainly, if true, would have been more astonishing than anything we have found in the pages of the two octavo volumes before us. We allude to the once popular (?) belief that the barnacle goose was the offspring of these marine creatures; and notwithstanding that worthy Master Gerard gives a circumstantial account of the whole process, and, moreover, prefaces it with a voucher, that "what our eyes have seen, and hands have touched, we shall declare," and even goes to the trouble of giving us a figure representing the metamorphose going on—which should satisfy the most incredulous—Mr. Darwin passes the worthy old naturalist by, and takes not the slightest notice of his account; this could not have been forgetfulness; for one could hardly repeat the name of the first species of the first genus of the Lepadidæ, without having the whole story strongly brought before him.

We have now told our readers of the existence of these two volumes—of what they treat about—and given them quotations, from which they will perceive that the wonders of this portion of creation are almost unrivalled; and it only now remains for us to give our opinion on the work.

We still recollect the suggestion given by one of our most distinguished British naturalists, some twenty years since, "that those who were really desirous of advancing the progress of zoology, should restrict their chief attention to some given department, and, when practical, to those particular groups which have been least studied; for that the longest life, added to the enjoyment of the most favourable opportunities, would not suffice for acquiring more than a very limited knowledge of the details of the history of all the existing species of nature." Acting on this advice, Mr. Darwin has applied his talents to the elucidation of the sub-class of the Cirripedia, as contained in these two volumes, which are published by the Ray Society; and it reflects credit on the Council of the Society that they selected for publication a work in every way so worthy of them. The plates to these volumes are drawn and engraved by George Sowerby with the greatest care, and will be found faithful delineations from nature. Mr. Darwin was awarded the Coply Gold Medal by the Royal Society of England for his researches in the Cirripedia, the result of which is contained in these volumes; after this high mark of honour, praise on our part would be of little worth; and yet we cannot help quoting the words addressed by the

great Sir Charles Linne to John Ellis, and referring them, in all sincerity, to Charles Darwin—"You have enriched our science by laying open a new submarine world to the admirers of nature. You have taken so lofty a rank in science, by your discovery among the Cirripedia, that no vicissitudes in human affairs can obscure your reputation." Such is our opinion of the author of this splendid Monograph; and we have little doubt that posterity will attach an equal value to it; and this, it is universally acknowledged, is the best test of a writer's merit.

Obituary.

It is with feelings of more than ordinary regret that we are called on to record the passage from time into eternity of two whose names were as familiar as household words to many of our readers—the Rev. David Landsborough, and Professor Edward Forbes; each of whom has left a blank in our scientific circles which will not be easily filled.

THE REV. DAVID LANDSBOROUGH,

Whose labours, to use his own language, "though carried on late and early, by one who all day, and every day, was occupied with his professional duties [duties which we know that *he* never neglected], were still far from unpleasant," and the record of which are well calculated, from their cheerful, popular style, to encourage many to tread in his steps. A severe attack of cholera carried him from the little things of this earth into the great things of eternity; he has ceased from his labours, he has entered into his rest; and for him we sorrow not, as those without hope.

PROFESSOR EDWARD FORBES,

So intimately associated with the progress of natural science in this country, has also passed away; but his memory will be long treasured up among the bright things of the past by all who were acquainted with him. Possessing scientific talents of the highest order, he was also gifted with those social qualities which were most calculated to endear him to all his fellow-students; and though his circle of acquaintance was more than usually great, it has been frequently remarked of him that he was a man who never lost a friend. There are few who read this

notice who cannot record instances of his kindly disposition, often most prominently displayed to those most in need of sympathy and friendship. Professor Balfour, his early friend and fellow-student, has already sketched,* with a kindly hand, the history of his discoveries; and shown what a man of zeal and energy may, even in this every-day world of ours, accomplish; and how, independently of a high reputation, he may also win that which is more difficult of attainment, the love and respect of all engaged in the same career.

He died at Edinburgh, on the 18th of November, 1854.

JAMES EDWARD WINTERBOTTAM, ESQ., M.B., F.L.S.,

Was born on the 7th of April, 1803, and was educated at private schools, partly at Twyford, near Winchester, under Mr. Clarke and Mr. Bedford, successively; but principally at the Rev. Dr. Mayrick's, at Ramsbury, in Wiltshire; he was entered a commoner at St. John's College, Oxford, in May, 1831, and in July, 1833, took out his M.B. degree. Of independent fortune, well educated, well informed, possessing a mind deeply imbued with a love of natural history, and endowed with almost an athletic frame, it is no wonder, says Sir W. Hooker, that he early sought to improve his mind by travelling. Owing to his remarkably retiring habits, and a disposition to avoid whatever might bring him into public notice, it would be impossible to do justice to his memory by stating all the services which Mr. Winterbottam has rendered to science.

On the 3rd of January, 1854, he left home for Egypt, *via* Southampton, and arrived at Alexandria on the 20th; after performing a voyage up the Nile for a considerable distance, he returned back to Alexandria, which he left in an Austrian steamer on the 14th April, for Beyrout, in Syria; he thence started over the Lebanon range to Balbec; thence to Damascus, Jericho, and Jerusalem, and all the other places of sacred interest. Having stopped at the Dead Sea for ten days, he went on to Beersheba and to Gaza, and returned thence by the coast to Beyrout; and, having visited Tyre and Sidon, went up to "the cedars," and almost to the summit of Lebanon, about 4,000 feet above them. Returning to Beyrout, he started in an Austrian steamer, the *Adria*, for Smyrna, on his way to Constantinople; but, being taken ill of diarrhœa, he was put on shore at Rhodes, on the 3rd of July, and died on the following day, after, it is said, six days illness.

* "Annals of Natural History," January, 1855.

Reviews.

A Synopsis of the British Diatomaceæ; with Remarks on their Structure, Functions, and Distribution; and Instructions for Collecting and Preserving Specimens. Vol. I., with 31 Plates By the Rev. William Smith, F.L.S. The Plates by Tuffen West. London. 1853. Price £1 1s.

About seventeen years ago, an expensive and elaborately-illustrated folio work was published in Germany. Its author was Christian Gottfried Ehrenberg, of Berlin, who had been already, by common consent, placed at the head of the investigators of the minutest forms of animal life, and whose fame as a microscopist had extended throughout Europe.

We shall not stop to criticise the views contained in the "Infusionsthierchen." Its author had a vast field before him, hitherto almost totally untrodden; for, however popular may have been the study of those infinitesimal beings which swarm in infusions of organic substances, and however much the faculty of wonder had been fed by the early revelations of the microscope, yet the whole attention of the older observers of these living atoms was directed to their external forms and habits, while of their internal structure there was, literally, almost nothing known till Ehrenberg engaged in their investigation. Ehrenberg had, therefore, nothing to fall back upon—he had no clue left by previous explorers to guide him through the untrodden paths of the vast region on which he had entered. Can it be any wonder, then, that he frequently went astray, and that subsequent researches, with all the advantages derivable from his previous labours, and from the unequalled excellence of more modern microscopes, should have shown the untenableness of many of his positions, and have drawn forth from the territory on which he first planted the standard of scientific discovery new treasures, not even dreamt of by its own Columbus?

One great revolution which modern researches has effected in that immense tribe of organisms associated by Ehrenberg under the common name of "Animalcules of Infusion" is, the total abstraction from it of a very numerous class of forms, and the allocation of this class to the vegetable kingdom as its rightful territory.

Among the beings which have been thus dissociated from the true Infusorial Animalcules are a set of microscopic organisms, of very various form, consisting essentially of a delicate vegetable cell, enclosed in a little

shell of flint, which almost always presents upon its surface the most exquisite sculpture, varying from species to species, and in its delicacy and beauty exhausting our conceptions of decorative form.

These wonderful little bodies are sometimes solitary; but they are often found associated into companies, in which the individual members are united to one another, so as to form curious zig-zag chains, or flat ribbons, or radiating fans, or elegant little trees. When exposed to the action of strong acid or of fire, the soft, vegetable cell is consumed, and the flinty case remains behind entirely unaltered, and retaining all its beautiful sculpture; and though thousands of years may have passed away since the living vegetable was encased within its walls of flint, this same sculpture will be preserved as perfect as if it were only a thing of yesterday.

To become the possessor of the extraordinary productions we have thus attempted to describe, you have only to make a careful search in the nearest stagnant pool, or running brook, or along the sea-shore at low tides; you will be then almost sure to find multitudes of *Diatomaceæ*—for such is the name given by naturalists to the bodies now under consideration—forming a brownish-yellow covering, like fine down or velvet, on the stems and leaves of various water plants, or on submerged stones, or spreading over the mud at the bottom of the water, or floating as a a thin film upon the surface. The Diatomaceæ being thus recognised, you are to collect them from the different localities, in small, wide-mouthed phials. It is, in most cases, impossible to obtain them at the time of collection free from mud and other extraneous matter; but, to separate them from the various impurities with which they are associated, you have only to expose them in water for a few hours to the light of the sun, admitted through the window of your room, and then, by that mysterious sympathy which exists between light and organized beings, the Diatoms will separate from the surrounding impurities, and congregate at the light side of the vessel.

But when once the Diatoms are in your possession, and you have fitted them, by separation from extraneous matter, for examination under the microscope, an important question at once suggests itself—How are you to proceed in the study of them?—how are you to find out all that is already known about the produce of your day's collection?—and how are you to satisfy yourself that any particular species has been already described, or may not be a totally new form which you have been so fortunate as to discover?

Two years ago this would have been a difficult task for the English natu-

ralist; the works which were then in his hands were totally inadequate as helps in this particular pursuit; but, thanks to the beautiful book whose title stands at the head of the present notice, the difficulty has been almost entirely removed. Of Mr. Smith's work, only the first volume has as yet appeared—it is to be completed in two—and we anxiously look forward to the publication of the second, what we have as yet had affording an earnest of what we have still to expect.

It is proposed to figure and describe every species of British Diatom. The figures contained in the volume now before us are admirable examples of accurate natural history drawings; they are from the pencil of Mr. Tuffen West, and indicate something more than the qualities of a mere draughtsman in the artist. It is quite evident that he understood and appreciated his subject, and that he is himself not destitute of the observing and discriminating powers of a naturalist. Our author's descriptions are excellent—free from that vagueness which is too common in systematic works, disgusting the young inquirer with a confused mass of unintelligible diagnoses and convertible characters.

The present volume is preceded by an introduction, in which the author enters into numerous important and interesting details concerning the habits and general appearance of the Diatomaceæ, their structure, movements, and other physiological phenomena.

There are, however, one or two points in which we cannot agree with him; we cannot, for example, assent to his opinion where he attributes to the siliceous cases of the Diatomaceæ a composition out of cellular tissue as the true explanation of the various markings which they present. To us it appears, that we may just as well attribute to a similar cause the sculpture on the pollen granule of the flowering plants. The Diatom, as well as the pollen granule, is simply and essentially an *unicellular* organism; all its structural peculiarities and physiological phenomena connect themselves with this fact; and to attribute to any portion of it a mullicellular structure is, certainly, opposed to our own observation, and appears to us contradicted by general analogy.

This criticism, however, is not intended, in any degree, to detract from the general usefulness and value of the "Synopsis of the British Diatomaceæ"—a work which has long been called for by the students of one of the most charming departments of microscopical research. We believe that Mr. Smith's Synopsis has already given a decided stimulus to the study of the Diatomaceæ in this country, and that many facts of value in science have, even now, resulted from it; and we cannot conclude the present notice without congratulating the microscopic student on the fact, that Mr.

Smith's merits have just been recognised in his appointment to the chair of Natural History in Queen's College, Cork, where enlarged opportunities of research will be afforded him in a field where he has already shown himself so able and philosophical an explorer.

PRACTICAL TREATISE ON THE USE OF THE MICROSCOPE. By John Quekett. 12 Plates, and 270 Woodcuts. Second Edition. 8vo. London: H. Baillere. 1852. Price 22s.

MICROGRAPHIA; containing Practical Essays on Reflecting, Solar, and Oxy-hydrogen Gas Microscopes, Micrometers, Eye-pieces, &c., &c. By C. R. Goring, M.D., and Andrew Pritchard, M.R.I.A. 8vo. London. 1837. Price 7s. 6d.

THE MICROSCOPE, ITS HISTORY, CONSTRUCTION, AND APPLICATION. By Jabez Hogg, M.R.C.S.E. 500 Engravings. 8vo. London: Orr and Co. 1854. Price 7s. 6d.

MICROGRAPHIC DICTIONARY. By J. W. Griffith, M.D., F.L.S., &c., and A. Henfrey, F.R.S., F.L.S., &c. Parts I. to VIII. Plates and Woodcuts. 8vo. London: J. Van Voorst. To be completed in Twelve Parts. Price 2s. 6d. each.

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE. Edited by Edwin Lankester, M.D., &c., and George Busk, F.R.C.S.E., &c. Vol. I., 1853; Vol. II., 1854. Plates and Woodcuts. 8vo. London: S. Highley. Price 17s. each.

THE MICROSCOPE, AND ITS APPLICATION TO CLINICAL MEDICINE. By Lionel Beale, M.D., &c. Plates and Woodcuts. 8vo. London: S. Highley. Price 5s.

THE MICROSCOPE, AND ITS APPLICATION TO VEGETABLE ANATOMY AND PHYSIOLOGY. By Dr. Hermann Schacht. Second Edition, enlarged. Edited by Frederick Currey, M.A. Illustrated. 8vo. London: S. Highley. Price 6s.

WITHIN the last century so rapid have been the advances made in the science of observation, as to render it extremely difficult to trace the various stages of its progress. In a great measure this, more especially in later years, may be accounted for by the systematic mode in which observations have been carried on, as well as the great improvement which has taken place in those accessory instruments which the student has summoned to his aid. Among these, none now can vie with the microscope. Alternately frowned upon and petted, its claims have now been universally recognised as the indispensable companion of every true naturalist. Nor does its influence rest here; the physician seeks by its aid to penetrate the hidden fountains of disease, of whose outward manifestations alone he would otherwise be

cognizant; the jurist has invoked its aid to solve mysteries which otherwise would baffle his utmost skill; and in the manufacturer's laboratory its sway has been scarcely less potent.

Since the commencement of the present century its value has been, however, more distinctly recognised; and, in consequence, the improvements which have taken place in it have been more numerous. The withering ban of the immortal Linneus, and its failure to realize the visionary dreams of its early votaries, long obscured its claims to the affections of the naturalist. These malign influences were slowly but steadily removed, and it was, at length, after many a severe struggle, elevated from the chilling atmosphere of the toy-shop to be the handmaid of science. Its history, which is curious, has been ably wrought out through some nineteen centuries by Mr. Quekett. We do not mean to say, that the ancient Romans, though highly intellectual, had, among their artificers, any "Microscope-maker by appointment to the Emperor," nor any patron of science with similar tastes to the late Mr. Goring, Mr. Solly, or others we could name; but Mr. Quekett rightly conceives that the history of its development—its germ, if we may so speak—should be traced from the period when its scientific principles were first recognised; the earliest trace of it which now, perhaps, can be found occurs in the writings of Seneca, who was born during the first year of the Christian era, and died A.D. 65. He writes "that small and indistinct objects become larger and more indistinct in form when seen through a globe of glass filled with water."* From this period until the close of the sixteenth century, the notices of the optical principles upon which the microscope is based are few and scanty. At that period, however, at Middleburgh, in Holland, lived two spectacle-makers, father and son, named Jansen, or Zansz, who appear, among a host of rivals, to have made the first microscopes, and rude, unwieldy instruments they were; a copper, gilt tube, about six feet in length, and supported on brass pillars on an ebony base; at least such was the appearance of one presented, in 1617, to King James the First, by Cornelius Drebbel, who pirated the invention of the ingenious Hollander.

We regret that our space is not sufficiently ample to trace even the more marked epochs of its chequered history. We must turn to the wants of the working naturalist, and refer those who feel an interest in the curiosities of science to the pages of Mr. Quekett, where they will find ample opportunity of gratifying their tastes.

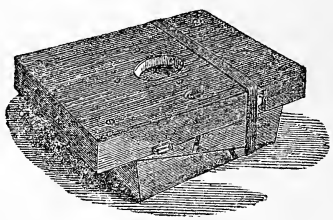
In making the following general observations, we wish to be understood

* "Literæ quamvis minutæ et obscuræ, per vitream pilam aquâ plenam majores clarioresque cernunter."—*Nat. Quæst., lib. i., cap.* 7.

as merely writing for those who, with very limited means at their disposal, are desirous of procuring a microscope to aid their researches. We wish to give some idea of what would be a good way of procuring a good, *plain* instrument *for use*, and at a moderate cost. Microscopes, as is well known, are divided into *simple* and *compound*—terms sufficiently well understood to need no definition; the former may be divided into those used in the hand, and those provided with a stand or apparatus for supporting the object to be viewed. In choosing the latter, the principal points to be attended to are, "to see that the stage is of sufficient size and strength, and that the arrangements for holding the lenses, and moving them in different directions, are convenient."

Microscopes of this kind used for dissecting are furnished by all the best makers. Of those we have used we prefer that furnished by Mr. Ross. In this instrument the arm at the top, which carries the lens-holder, has a forward motion, by rack and pinion, and a traversing motion, on a pivot, by which means the lens can be carried in any direction over the stage. It is usually furnished with lenses of one inch, half an inch, quarter of an inch, and one-tenth of an inch focal lengths, and sometimes with a Wollaston's doublet. For a figure of this instrument, accompanying the above description, we must refer to the pages of Schacht's valuable manual on "The Microscope, and its application to Vegetable Anatomy and Physiology." For those who may not be disposed to purchase so expensive a form of simple microscope, we can recommend the very portable one, called "Quekett's Dissecting Microscope," lately produced by Mr. Highley. Of this microscope the accompanying figures will give some idea. Fig. 1 shows the instrument folded up, with an Indian-rubber band round it, in a manner which admits of its being carried in the pocket. The two wedge-shaped pieces of wood unfold, and form the legs (see figs. 2 and 3). Fig. 2 shows the internal arrangement and the manner in which the mirror, lenses, and lens-holder are packed away. The straight flat bar, on the right in fig. 2, serves to keep the legs from closing together, and also as a support for the mirror, which slides into a piece of brass tubing, attached to the flat bar. The circular hole at the lower end of fig. 2, is another piece of brass tubing, into which the lens-holder slides. The instrument is furnished with three lenses, and is to be had at a moderate price.

Fig. 1.



In the compound microscope the mechanical parts may be divided into two parts—*the stand* and *the body*. "*The stand* is usually composed of a tripod, with two upright pillars; between these pillars is a bent bar, which works in a joint; the bar carries at one end the compound body, to which the object-glass and eye-piece are attached, and at the other end the stage and mirror. *The body* consists of a long brass tube, which carries the object-glass at one end and the eye-piece at the other; the object-glasses are screwed on to the body, but the eye-pieces are attached by their own tubes, which slide into the tube of the body."

Fig. 2.

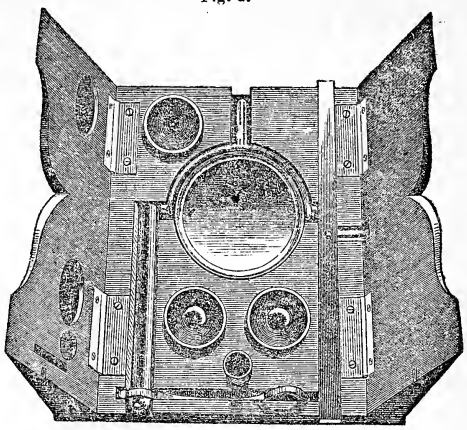
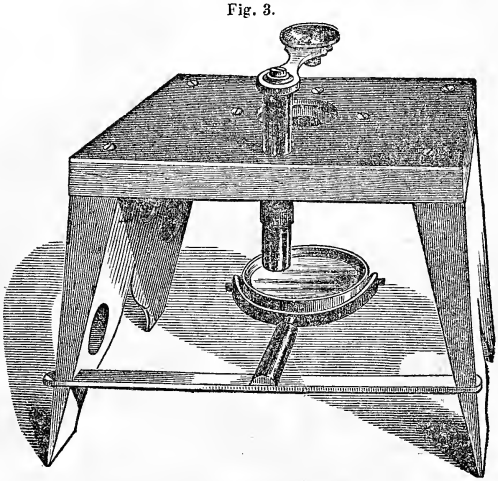


Fig. 3.

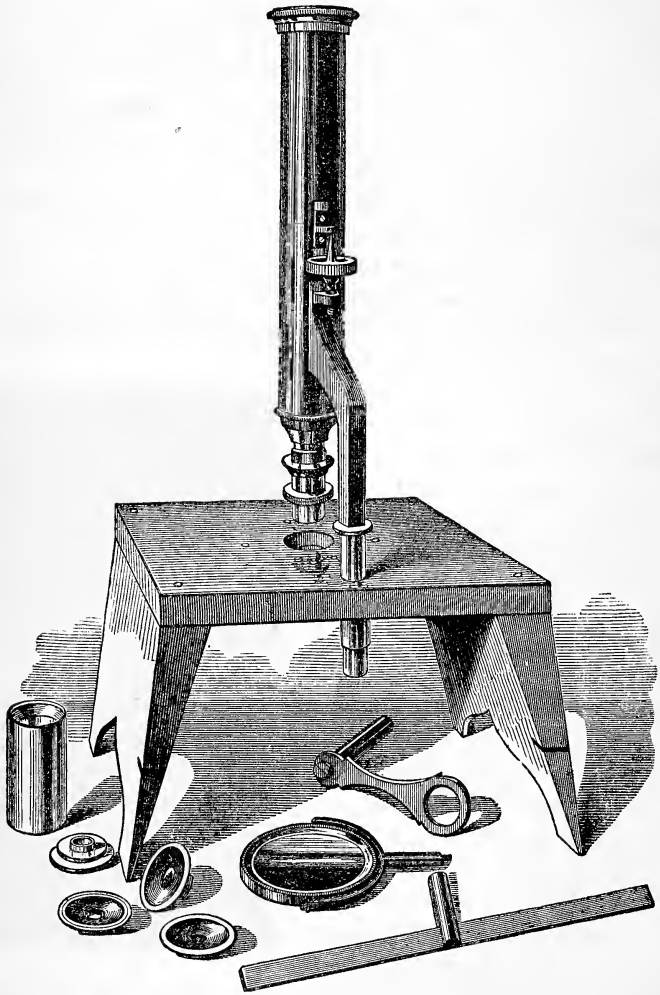


"*The stage* consists of a plate of brass, having another plate of brass, called the object-plate, fitted to it, and made so as to slide up and down upon it; the object-plate has a raised edge, at the lower end, for supporting the object when the instrument is inclined." In the more expensive instruments the object-plate is made to move in different directions by screws with milled heads. Quekett's dissecting microscope is occasionally arranged as a travelling compound body. (See next page, fig. 4.)

The accuracy with which observations *can* be made depends on the skill of the observer and the quality of his object-glasses. The ease with which

his operations are conducted, to a certain degree, depends on "the build" and finish of his instrument. French object-glasses, of very good defining powers, *may* be obtained; but they are not equal to those furnished by the best English makers.

Fig. 4.



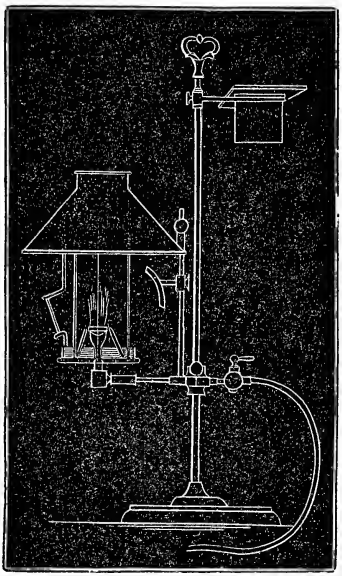
Within the last few years considerable advances have been made in grinding object-glasses, whose perfection is now estimated by the accuracy with which minute pores, striæ, or other markings on certain objects which,

used as *tests*, are rendered visible. Complete freedom from aberration and high magnifying power are not sufficient alone to give perfect vision to this class of objects; these essential qualities must be combined with a large angle of aperture,* the attainment of which is of the utmost importance in the construction of object-glasses. Within the last few years astonishing perfection has been attained by some of our best makers. Microscopists are still alive who can remember the admiration excited by the first objectives of 20° or 30° aperture; and when Ross carried this element to 60°, it was considered a *ne plus ultra*. Angles of 170° and upwards have been now obtained with us by some of our leading opticians, and by Nachet in France, and Spencer in America.

To obtain object-glasses of good defining power should be the *first* aim of the student; the form of stand, provided it is free from tremor, &c., is only a secondary consideration in comparison. The powers most useful are, the inch, half-inch, and quarter-inch. He will rarely need higher powers.

Whenever practicable the student should carry on his researches by daylight; but, as in all cases this cannot be done, he should provide himself with some means of artificial illumination. A wax candle gives a good light; but a much more agreeable light is furnished by a lamp—that known as the Cambridge is the best form—if oil is used. In towns where gas can be obtained, an achromatic lamp, adapted to its use by Mr. Highley, gives the most perfect means of artificial illumination we are acquainted with. It consists of a stage, supported by a tube and socket (see fig. 5), and carrying an Argand burner. A metal cone rises to the level of the burner, and is about an eighth of an inch from its outer margin, by which means a bright cylindrical flame is procured. A Leblond's blue glass chimney is placed over the burner, which corrects the colour of the flame, and this is further rectified

Fig. 5.



* Those who feel an interest in the investigation of this subject should carefully peruse the able memoir of the President of the Royal Irish Academy, read before that body, January 23, 1853, and printed in its "Proceedings," vol. vi., part 1, pp. 38-47, where the causes of imperfection in some glasses of high angular aperture is investigated.

by a disc of bluish-black neutral tint glass placed obliquely in front of the chimney. Parallel to this disc, and behind the chimney, is placed a metallic reflector, which concentrates the light.

For the engravings which illustrate the above remarks, from the work of Dr. Schacht, to which we have already referred, we are indebted to the liberality of its publisher.

We would gladly have loitered over the microscope and its appurtenances, but we are reminded that our space has been nearly occupied, while those who have devoted, we might almost say, the energies of their life to its study and use are waiting an introduction to any of our readers with whom they have not had a previous acquaintance, and with each of whom we will only say a few words, trusting that those to whom they are addressed will cultivate a closer personal acquaintance.

We have already expressed our sense of the importance of the "Treatise on the Use of the Microscope," by Mr. Quekett, which is deservedly entitled a *practical* treatise, as in it nearly every difficulty which the practical observer meets with has been ably and lucidly treated. To give extracts from such a work would be almost impossible, as any isolated fragments would convey a most unjust, because inadequate, idea of its merits; we may, however, glance at its general arrangement, so as to show those of our readers who may not be possessed of it (and we should say they are few) how rich its treasures are. Mr. Quekett divides his treatise into three divisions, or parts, which treat severally of *Mechanical Arrangement*, *The Use of the Microscope*, and *Manipulation*. To the first of these we have already referred in our glance at the history of the microscope, with which the work opens, affording, in its introductory chapter, a valuable sketch of its chequered career, which interested us not the less because some of our own earlier observations were made with such rude instruments as are figured and described in it. This chapter is followed by an account of the simple and compound microscopes, and the accessory instruments used with them. In the present edition (the second) a seeming omission made in the first has been corrected, by a description being added of all the best instruments made by our Continental neighbours. We were glad to see this addition, as, while it does full justice to the ability and skill displayed by such makers as Plössel and Schiek, of Vienna; Pistor, of Berlin; and—names still better known to the English microscopist—Oberhauser and Nachet, of Paris, it also shows the manifest superiority of instruments made by Smith and Beck, Ross, and others whose names are as familiar to us as household words. This part concludes with a chapter "On the Magnifying Powers used with Simple and

Achromatic Microscopes." The second part, which our author entitles "The *Use* of the Microscope," supposes that the reader is possessed of the information contained in Part I., and also of some of the instruments described in it, but requires some directions as to how to use the instrument, with whose parts only he is familiar. The eye and the hand require alike to be educated, before even the most ordinary observation can be made with accuracy. Here Mr. Quekett's great experience and practical knowledge of the instrument he writes upon is evident in every page, while he describes, with brevity and accuracy, how to observe, how to illuminate objects, and such kindred subjects. The last part ("Manipulation") is devoted to what we conceive the most difficult and important portion of the work—we mean, those niceties of manipulation which, when once mastered, appear so simple, but which are almost impossible to *describe* to those who have not had opportunities of seeing them performed. These are subdivided into their appropriate heads, and under each full directions are given, which will, with a little patience and care, enable the beginner to perform most of the niceties of microscopical research with satisfaction to himself. We cannot close this treatise without expressing our conviction that, as a single work on the subject it treats of, it is inferior to none; and in making this statement we are not insensible to the advantages which many others present, and more especially those devoted to particular branches of research, which should, however, be regarded as constituting a particular class, and judged as such.

Leaving Mr. Quekett, our attention has been caught by the face of an old friend, and a name which is well known to observers; and though the date of the work may appear, perhaps, rather antiquated, still we cannot pass it by in silence, as it treats of a class of microscopes now but little known. It is the "Micrographia" of Dr. Goring and Mr. Pritchard, and is principally occupied by a consideration of Reflecting, Solar, and Oxy-hydrogen Microscopes. Though some seventeen years of active and busy progress have elapsed since its appearance, in which great changes have been effected in the science of observation, still we cannot forget that a new and most important era in microscopic science commenced with the improvement of the reflecting microscope (constructed by Amici, in 1815) by Sir David Brewster, Dr. Goring, and Mr. Pritchard. Since then the progress in this country has been rapid, and more particularly so within the last few years. As early as 1738, reflecting microscopes were in use; but, from defective construction, they were gradually abandoned, until Professor Amici, of Modena, whose attention had been directed, in 1812, to the improvement of the achromatic object-glass, during his investigations,

produced a reflecting microscope far superior to those previously in use; the advantages of this instrument were such, that, for a time, he laid aside his researches on the achromatic object-glasses.

In 1824, Dr. Goring, with the assistance of Mr. Cuthbert, so far improved upon the arrangement of Professor Amici that, for some years, this form of instrument was the most perfect microscope manufactured in this country. Like the reflecting telescope, however, it speedily fell into disuse, owing to the difficulties attending the arrangement and management of the reflectors. In the "Micrographia," and other works* of Mr. Pritchard, are ably detailed the construction of this instrument, as improved by himself and Dr. Goring. To the liberal and judicious patronage of the latter† British microscopists are especially indebted, as to it they owe the construction, by Tully, of the first achromatic object-glass (in 1824) in this country—of the diamond lens, by Varley and Pritchard—and of the improved reflecting instrument of Amici, by Cuthbert. Impulses like these, given at the threshold, if we may so speak, of scientific enterprise, have a wonderful effect in urging it on, and stimulating others to action; but those who give them are often unable rightly to appreciate their prospective results. This was the case with the late Dr. Goring, who stated it as his opinion, in 1829, "that microscopes are *now* placed completely on a level with telescopes, and, like them, must remain stationary in their construction." The advances made since then have been such, that *now* microscopists would hesitate before pronouncing such an opinion.

"The Microscope, in its History and Construction," by Mr. Hogg, is a work essentially of a different stamp from those we have been considering, and may be regarded as belonging to a daily-increasing class of observers. It is a work for the *million;* and we gladly hail it, as we do all *such* works tending to direct their too often misspent energies into a wholesome direction. With a similar object in view as that of Mr. Quekett, it has chosen a much wider range of subjects, which, consequently, are not treated with the accuracy which characterizes that invaluable treatise; it will, however, we feel confident, prove very acceptable to a large class of readers. Its pretensions to originality are few; but the variety of the selections are an ample compensation for this defect. The plates and woodcuts with which it is interspersed are beautifully executed, and reflect great credit on the taste and liberality of its publisher. We regret that it is, in many places, disfigured by what, in charity, we must call misprints, as no member of the profession to which Mr. Hogg belongs could be guilty

* The "Microscopic Cabinet" and the "Microscopic Illustrations."
† "Quekett's Practical Treatise," 45.

of them. We mention this that they may be corrected in a second edition, which we hope may be soon called for.

While these works may be regarded as furnishing the inquirer with what he needs as to the microscope, and the auxiliary instruments needed more or less by every student of nature, they do not fill a want which every day he will feel more and more. He will require a book sufficiently portable to be the constant companion of his microscope, which will briefly tell him what is known of the objects he has been examining, and also direct him to the best sources of information. This want is being now supplied in the "Micrographic Dictionary," published by Mr. J. Van Voorst, who seems to have resolved, that the school of British naturalists shall feel no want in their pursuits which can be remedied. Eight parts of the "Micrographic Dictionary" have now appeared; each number has made us more desirous of seeing its completion. We have already,* on the appearance of the first numbers, expressed our opinion of its utility —an opinion we see now no reason to alter. In the introduction prefixed to the early numbers are contained some observations on the selection of a microscope, which those about to purchase will not regret the careful perusal of; they are clearly and intelligibly written, as well as remarkably free from any tendency to exaggerate either the merits or defects of any particular maker. The plates and woodcuts, with which it is plentifully illustrated, possess the finish and accuracy which characterize the productions of Mr. Van Voorst's press.

The microscopist being deeply imbued with that "*love of progress*" which is so marked a characteristic of the present age, still feels dissatisfied with all the books on microscopy—though their name is legion—which have issued from the press bearing on every imaginable subject on which the aid of that instrument can be called in. He wants "sympathy;" he needs "assistance;" he wishes to tell what "he has done," and "to hear what others are occupied with."

There had existed in London a society which a high legal functionary,† in a late remarkable trial, justly described as "a learned body, who make it their object to pry into all things"—we mean, the Microscopical Society of London, which, from some cause or another—we suppose that defect in all societies, too cumbrous machinery—was not so beneficial as might, from the zeal and ability of its members, have been expected; its Transactions, appearing at uncertain periods, had but a very limited circulation. From these and other causes, which we need not now discuss, it failed *fully* to

* Nat. Hist. Rev., vol. i., p. 126.

† The Lord President's address to the jury in the Torbane-hill mineral case.

supply the craving we have alluded to; and some two years since, Messrs. E. Lankester and G. Busk, whose names are a guarantee for the ability of any similar undertaking, commenced to edit "The Quarterly Journal of Microscopical Science;" a staff of writers were collected around them, among which, names of European celebrity will be recognised. A judicious arrangement was made with the council of that *prying* body—the Microscopical Society—by which it was made the organ for publishing their proceedings. A new impulse was given to the science of observation and the unsatisfied longings of many isolated students, while a periodical, Minerva-like, sprang into full vigour in an instant. Two yearly volumes of this journal are now before us, full of rich treasures for the thoughtful student. The works we have been previously glancing at, were the aids to the naturalist; here we have stored, in rich luxuriance, the fruit of his labour, and, as such, we cannot so summarily dismiss them. The volumes are divided into two sections, with separate titles, indices, and pagination. The first portion contains, properly speaking, the "Journal of Microscopical Science;" here the contents are both varied and interesting, presenting an agreeable record of what has been done by observers, both here and on the Continent; while, "in order," as the editors observe, "to gather up fragments of information, which, singly, might appear to be useless, but, together, are of great importance to science, a department has been opened for short notes, memoranda, and correspondence, to which they would especially invite the attention of their scientific friends, as they believe there are few possessors of a microscope who have not met with some stray fact, or facts, which, published in this way, may not lead to important results. They hope, also, to relieve the graver or more scientific matter of the journal by lighter contributions, such as will be found useful to the beginner, not uninteresting to the advanced observer, and of interest, perhaps, to the general reader." The reviews, which are contained in this portion of the journal, are most interesting; and we are glad to find among them a large proportion of Continental works of merit, which, without its aid, might have remained long unknown to the English public. To this first portion of the journal the naturalist is under especial obligations for the careful manner in which the memoirs are written; these we need not specify in detail, a reference to the pages of our present and past numbers, when treating of the serial literature of each three months, show how much aid the naturalist has received from this journal.

The second portion into which the journal is divided contains an authorized report of the transactions of the Microscopical Society of London. Here we naturally look for papers of a higher tone, and expect to find

evidences of more careful research. The papers in it show a marked improvement over some of *even* the more recently published proceedings of the same society, when issued in a separate form; and we trust that the improvement may be regarded as a proof of increased vitality in a body to whose members British natural history has been so long and so deeply indebted. The plates with which these volumes are illustrated are highly finished; they are executed by Mr. Tuffen West, from whose burin the very beautiful plates which illustrated Smith's "Monograph of the Diatomaceæ" have also proceeded.

The two last books on our present list are devoted to special branches of microscopical research—the one, to the use of the microscope in clinical medicine, by Dr. Lionel Beale; the other, to its application in medical anatomy and physiology, by Dr. Hermann Schacht. The former of these ("The Microscope, in its Application to Clinical Medicine") is based upon a course of lectures delivered in the spring of 1853. To the notes then prepared, considerable additions have been subsequently made, forming the present very complete and useful manual. The importance of observing with attention those structural changes which are the result of disease is every day more widely recognised; and we fully agree with its author, that the medical man will find in these investigations ample employment, and may thus contribute to the advancement of the true interests of his profession.

A work devoted to such a line of investigation, at first sight may appear to have but little charms for the naturalist; still, we have perused it with pleasure and profit. It is such a manual as we would gladly see more of —suited to the wants of the student by its great simplicity, while, from its ability and research, the more experienced practitioner will gladly turn to its pages as a welcome guide. It is embellished with some 230 woodcuts, ably executed by Mr. Davies; and, what we conceive to be most valuable in such a work, the student is told by what power they were examined by Dr. Beale, and he is furnished with a scale by which he can test the accuracy of his own observations.

Among the topics most interesting to the naturalist are, notices of several Entozoa and some parasitic vegetable structures, as *Pencilium glaucum*, *Achœrion Schœnleinii*, *Tricophyton tonsurans;* and, among the parasitic algæ, *Sarcina ventriculi* and *Leptothrix buccalis.*

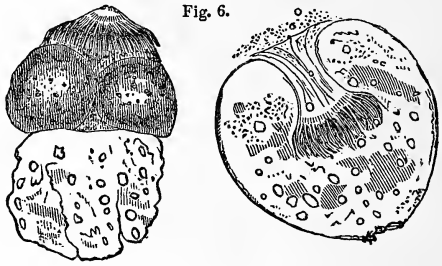
As this work may, perhaps, not be consulted by some of our non-professional readers, we briefly extract an account of these productions, and illustrate our quotations with woodcuts, for the liberal use of which we are indebted to its publisher. Among the *Entozoa* noticed, are the Genus Echinococcus, which has been recently shown to be the larvæ of Tænia.

These curious productions, however, do not attain to their full development into Tæniæ, unless they reach the alimentary canal.*

We extract Dr. Beale's account of the way in which they present themselves to the student—

"*Hydatids* are not unfrequently met with in the *post mortem* theatre. They are usually found in the form of large cysts, occupying a considerable portion of the liver. The parent cyst is often surrounded with a layer of purulent fluid. Upon opening this parent cyst numerous small, rounder cysts (Acephalo-cysts), with much fluid, escape. The walls of the cysts are usually quite white, not unlike the boiled white of eggs, and vary very much in thickness; the external surface is smooth, but the internal appears more transparent and granular. The granular appearance arises from the presence of little elevations with which the surface is studded. By scraping these gently with a knife, not unfrequently many Echinococci will be removed. These may also be obtained by allowing the contents of the Acephalo-cysts to flow into a conical glass. After a short time the Echinococci sink, when they may be removed with a pipette.

Fig. 6.

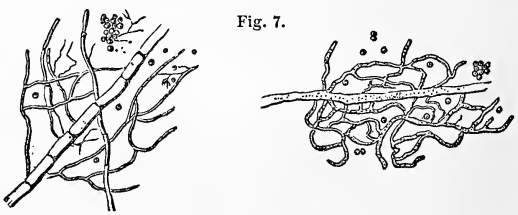


"In the annexed figure are shown the appearance of two Echinococci, as seen under a quarter-of-an-inch object-glass (about 220 diameters). In one of these the hooks are seen to be extended, a condition which has been considered to result from the occurence of endosmosis, and commencing decomposition."

Passing over the other Entozoa and Epizoa noticed by the author, we turn to some of the genera whose existence in the entophytic flora the microscope reveals as closely connected with disease, and of which more than one monograph has recently appeared. We have already named some as figured in Dr. Beale's very comprehensive manual. We will now endeavour to convey some idea of their appearance by again referring to his pages.

"There are certain vegetable structures, of a very low organization, which not unfrequently fall under the notice of the practitioner. Some of these are found growing on the surface of the skin or mucous membrane in certain forms of disease, while others are met with in recent fluid secretions, or become developed at periods of time after the secretions leave the body. Fig. 7 shows the general characters of a fungus often developed in acid urine (*Penicilium glaucum*).

Fig. 7.



"The *Achærion Schœnleinii* usually appears as elongated vesicles, of a more or less oval form, many of them being irregular, and varying much in size, but often joined end to end, so as to form branches. This fungus

* See, also, "Micrographic Dictionary," under Echinococcus and Acephalo-cyst.

grows in the hair follicle, and is also found in abundance amongst the epithelium, in the neighbourhood. It may be frequently seen within the hair in considerable quantities (fig. 8), and may be found in abundance in the little honeycomb-like masses, termed favus crusts.

Fig. 8.

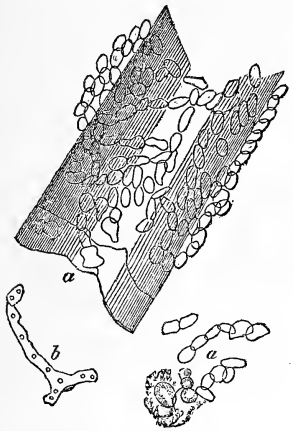
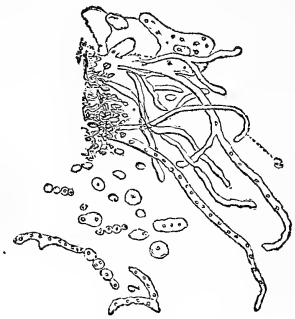


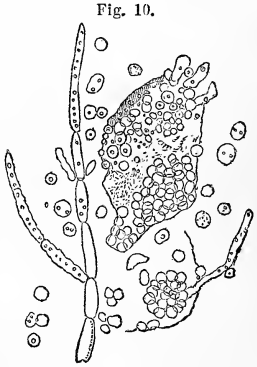
Fig. 9.



"The *favus* consists of a little cavity, filled with spores of the fungus, granules, and epithelial cells (fig. 9); one or two hairs usually pass through the centre of the favus. The fungus is composed of the *mycelium* (*a*), or the proper substance of the plant; of a *receptacle* (*b*), or *sporangium*, which contains the reproductive organs; and the reproductive organs themselves, or the *spores*.

"This fungus occurs in *Tinea favosa*, *Porrigo favosa*, *scutulata*, &c. The favus may be placed upon a glass slide, moistened with water, and subjected to microscopical examination. When the hair is to be examined, the same course is pursued; but it will often be found advantageous to treat it with a drop of the solution of potash, which renders the hair more transparent and the fungus more distinct.

Fig. 10.



"There are several other species of fungi infesting the hair; the *Tricophyton tonsurans* is found in the form of very minute, oval or rounded, perfectly transparent cells, *within* the bulb, and in the central canal of the hair. When it occurs external to the canal of the hair, its presence depends upon the hair having been broken, and the escape of the contents.

"Other species are found in the epithelium of the skin. That condition of the skin termed *Pityriasis versicolor*, depends upon the epithelial cells in the coloured situations being infested with spores of another of these minute fungi. Cases have occurred in which a previously healthy individual has been infected with the disease after having slept with a patient suffering from this affection.

"Parasitic plants are met with in the following skin diseases :—

1. Tinea tondens.
2. Tinea favosa.
3. Mentagra.
4. Pityriasis versicolor.
5. Porrigo decalvans.
6. Plica polonica.

"Apthæ; Muguet.—The Apthæ which occur upon the mucous membrane of the mouth and pharynx of ill-nourished infants, and the whitish matter resembling false membrane, which is sometimes formed in the same situation in adults who have long suffered from exhausting diseases, and to which the term *muguet* has been applied, are composed of a vegetable fungus, which was first described, in 1842, by Gruby, and has been spoken of by him under the names of Aphtaphyte and Cryptogames de muguet. It is placed under the genus Oidium, and termed *Oidium albicans* by Robin.* The appearance of this fungus is shown in fig. 10, which is taken from M. Robin's work. The examination of those vegetable growths in the microscope presents no difficulty; but without care they may readily be passed over unobserved. As their structure is very delicate, and they are generally found accompanied with epithelial cells and much debris, a very small piece only should be admitted to examination, and should be moistened with a little water or dilute syrup. They may be seen clearly with a power of 200; but to bring out their characters clearly requires a power of 500 to 600.

ALGÆ.

Sarcina Ventriculi.†—This body is a species of alga which was originally discovered by Goodsir, in 1842, among the matters vomited by a patient. Since that period it has been found by a great many observers, and, indeed, now may be looked upon as by no means uncommon.

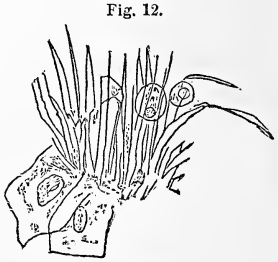
"The vomited matters have much the appearance of yeast, and fermentation proceeds for some time after they have been ejected. In vomit presenting these characters the Sarcinæ are, I believe, never absent; but they have been found in other cases and in other situations.

Fig. 11.

"In all cases which have come under my own observation, the matter in which the Sarcina was present was acid, although, in several instances, in consequence of the ejection of much clear fluid (pyrosis), the vomit generally had an alkaline reaction; but in these cases the brown flocculi which contained the Sarcinæ were entirely acid. The Sarcina is generally, but not invariably, accompanied with a great number of oval torulæ, which vary considerably in different cases (fig. 11, *b*). In the accompanying woodcut a partially digested starch granule is shown at *d*, and an oil globule at *c*.

"Other forms of algæ are found in different situations; for instance, in the cavity of the mouth, especially towards the back; mixed with, and adhering to, or growing from the cells of epithelium, will be seen, with a power of 200 or higher, a vast number of little, hair-like bodies, which consist of filaments of very minute alga (*Leptothrix buccalis*). The filaments grow upon any small particles of food which may remain entangled in the *epithelium* of the mouth. The papillæ, at the back of the tongue, are thickly covered with very long filaments, consisting almost entirely of this alga (fig. 12). It is very abundant between the teeth, and the so-called tartar is partly composed of it.

Fig. 12.



"The examination of these substances presents no difficulty; Sarcinæ may be removed with a pipette from fluids, in which they subside as a deposit, or, in cases where the mass is very viscid, with the handle of a knife. If necessary, a little water may be added, and the whole covered with thin glass, which often requires to be pressed down firmly, in order to obtain a very thin stratum for examination.

* "Histoire Naturelle des Végéteaux parasites qui croissent sur l'homme, et sur les animaux vivants." Paris. 1853.

† M. Robin has arranged it under the genus Merismopdia (*Meyen*), and he calls it Merismopdia ventriculi.

"To examine the alga from the mouth, it is only necessary to scrape the upper surface of the tongue, and examine the epithelium and debris, removed in the usual way, and moistened with a little water, under the microscope."

The series of text-books, of which this work of Dr. Beale's forms a portion, are no slight boon to the student, as they present, in a small compass, and at a moderate cost, an amount of laborious research, which those who have engaged in similar investigations can alone appreciate. We have refrained from extracting more largely from this manual only because of its purely professional character, which, however, will not, we feel assured, prevent its being read with profit and interest by many who are not connected with the profession, to whose wants it is now more particularly addressed.

"The Microscope, and its Application to Vegetable Anatomy and Physiology," as Dr. Hermann Schacht styles his work, is no ordinary production, but one which will amply repay the time spent in its study by every botanical observer, and which we feel sure must exercise a most important influence on the microscopic examination of vegetable tissues. The rapid sale of the first edition—no bad criterion of its value—has already made a second necessary; and even if our attention had not been called to it by the translator's preface, we could not fail to have remarked the very useful practical changes effected in the present, by the introduction of new matter, and the omission of what was not valuable. These changes are the introduction of *four* chapters at the commencement of the work; for these the editor, Mr. F. Currey, is responsible. We are glad to see that, in chapter iii., he has retained the very useful list of re-agents found in the first edition. The first of these chapters contains some elementary principles of optics necessary to a proper comprehension of the microscope; the second, a description of English microscopes, &c.; the third, an account of the accessory apparatus and chemical re-agents necessary for microscopical investigations in botany; and the fourth is occupied by directions for the preservation of specimens. At the suggestion of Dr. Schacht, chapters ix., x., and xi., have been added, containing a very interesting account of the embryogeny of the coniferæ; these are a translation of a portion of a work published by him last summer.* Besides these very important improvements, Dr. Schacht had communicated to the editor many manuscript additions, the result of his researches since 1851, which have been incorporated with the text, so that it can scarcely be regarded as a *translation* of the original work. Some omissions, however, will be found in the present edition; chapters vii. and viii. of the

* "Beiträge zur Anatomie und Physiologie der Gewächse."

first no longer exist as such, their more important details being included in chapters iii. and iv. of the present edition, which treat nearly of the same subjects.

Passing over the four first chapters, whose contents we have already referred to, we find the fifth occupied by "General Rules for the Use of the Microscope, and for the Preparation of Objects," which, though not containing anything novel, are marked by great clearness of expression. The three following chapters are devoted to the histology of vegetable tissues, and the concluding chapters (ix., x., and xi.) we have already noticed as having been extracted from another and later work by the same accomplished observer.

As a microscopist, Dr. Schacht has long maintained a deservedly high reputation, and his works are free from that crudeness of theory which disfigures so many Continental productions. We are glad to find that their ability has been recognised, and that their author's zeal has been stimulated to increased exertion by those marks of royal favour too rarely bestowed on the man of science. For another important work, containing his researches into the vegetable cell, and kindred subjects,* he was fortunate enough to gain the notice of the King of Prussia. This, though attracting considerable attention, is scarcely superior to the one we have been noticing in its claims on the attention of the student. The manner in which Mr. Currey has executed the delicate task of editing this work, and the judgment and care with which his additions and omissions have been made, lead us to hope that we may again be gratified by an introduction to other Continental works of merit from one so well able to appreciate their points of attraction, and gracefully to veil their deficiencies.

In thus briefly noticing works which have long reproached us for our silence, there are topics which we passed over because we felt that they demanded a separate notice; to these we purpose, at a future time, to revert. It was, for example, our first intention to have introduced into the present article some account of the application of micro-photography to the purposes of natural history; on more mature consideration, we have preferred deferring it to a future number, when we hope to notice something of what has been written and done on this subject. We cannot, however, dismiss the subject without urging the necessity of habits of repeated and accurate observation. Theories are, alas, too often and too superficially advanced, and the result is discredit to the cause of science. The student is surrounded by objects all demanding and all worthy of examination.

* Die Pflanzenzelle, der innere Bau und das Leben der Gewächse. Berlin. 1852.

The brilliant discoveries which stud, at short intervals, the career of some men, are not so much the result of fortunate coincidences, or superior abilities, as they are the legitimate offspring of habits of close observation, carefully and *systematically* pursued; and we believe that, to the earnest student, there is no department of natural science whose unknown treasures do not exceed the wildest imaginings of her most enthusiastic votaries.

The student who would seek a close acquaintance with nature, must toil long, and watch anxiously; bright glimpses will often illumine his path, tempting him to stray into theories which his severer judgment would condemn; but as he struggles onward his pleasures will gather at each step more thickly around him, while the sense of his own ignorance will deepen in contemplating the wondrous wisdom of Him who made all the things of beauty by which he is surrounded, and whose contemplation fills his inner soul with joy.

THE FERNS OF GREAT BRITAIN. Illustrated by John E. Sowerby, Proprietor of Sowerby's English Botany. The descriptions, synonyms, &c., by C. Johnston, Botanical Lecturer at Guy's Hospital. London: J. E. Sowerby, 3, Mead-place, Lambeth. 1855. 8vo. Pp. 88, with 49 plates. Full coloured, price £1 7s.; partly coloured, 14s.

NOT very long since we introduced to our readers' notice the first part of the volume before us, with the intention of bringing it again before them when the work was complete. This we have now the pleasure of doing, and it affords us much gratification to be able to say, that the volume now complete has kept up the promise of its first number.

This work naturally divides itself into two distinct heads; the descriptions by Mr. Johnston, and the illustrations by Mr. Sowerby. An average of one page of letterpress is devoted to the description of each species. The descriptions are neatly written and have appended to them instructions for cultivating the ferns. The nomenclature is somewhat of a puzzle to us, and the preface affords us no hints by which we could arrive at a conclusion. One thing is certain, the author has not adopted that proposed by Mr. Newman in his third edition of the "British Ferns." We expected that, this being an illustrated work, we should have had every species that had any claims to such, figured; but we shall presently show our readers that this is not the case, and that Mr. Johnston has not been a writer of descriptions to introduce illustrations, but claims notice, if not as a

species maker, at least, as a species breaker. To avert for one moment to Mr. Newman's "History of British Ferns," we find, in the introduction, a list of four ferns "which stand, though of a second grade, as far as regards their rank, as species, yet stand established as such in the text, and without any manner of doubt." On turning to one of these—Cystopteris Dickieana—we find, that "the propriety of separating *Dickieana* from *fragilis* rests on these grounds—it is a perfectly healthy plant, not monstrous nor distorted, and produced freely from seed, becoming a perfect weed; whereas, *fragilis*, under similar treatment, rarely reproduces itself. Cultivated in the same soil and in the same pot with *fragilis*, the latter becomes larger and more vigorous—*Dickieana* smaller and less vigorous; and the more care the cultivator bestows on these two plants, the more will he find they recede from each other; whereas, all differences between the so-called *C. fragilis*, *augustata*, and *dentata* are speedily lost in cultivation." This certainly appeared to us very fair evidence that Dickieana had a right to its place as a distinct species; but this right Mr. Johnston denies, and says—"If there be any value attached to physiological facts of this kind, regarding the determination of species, it must depend upon their correspondence under all circumstances, and the above remarks *do not* agree with my own experience of nearly thirty years."

We have a description of Cystopteris alpina; but, as the plant gathered at Low Leyton was found on a suspicious locality—a garden wall—and as no specimens have yet been gathered wild in Britain, we do not see its right to be classed along with the "British Ferns."

We have also Asplenium fontanum described and figured; and we think it has but the shadow of a right to be considered as indigenous to Britain; and its admission as such is questioned by, we believe, all our English botanists.

In concluding these brief remarks on the letterpress of this volume, we must say, that it is carefully written, displaying evidence of a deep knowledge and long experience of the subjects about which it treats; it is compressed, too, into the smallest compass, and the volume will not prove a burdensome one to the botanical tourist; at the same time, it is not a "History of the British Ferns," nor, indeed, does it purpose to be so.

With regard to the illustrations which occupy the latter half of the volume, we must give them our warmest praise and recommendation; they are generally faithful portraitures, perhaps, in some cases, a little too highly coloured, but, for the most part, accurate, neatly drawn, and faithfully delineated.

Of all botanical productions the ferns are, we think, the most difficult to represent by drawings; of some we have never seen a perfect likeness, so impossible is it to catch their exact outline; and we think the only remedy for this would be, to call in the aid of the photographist, and thereby obtain figures which will represent those peculiarities which appertain to them, and which, though they be wanting in the majority of engravings, yet the best Ptendologist would find himself perplexed to point out exactly were the artist was in error.

To such of our readers as cannot afford to buy the "fully-coloured copies," we can recommend the half-coloured ones, as being equally useful; and the price at which they are published is such, as to place them within the reach of all. The engravings are forty-nine in number, and we have no hesitation in saying, that they should have a place in the library of every botanist.

Obituary.

PHILIP B. WEBB, ESQ.

The decease of this distinguished botanist took place in Paris, on Thursday, the 31st August, 1854, aged 61 years. Although a native of England, and proprietor of the beautiful estate, Milford House, Surrey, yet most of his time, of late years, was spent in Paris, where he found facilities for carrying on expensive scientific publications. He was born in July, 1793, and first went to Dr. Moore's celebrated school, thence to Harrow, and afterwards to Christ Church, Oxford, where he took a first class, in 1815. The principal work published by Mr. Webb is his magnificent work, published in connection with M. Berthelot, the companion of his travels, entitled "Histoire Naturelle des Isles Canaries," par MM. P. B. Webb et S. Berthelot. This must rank amongst the most remarkable publications of the present day, and consists of three large quarto volumes, with plates and numerous maps.

Mr. Webb was assigned the Legion of Honour by the Emperor, Napoleon III.; and Her Majesty Queen Isabella II., not only permitted his work, entitled "Otia Hispanica," folio, forty plates, to be dedicated to her, but conferred on him the Cross of the distinguished Order of

Charles III.—the first order in Spain, after that given only to princes of Spanish blood. The whole of Mr. Webb's fine botanical collections, with his library, have been bequeathed to the Grand Duke of Tuscany, and will be shortly removed to Florence.

WILLIAM WING, ESQ., F.L.S.,

SECRETARY OF THE ENTOMOLOGICAL SOCIETY OF LONDON,

Has left a blank that will not be easily supplied. As an entomological artist he had few rivals. It was at the age of fifteen that he first turned his attention to entomology, and, in the course of a few years, he succeeded in forming an extensive collection of British lepidoptera, hymenoptera, &c. A talent for drawing was early developed, and this, combined with his predilections for natural history, soon led to his being employed at that great national establishment, the British Museum. Many will remember that their first recollection of Mr. Wing is as a slight, rather delicate youth, assiduously plying his pencil in the entomological room of the British Museum. He lithographed a number of plates for the British Museum Catalogues, and also for the Transactions of the Entomological and Linnean Societies. He was naturally very retiring, and though possessed of a great amount of knowledge on a variety of subjects, he never used it for the purpose of display; and few who had not opportunities of drawing him out, would have suspected the extent of his information. Latterly his attention had been more particularly directed to making drawings of the larvæ of the microlepidoptera, and upwards of 200 of these representations, which, for accuracy and life-likeness, have never been surpassed, testify to his industry and perseverance.

It was just as he was entering on the new career of usefulness, indicated by the promised "Natural History of the Tineina," that he was smitten with an incurable disease (diabetes), which speedily assumed such a serious aspect, that great fears were entertained that he would sink under it last spring; fortunately, prompt medical attendance, together with his own habitual cheerfulness of disposition, succeeded in restoring him to health; and during this temporary prolongation of life he was enabled to execute the plates to Mr. Stainton's volume of the "Insecta Britannica."

Mr. Wing's death occurred on the 9th of January, in the 28th year of his age.

Reviews.

RECENT WORKS ON THE DIPTERA OF NORTHERN EUROPE.

1. Zetterstedt, Insecta Lapponica, etc. 1 Tom. Folio; Lipsiæ, 1840.
2. Zetterstedt, Diptera Scandinaviæ, etc. 11 Tomi, 8vo. Lundæ, 1842–1852.
3. Stæger, Systematisk Fortegnelse over de i Danmark fundne Diptera, samt Danske Dolichopoder, o.s.v. i Kröyers Naturhistorisk Tidsskrift, 1ste Raekke, 1ste–4de Bind, 1837–1844.
4. Stenhammar, Försök till Gruppering och Revision af de Svenska Ephydrinæ, i Kongl. Sv. Vet. Akademiens Handlingar för aar 1843.
5. Wahlberg, Dahlbom, Bohemann, } Nya Svenska Diptera, i detsamma, och Oefversigt af K. Sv. Vet. Akad. Förhandlingar,—aatskilliga aar.

The extent of the field which Entomology appropriates, even since the *Crustacea* and *Arachnida* have been detached from it, has made its literature already voluminous, though barely of the growth of a century, and promises an increase in proportion for a long time to come. Apart from the common domains of anatomy and physiology, the history and classification of its countless species, probably outnumbering all the other denizens of the land, are enough to occupy Reaumurs and Degeers, if such there should be, yet unborn. Probably, in consequence, a somewhat partial and one-sided character has been impressed upon the science with most who have pursued it with predilection; so that the results to be looked for from the study of the endlessly-diversified, yet closely-linked, modifications of that one well-marked type of organization, have scarcely yet redounded to the benefit of biological science in general. And not only has Entomology been treated as if it were an independent branch, but the attention both of collectors and systematists has been much confined to one or two orders out of the whole. Indeed, reasons may be easily found for the preference so generally given to the *Lepidoptera* and *Coleoptera;* and the classification of the latter has now arrived at such a stage, that the study of it may be considered as a preliminary training for that of the other orders. But, this point attained, we are glad to see increasing attention of late directed towards the sometime slighted *clearwings* of collectors, as preparing the way for broader views of the class of insects, in itself as a whole, and in its relations to the rest of animated nature. Each of the other orders, meantime, may

invite a study as particular as the *Coleoptera* have received, and some of them, perhaps, will afford a field as ample. Local Faunas, Monographs, the collections of voyagers, all have their use in building up parts of the unfinished fabric; and the productions of our own country naturally will occupy the greatest number of students at home. But, with the exception of the two orders before named, the British collector quickly finds himself at a loss for any ready means of determining even the names of the puny myriads that flit or creep, dive or burrow, on every side about him. In default of manuals devoted to the productions of our own country, we may look abroad, next, to those which describe the insects of the nearest mainland, from which chiefly the island Fauna seems derived, a colony diminished by the broken continuity of land, and the lower summer temperature of a seagirt shore. The Fauna of France, whose territorial limits lean on the snowy buttresses of the Alps and Pyrenees, on either hand, flanking a gulf of the Mediterranean, whither many of the insects seem as if transmitted, with the hot winds, from the African coasts opposite, is enriched with Alpine and southern forms wholly strange to us. But a comparison of the *Coleoptera* of each, points to the inference that the British insect Fauna might almost be presented as an extract from that of neighbouring France; while the species deficient in the latter may mostly be found in the Scandinavian Fauna, along with the great majority common to the three countries. Passing beyond that order and the *Lepidoptera*, the materials for such a comparison have been hitherto more imperfect. We have coupled together, at the head of this article, the chief contributions to the Dipterous Fauna of Scandinavia, which have appeared since Meigen's Systematic Description of the Diptera of Europe was completed. The impulse given by that classical work to the study of this order has tended to antiquate itself in some degree, as Meigen's terse and scientific definitions became inadequate, amid the additions made by the industry of his scholars. Among those who have contributed to such a revolution, the Swedes may justly claim a foremost place; and we would scarcely dispute Bohemann's judgment of the great work of Zetterstedt now concluded, that no other country can show a descriptive catalogue of its *Diptera* so complete and accurate as Sweden possesses.* Restricted to the limits of the Scandinavian and Jutish peninsulas and islands, it does not affect the character of a Dipterologia Europæa, as Oken has ventured to style it.† But for the determination of the British species of *Diptera* in general, we have, up to this time, no book of reference as use-

* Aarsberättelse för 1847-8.

† Isis, 1848, 696.

ful and complete. The other essays, which we have coupled with it, having been chiefly incorporated in this comprehensive work, we shall have little occasion to review them individually, but some notice of them seemed necessary towards a general summary of the contributions to the literature of the order, which have proceeded from this quarter, since the last additions were engrafted on the system by Meigen.

Stæger commenced, in 1838, publishing a catalogue of the *Diptera* of Denmark, in Kröyer's N. H. Journal, with descriptions of the new species only, of which the number was not inconsiderable. We owe to him the institution of two new genera, *Ptiolina* and *Boletina*. Having gone through the *Nemocera* on this plan, and commenced a Monograph of the *Dolichopidæ*, of which only the species of *Dolichopus*, *Sybistroma*, and *Orthochile* were given in detail, he transferred the materials for the rest to the behoof of Zetterstedt's work, which his communications chiefly have rendered a Fauna for both countries.

Stenhammar has produced a very accurate and complete description of the *Ephydrini* of Sweden, the number of which he has much more than doubled. His generic arrangement deserves the highest praise, and the changes which Zetterstedt has made, while adopting it in the main, cannot be called improvements. His careful delineation also of the external anatomy of these insects has both laid the grounds for a better characteristic of the genera and species, and supplied materials for a more precise glossary of the parts. We think the term *prælabrum*, which he has introduced, superfluous, the part denoted corresponding to the *epistoma* in other orders, where it is separated by a distinct suture from the *hypostoma* or face. We gladly look for a promised Monograph of the *Sphærocerini* from the same pen, expecting that an enlarged acquaintance with the literature of Entomology will exclude from it such nominally new, but, in fact, previously-described, species and genera, as have gone to swell the synonyms among the *Ephydrini*.

Of the shorter essays in the Transactions and Proceedings of the Swedish Academy, in which many species have been described originally, those by Wahlberg are the most important, as containing the characters of several new genera, *Thinophilus*, *Psairoptera*, *Amphipogon*, *Lobioptera*, *Selachops*.

Zetterstedt's earlier work, Insecta Lapponica, opens with a very interesting sketch of the distribution of insects on the several stages of ascent of the Lappish Alps. The outline, drawn with a masterly hand by Heer, "*On the Highest Limits of Animal and Vegetable Life on the Swiss Alps*," has since been filled up, in part, for the zones of the Alps, the

Pyrenees, the Riesengebirge, and Caucasus, respectively, by Ghiliani, Dufour, Kiesenwetter, Kolenati, and others; but scarcely one of them has produced a picture more full of life, or rich in details, than Zetterstedt, the earliest of the list. The greatest number of the new Dipterous genera, and a large proportion of new species, were characterized in this volume; but we propose to treat all such together in our examination of the DIPTERA SCANDINAVIÆ. This great work, a monument both of untiring industry, erudition, and acute discrimination, is comprised in eleven 8vo volumes, which average above four hundred pages each; and the publication, commenced at the author's own expense, and afterwards worthily sustained by the public purse, has extended over a period of ten years. After a short preface, and list of works cited, an hundred and three pages are given to the analysis and characteristic of the families and genera. A final index of one hundred and ninety-two pages, containing the synonyms, as well as the generic and trivial names of the text, affords every facility for reference that can be desired. The specialities, analysis, description, and history of the species, with supplementary characters of the genera (two hundred and eighty-five in number), fill nearly four thousand two hundred and fifty pages, giving for each of the 3,462 species described, after all deductions, a good deal more than a page on the average. Of this number, 1,585 purport to have been first described in one or other of the books we have titled, making the proportion rather more than five new species to six previously included among the European Diptera of Meigen; and of these last, Fallen had recorded but 845, where Zetterstedt has 1,260 in the corresponding families; so largely has the older stock of Fallen and Fries been added to by the author's own travels in Lapland, and by the communications of Dahlbom, Wahlberg, Anderson, and Skogmann, from the same source; of Liebke, in Norway; Sahlberg, Nylander, and Mannerheim, in Finland; Stæger, Schiœdte, Drewsen, Boje, Jacobsen, and Westermann, in Denmark; besides a list of about twenty correspondents in the Swedish provinces, including the honoured names of Schönherr and Bohemann. When will our own islands furnish such help to any one who may undertake for them a task like that Zetterstedt has achieved for his country? Particular attention has been paid to the geographical distribution of the species, and various localities are assigned for most of them; so that the names of some of these correspondents recur as authorities almost in every page. These volumes of Zetterstedt's are the more available to the British student, as they are wholly written in Latin —fair, entomological Latin; a quality which, without pretending to classical nicety, we are not disposed to undervalue, with the recollection fresh

of the curious dialects that certain naturalists, on either side of the Alps, have muffled in the folds of the toga. Erichson has given a recipe for such cases when, criticising a compatriot, he goes on to say—"Our western neighbours, also, in their natural history works, favour us pretty often with a Latin which can only be deciphered through the medium of a literal retranslation into the vernacular idiom of the writers." The closer affinity of the Runic idioms to the English may render us less sensitive to *isms* from this source than we are to the German, French, or Italian dialects of Latin. Certainly we have found no occasion for a Latin-Swedish dictionary, in order to understand Zetterstedt's descriptions. We must demur, however, when he calls in question *subsultans* of Linnæus, or borrows such a superfluous barbarism as *anciennetas*, foreign alike to the vocabulary of the great master, and of his classical models. But these are the rare and pardonable slips of a style sufficiently correct in general. To us the least satisfactory portion of Zetterstedt's work is the composition and arrangement of the families. Commencing with *Tabanus*, the series of the *Brachycera* is made to end in *Phora*, followed by the *Coriaceæ*, which again the *Nemocera* succeed. Here the interposition of *Phora* and the *Coriaceæ* excludes all thoughts of a natural transition between the two great sections of the order. The system of the *Diptera Scandinaviæ* is avowedly an artificial one; but viewed simply as such, seems not to fulfil the end so well as to compensate for the disregard of natural affinities. Zetterstedt, in grateful deference to the authority of his illustrious master in Entomology, has retained the arrangement and names of Fallen's older system to a great extent, when, perhaps, his unbiassed judgment might have accorded better with the more recent systems of Meigen or Macquart. But in the *Nemocera* also, where he had not that precedent to constrain him, and his classification is more original, some of the families appear as far from natural groups. Perhaps the most signal instance is that which Schaum has already singled out—the *Ryphii*, in which *Rhyphus*, the typical genus, possessing three equal and equidistant ocelli, an ambient vein, and normal system of venation, stands associated with *Ceroplatus* and *Cordyla*, two genera transferred from the *Mycetophilinæ*, a family whose characters are nearly the opposite of those; while the larvæ of the two are no less different, that of *Rhyphus* being amphipneustic,* those of the *Mycetophilinæ* peripneustic.† Another genus, *Pachyneura*, having three ocelli, and wanting the suture of the mesonotum that is characteristic of the *Tipulides*, with which it is ranked by Zetterstedt, should probably also be referred to the

* With anterior and posterior spiracles only. † With intermediate spiracles also.

Mycetophilinæ, with some of which it closely agrees in the venation. The latter family, again, should be rid of *Corynocera*—a genus whose affinity to his *Chironomii* has not entirely escaped Zetterstedt's observation, and to us appears unquestionable. In the section *Brachycera*, again, the conjunction of *Lonchoptera* with *Phytomyza* in one family (*Phytomyzides*) seems unaccountable, except on the ground of Fallen's preponderating authority, all other modern systematists having removed the former genus entirely from the *Muscidæ*. This great family has been carved by Zetterstedt, following Fallen, into a number of groups, which, though here denominated families, cannot, in respect of characters, be accounted co-ordinate with the other families of this order, however the multitude of species to be grouped may recommend such a plan in a system professedly artificial. But, indeed, the subdivisions of this family have been so variously treated, that we do not venture to criticise closely the order or limits of Zetterstedt's corresponding groups. Only the *Hæmatomyzides* may be specified as a merely artificial assemblage of members taken from three different natural groups; *Siphona* being closely related to *Tachina*, *Prosena* to *Dexia*, and *Stomoxys* to *Musca*. We are compelled to regard it as a retrograde step, that Zetterstedt has fused again so many modern genera into one vast one—as in the cases of *Tachina*, *Anthomyia*, *Aricia*, the last two being distinguished from each other merely by the colour of the legs. The carefully-constructed analytical tables of the species, given with each at least of the more extensive genera, do, however, remedy, in a great degree, the inconveniences of such a fusion; nor can we attribute the rejection of so many genera to any indolence, since in the notes he has been at the pains of referring every species he has described of these to its appropriate place in some one of the genera adopted by Meigen in his supplementary volume.

The descriptions of the species in the Diptera Scandinaviæ we have found in general as clear as they are full; and we must commend, in particular, the simple phrases by which he has, in many instances, delineated the varying venation of the wings without the help of figures. Having expressed dissatisfaction with the families he has given, we shall rather follow the arrangement proposed in the first volume of the Insecta Britannica, and refer the new genera we have to notice to their places in the families according to it. Mycetophilidæ—*Pachyneura*, venation not very unlike *Platyura*, antennæ filiform (18-jointed?), palpi 4-jointed, lateral spines of tibiæ very slight; one species *P. fasciata*, 9-11 lines long; Lapland and N. Sweden about rotten trunks of trees. *Boletina* Stg., for the species of *Leja* Mg., in which the forks of the two brachial veins are equally distant from the base of the wing. Chironomidæ—*Corynocera*, wings adiaphanous,

with four or five very obsolete veins, the tip armed with a long curved bristle, which is triple in the female, antennæ 12-jointed, the first joint short and stout, the last oblong and thickened, the intermediate joints small, globose, and compact; one species *C. ambigua*, 1½-2 lines long, found on the shore of a lake in Tornea Lapland. TIPULIDÆ—*Psiloconopa*, wings divaricated, venation nearly as is *Limnobia*, Mg. Zw. i. t. 5, f. 6, antennæ 16-jointed, moniliform, eyes meeting under the antennæ, proboscis short, palpi 4-jointed; one species *Ps. meigeni*, 3 lines long, like *Erioptera lateralis* in colour; found throughout the northern provinces in watery places. *Tricyphona*, distinguished from *Limnobia* by the peculiar venation, type *L. immaculata*, Mg. Zw. i. t. 5, f. 8. *Dicranota*, antennæ 13-jointed, type *Limnobia pavida* Hal. (*D. guerinii* Ztt.), and it seems to us that *L. bimaculata* (Schümmel) is congenerous, although Zetterstedt has left that species among his *Limnobiæ*. LEPTIDÆ—*Ptiolina* Stg., dismembered from *Atherix*, third joint of antennæ oval, with short apical arista; *e.gr. A. melæna* Mg. BOMBYLIDÆ—*Psilocephala*, founded on the species of *Thereva* with naked face; but Loew (Beytr. ii.) has retained them as a portion of that genus. ACROCERIDÆ—*Sphærogaster*, resembling *Cyrtus* in the antennæ and exserted proboscis (which is horizontal and as long as the head), and *Henops* in venation; the alulæ very small; one species *Sph. arcticus*, little more than ½ line long, a single specimen found on a mountain of Finmark. EMPIDÆ—*Anthalia*, like *Euthyneura*, third joint of antennæ ovate, without a style, hind femora rather long; seven species, almost exclusively northern; *A. furcata*, having the cubital vein forked, should probably be removed from this genus. *Iteaphila*, like *Euthyneura*, but the cubital vein forked; two species, chiefly northern. *Hormopeza*, seems to come near to *Ragas*, but the third joint of the antennæ is ovate, and the style longer in proportion, the fore tarsi moniliform in the male; one species *H. obliterata*, above two lines long; Tornea Lapland and the north of Bothnia. *Microcera* Ztt. is synonymous with *Sciodromia*. *Phyllodromia*, type *Tachydromia melanocephala* Fabr., differing from *Hemerodromia* chiefly by the simple cubital vein. *Wiedemannia*, type *Heleodromia bistigma* Curtis (*W. borealis* Ztt.); Wahlberg has remarked that *longicornis* is the only genuine *Brachystoma*, and that the other species referred to that genus by Zetterstedt belong to *Paramesia* Macquart (synonymous with *Heleodromia*); we would add that both *Heleodromia* and *Wiedemannia*, and, perhaps, *Ardoptera* too, might be reunited with *Clinocera;* and *Wiedemannia* has been employed as a generic name, not only in another family of *Diptera*, but in botany also. DOLICHOPIDÆ—*Thinophilus*, like *Rhaphium*, but the third joint of antennæ round, with dorsal arista; type

Rhaphium flavipalpe Ztt. PLATYPEZIDÆ—*Platycnema*, two species, type *Empis pulicaria* Fln. *Microsania*, including *Cyrtoma pectipennis* Mg. and a second species, differs from the preceding chiefly in venation, the cubital vein running to the hind margin. PIPUNCULIDÆ—*Nephrocerus*, antennæ with the third joint reniform, the venation nearly as in *Pipunculus auctus;* two species, larger than any of that genus. MUSCIDÆ, 1. CALYPTERI—*Micra*, placed next to *Phania*, the clothing pubescence without bristles, the abdomen ovate; one species *M. Trixina*, 2 lines long, a single specimen found in Northland. *Wahlbergia*, type *Tachina melanura* Mg., allied to *Ocyptera*, the radial vein longer and not curved, the angle of the subapical vein more obtuse, the alulæ smaller. *Gymnopeza*, distinguished from *Phasia* by the nearly naked body and legs, and the gentle curvature of the subapical vein, which joins the cubital exactly at the end, and resembling *Phania* by the incurved extremity of the abdomen; two species, scarcely exceeding 2 lines in length. *Cinochira*, of rather doubtful affinity; the subapical vein approaching the cubital with a slight curve towards the end, the alulæ pretty large, antennæ with the third joint not longer than the rest, rounded, the arista long and capillary, eyes distant (in male?); one species *C. atra*, $2\frac{1}{4}$ lines long; allied to the *Tachinides* in the opinion of Wahlberg the discoverer, but placed by Zetterstedt at the end of the *Muscides*, immediately before the *Anthomyzides*. 2. ACALYPTERI —*Leptopa*, one species *L. filiformis* Ztt. (*Cordylura flava* Hal., Ent. Mag. A.D. 1836, but Wiedemann had previously a *C. flava* from Egypt); separated from *Cordylura* on account of the shorter antennæ and oblong eyes; the orbits of the face very prominent below, where they bear the ordinary "mystacine" cilia. *Ectinocera*, differing from *Tetanocera* in the comparative length of the joints of the antennæ, the third being elongated, and the two preceding short; *E. borealis*, a northern species, $2\frac{1}{4}$ lines long. *Psæroptera* Wlbg., allied to *Ortalis*, and the wings spotted in like manner, hypostoma short not keeled, habit of *Sepsis;* four species, from $1\frac{1}{2}$ to 3 lines in length; frequent the trunks of trees, running with the wings extended horizontally in constant motion; the larvæ feed under the bark. *Colobœa*, type *Opomyza bifasciella* Fln. (*Sciomyza concentrica* Mg.). *Rhynchœa*, resembling *Lonchœa*, but the oral angles of the face armed with a bristle; one species *Rh. lonchœoides*, $1\frac{1}{2}$ line long. *Macrochira* (*Clusia* Hal., Ann. Nat. Hist. ii., 188, A.D. 1838), type *Heteromyza flava* Mg., but Zetterstedt has not recognised their identity, though he happens to have adopted the same trivial name. *Amphipogon* Wlbg., much resembles the preceding, but the round third joint of antennæ bears the naked arista near the base; one species *A. spectrum* Wlbg., between 2

and 3 lines long, the male distinguished by the cheeks, hypopygium, fore and hind thighs, and middle tibiæ being pectinated; generally found on fungi in the northern provinces. *Ampycophora* Wlbg., identified by Zetterstedt with *Aulacigaster* Macquart. *Earomyia*, like *Lonchæa*, face more prominent, eyes smaller; one species *E. lonchæoides*, 2 lines long. *Anthophilina*, synonymous with *Leptomyza* Macquart. *Lobioptera* Wlbg., allied to *Milichia*, but the fore edge of the wing with a deep incision at the end of the subcostal vein, and the costal vein vanishes before the end of the subapical; one species *L. ludens* Wlbg., $1\frac{1}{2}$ line long. *Selachops* Wlbg., like *Lonchæa*, but the mediastinal vein indistinct, and the ovipositor not protruded, form of the head somewhat like *Tetanops*, the protuberant front overhanging the short antennæ, the third joint of which is round, with the naked arista implanted towards the tip; one species *S. flavocincta* Wlbg. (*Eucoelocera bicolor* Lw.), occurring in the northern and central provinces, and abundant on the banks of the River Luleaa. And of the "sections" of Stenhammar, but which are formally named and divided as genera, *Parydra* Stnh. is synonymous with *Napæa* Desvoidy, but the latter name pre-occupied in botany; *Epipela* Stnh. is *Ilythea* Hal.; *Philygria* Stnh. is *Hydrina* Desvoidy, including *Hyadina* and *Axysta* Hal.; *Clasiopa* Stnh. is *Discocerina* Macq., as limited by Haliday, A.D. 1839. Hippoboscidiæ—*Leptopteryx*, of rather doubtful affinity, differing from the rest of this family by the distinctly triarticulate antennæ without an arista, long slender legs, and wings not distinctly veined; *L. nivalis*, $1\frac{1}{2}$ lines long; a single specimen found crawling on the mountain snow in Lapland.

Among the more remarkable species made known by Zetterstedt, are a species of *Scenopinus*, with the second branch of the cubital vein again forked, *S. furcinervis*, and an *Echinomyia*, with 4-jointed tarsi, *E. tetramera*. Only one specimen had occurred of each. May they not be symmetrical monstrosities, such as are not without example?

The space will not allow us to pass in review the multitude of species first made known in these volumes, or to indicate the synonyms of some, which appear to have been described before. We hope to see this yet done, as well for the "Diptera Scandinaviæ," as the "Insecta Britannica," when the concluding volume of the latter shall have appeared, since the collation of both works may lead to more satisfactory results.

We have endeavoured to arrive at some estimate, of course a very problematical one, of the relative numbers of *Diptera* in Sweden and in the British Islands. Walker, in a preface to the second volume of "Insecta Britannica," has expressed an opinion that the numbers may be about equal;

but such a conclusion seems scarcely borne out by the data, as we have collected them in the annexed table :—

COMPARATIVE NUMBER OF RECORDED SPECIES OF	SCANDINAVIAN.		BRITISH.	
	Zetterstedt.		Curtis.	Walker.
	n. spp.	total.	Guide.	Ins. Br.
Pulicidæ	—	—	17	
Mycetophilidæ	135	235	138	
Cecidomyzidæ	21	33	33	
Bibionidæ	10	37	34	
Simulidæ	5	12	13	
Chironomidæ	107	222	154	
Culicidæ	7	20	27	
Phlebotomidæ	1	10	9	
Heteroclitæ	1	5	10	
Tipulidæ	62	198	161	
Rhyphidæ	0	3	4	
Stratiomidæ	9	42	50	49
Xylophagidæ	0	4	2	3
Tabanidæ	16	38	29	17
Acroceridæ	2	6	4	3
Asilidæ	8	37	33	25
Leptidæ	3	19	20	15
Bombylidæ	4	35	27	17
Scenopinidæ	1	3	(8)	2
Empidæ	146	267	183	155
Dolichopidæ	104	204	132	138
Lonchopteridæ	3	8	8	5
Platypezidæ	8	24	19	17
Pipunculidæ	11	25	14	12
Syrphidæ	106	284	210	153
Conopidæ	0	7	8	9
Muscidæ { *Calypteri*	473	859	369	(760*)
Muscidæ { *Acalypteri*	338	775	584	
Œstridæ	1	11	8	7
Phoridæ	16	38	32	18
Hippoboscidæ	1	7	10	5
Nycteribidæ	0	0	2	2
	1599	3468	2335	

* Computed.

We may here observe that since the completion of Zetterstedt's work in 1852, more species appear to have been added to the Swedish Diptera than have been to the British since 1851, when the first volume of the "Insecta Britannica" was published, if we may judge from a comparison of one or two of the principal families included in each. Thus, the *Dolichopidæ* have been increased by two with us, and as many for Sweden; the *Empidæ* by three for Sweden, and none here. Curtis, in his Guide,

has enumerated, as it appears, 2,335 species of British *Diptera*, exclusive of the *Pulicidæ*, which neither he nor Zetterstedt has included in this order. Of these, 650 belong to the families treated in detail in the first of Walker's volumes, where they are reduced to 620, out of which 470, or more than three-fourths, are described in the DIPTERA SCANDINAVIÆ. If the same proportion hold good in the remaining families, the total number of British species known would be about 2,130, and we might expect above 1,600 of them in Zetterstedt. Walker, however, thinks the *Tachinides* and *Anthomyzides* are much more numerous than has been supposed hitherto. Adopting his estimate of them (uncertain as such a computation of species unnamed may be), we should have nearly 400 to be added to the number of these given in the Guide, still leaving the total of British *Diptera* short of the Swedish by about 950 species. Nor does this seem a very improbable excess on the other side, taking into account the extent of the peninsula, with the greater variety of temperature and elevation, the tracts that border on the Arctic circle, the Alpine chains of Lapland and Norway, the breadth of primeval forest, and the more genial summer of the south of Sweden, parted only by a narrow strait from Jutland and the vicinity of central Europe. Accordingly, the Swedish fauna has representatives of many Continental genera unknown with us—Ceroplatus 6 spp., Gnoriste 3, Penthetria, Macropeza, Chionea 2, Pachystomus, Cænomyia, Hexatoma, Microsania 2, Gloma, Pelecocera 2, Stachynia, Lophosia, Wahlbergia, Cystogaster, Rhinophora 2, Dialyta, Selachops, Colobæa; against which we can set off only Mochlonyx, Sycorax, Geranomyia, Actina, Spania, Euthyneura 2, Ulidia, Lucina, Eurhina, Camarota, Tichomyza, Nycteribia 2. So far as known at present, the following—Pachyneura, Corynocera, Psiloconopa, Sphærogaster, Anthalia, Iteaphila, Hormopeza, Nephrocerus, Gymnopeza, Cinochira, Ectinocera, Psæroptera, Rhynchæa, Amphipogon, Earomyia, Lobioptera, Leptopteryx—appear to be peculiar to the Scandinavian fauna; while the British islands claim on their side—Leptomorphus, Epidapus, Clunio, Ragas, Aphrosylus, Tethina, Atissa, Glenanthe, Canace, unknown to Sweden. In certain genera of wide geographical range, and rich in species, the great disparity between the lists is probably owing, in part, to the neglect of them by the British collectors. The genus Rhamphomyia numbers only 24 species in Curtis's Guide, reduced to 10 by Walker; while Zetterstedt has described no less than 72, and, out of that number, 21 as new species of Swedish authors. Other genera augmented largely, in like manner, if not in equal proportion, are Anthomyia with new species 122 to 68 previously described, Aricia 176 to 66, Tachina 112 to 94,

Cordylura 46 to 21, Dolichopus 71 to 65, Mycetophila 48 to 20, and many more which might be mentioned. We had extracted from the INSECTA LAPPONICA a list of species given there as proper to Lapland or the northern provinces of Sweden, which have been found in these islands. Later investigation, however, has proved most of these to be diffused farther south, several of them extending into Germany also; and probably the few remaining exceptions may also be withdrawn by future research. It is possible that North Britain, when explored more diligently, may yield other species hitherto attributed as peculiar to the northern provinces of Scandinavia; but it is not likely that the number should be considerable, since our mountains scarcely attain to the limits of an Alpine fauna, and the disconnected lower ranges are everywhere comparatively poor in number of species, and in peculiar forms. But experiment will best solve the question, which at present we approach with such imperfect evidence.

Zetterstedt is not one of the writers who are content to make a parade of erudition, by transcribing synonyms one after another, without the pains of critical discrimination. The authorities he cites have evidently been collated with scrupulous care, while he has not thought it necessary, in general, to go back to the older authorities, with the exception of Linnæus, Fabricius, and Degeer. But he has not had access to all the recent sources, especially those of the English literature, so that some portions of his matter will turn out to have been anticipated. The admirable BRITISH ENTOMOLOGY, of Curtis, is not once referred to, and thus, among other things, the genus *Dolichopeza* is attributed, without remark, to Meigen, who had omitted to cite from Curtis, the original author. Hence, also, the representatives of other modern genera, in the Swedish fauna, lie disguised under alias names—*Diadocidia ferruginosa* as *Sciara testacea*—*Catocha* under *Lestremia*—*Corynoneura* among the *Chironomi* of Zetterstedt. Having inserted, for completeness' sake, the descriptions from other pens of some species, the originals of which he had not an opportunity of collating, he has, consequently, been led, in one or two instances, to give the same insect twice over; thus, the genus *Cordyla* appears among the *Rhyphii*, and, again, as *Pachypalpus* (Macquart), among the *Mycetophilinæ*, and *Ditomyia annulata* is twice described as *Ceroplatus flavus*, and as *Mycetobia annulata*. He has not constantly regarded the strict law of priority to which we have been accustomed to defer, in the application of generic and trivial names. Fallen and Fabricius seem to weigh more with him sometimes than age or usage, and rules are made to yield to predilection. We will let the dates stand, instead of statements in detail, for judgment of the principal instances of this sort, which affect the

generic nomenclature. Zetterstedt has adopted (1) Hirtea Fb. (1798) for Bibio Geoffroy (1764); Hirtea Scopoli (1763) being a different genus.—(2) Chenesia Macq. (1834) for Orphnephila Haliday (1831), or Thaumalea Ruthe (same year).—(3) Sicus Fb. (1798) for Coenomyia Latr. (1797); Sicus of Scopoli (1763) being Myopa.—(4) Eristalis Fallen (1810) for Chilosia Mg.; whereas Eristalis was first named and characterized by Latreille in 1804, while Eristalis of Fb. Antl. (1805) is made up of species of the genera Chilosia, Eristalis, Helophilus, Merodon, Mallota, Milesia, Eumerus, Pipiza and Chrysogaster.—(5) Syrphus Fallen, for Eristalis Latr.; Meigen having defined the genus Syrphus otherwise in 1803, and Syrphus of Fb. Antl. including Volucella and Sericomyia along with part of Eristalis.—(6) Scæva Fb. (1805) for Syrphus, previously applied by Meigen as above.—(7) Scatomyza Fallen (1810) for Scatophaga Mg. (1803)—and (8) Scatophaga Fallen for Psila Mg. (1803), being four years before Jurine applied the name of Psilus to the Hymenopterous genus Diapria Latr. (1797).—(9) Oxyrhina Mg. (1838) for Trigonometopus Macq. (1835).—(10) Ulidia Mg. (1826) for Mosillus Latr. (1804), or Chrysomyza Fallen (1817). But Ulidia also may be retained, being limited, according to Loew's suggestion (Beytr. i. 27), to U. erythrophthalma and the allied species.

Here we close the chapter of criticism; and if we should seem to have discharged the task in a spirit more captious than tolerant, the volumes on which we have dwelt so long do not need, and could not gain by, any commendation we might bestow, while every correction, and every doubt, may contribute in some small degree to their better use, which we would desire to see more general in the hands of our fellow-students. We lay them down, glad to see that the latest portions of his long labours betray no symptoms of failing eyes or energy diminished, and hoping that the venerable author, now in his seventieth year, may be enabled, next, to complete a like history of the HEMIPTERA of Sweden, which we are authorized to expect from his hand.—A. H. H.

A HISTORY OF BRITISH BUTTERFLIES. By the Rev. F. O. Morris, B.A., Member of the Ashmolean Society, Life Member of the British Association for the Advancement of Science, &c., &c. With seventy-one Coloured Plates. London: Groombridge and Sons, Paternoster-row. 1853. Price £1 1s.

THIS is a book by no means destitute of attractions. A thick, good-looking, royal 8vo, rather elegantly bound in green cloth, with wide

margins, and ample space allowed for both letter-press and plates. There is something showy about it, calculated to render it, as it was doubtless intended to be, in a certain way popular. It would look very well on a drawing-room table, and would be pronounced "a very pretty book." The author is well known for his devotedness to natural history in various branches, in connection with some of which he has put out other very pretty and popular books; but he confesses in the preface to the book now before us, that, "if there be one branch of natural history which is to me more captivatingly interesting than another, it is entomology," and in this we are at one with him. It is, also, very gratifying to find that he is a naturalist on right principles, those which lead us to seek and find God in every work which he has made, and to love them for his sake, and study them for the better showing forth his wisdom and glory; while, at the same time, he acknowledges that, for one in his position, and bearing the sacred office of "a Priest in the Church of God," these pursuits ought to be followed merely as a relaxation from more arduous duties. "I trust, indeed," he writes in the preface, "that I have not forgotten, do not forget, and never shall forget, that I have high and holy duties to perform, to which all else must be subordinate and give way. Knowing, however, that these studies are innocent in themselves; that they add to the amount of human happiness; and that, if used as they always should be, they infallibly lead from the works of nature up to the God of nature, in feelings of the holiest adoration, and most humble worship; I encourage others to follow them, so far as it may be right for them to do so."

The book itself is addressed altogether *ad populum*, and aims at exciting an interest in the minds of the previously careless or ignorant, and promoting a desire to *collect specimens* rather than at giving them instruction in the science of the pursuit, still less increasing the knowledge of the scientific entomologist. Accordingly, there is no admission granted to anything that could be called a dry detail, no sesquipedalian terms are found there, no nice criticisms on the various characteristics of families and genera, no balancing of authorities in nomenclature, no questions of scientific precedence or etiquette interfere with the light-hearted good humour of the book; the author's object is to attract and captivate the uninformed, as it were to matriculate freshmen into the entomological university; and he knows very well that freshmen do not expect to be confounded with the profound mysteries which make even solemn professors look grave. So he leads them gaily along from butterfly to butterfly, with something of the sprightly nonchalance of Harold Skimpole, and, it must be feared, nearly as ready to be diverted from his object—but more of this hereafter. If a

butterfly rejoices in twenty names from twenty different naturalists, with all impartiality they are set down in order, and no apparent preference is given to any. The change of the generic name, from time to time, is notice enough that we have entered on another genus; why the pale clouded yellow should be called "Colias," and the next species, the black-veined white, "Pieris," why they may not be both Colias, or both Pieris, and what is the difference between Pieris and Colias, we are not informed. The only important fact is, that both are handsome butterflies, and may be found at such and such times, and in such and such places—if one is lucky enough to find them. This principle, which is acted on throughout, is carried, we think, rather too far, even where scientific information is not the primary object. It reduces the study to the level of a mere plaything, which is scarcely fair in these days, when it is no longer considered a mark of childishness to be an entomologist. The dignity of the title, "A History of British Butterflies," is hardly sustained in the body of the work, which is little more than portraits of eminent and ordinary British butterflies, and references to their residences—sylvan, rural, or marine. Surely, Mr. Morris might have found room for one or two of the leading characteristics of each family, if not of each genus; it would not have made the book less interesting, and it would have rendered it far more practically useful.

We would, nevertheless, by no means, undervalue what we have got. The copious list of localities appended to the several species is very valuable, and it would be well if the localities in which rare species have been captured were more carefully collected, and more widely published; not merely because it would direct entomologists where to look for them, but because much curious information might be elicited as to the times, situations, variations, and peculiarities of their appearance, disappearance, or recurrence, which at present seem full of anomalies and perplexities, but might not improbably be in time reduced to something more like order and system. Other peculiarities, relating to the more abundant species, might also be discovered, if note were taken of the localities in which they are *not* to be found, which may be as interesting, in a scientific point of view, as the record of places where others are to be met with. For this reason we are glad of the information that, in the neighbourhood of Falmouth, some of our commonest butterflies are scarce—*e.g.*, the Hipparchia hyperanthus, Hipparchia pamphilus, and Vanessa atalanta.

The careful record of the times of appearing of the species is also advantageous, though, of course, its value depends on its rigid accuracy when the period is predicted to a day or two. The variations in the

temperature of the seasons in different years must, more or less, affect its accuracy; but still to know, within a week, when to look for freshly-evolved specimens of valuable insects, is knowledge not to be despised.

From the character of the work, little controversy of any kind is to be expected; but, on two occasions, Mr. Morris does battle vigorously—the one being in support of the claims of Papilio podalirius to be accounted a native species; the other, in refutation of the imputations cast by "certain malignants" on the character of Mr. Weaver, the original capturer of the Melitæa dia. As to the former, we should have thought that few persons would now have ventured to deny to Papilio podalirius a place among our native fauna; but if there be any such remaining, and they are open to conviction, Mr. Morris's array of "facts" and proofs from ocular evidence ought to silence the tongue of suspicion for ever. And for Mr. Weaver, we think it a disgrace to English entomologists that any further defence should be needed; right and proper it is that all care should be exercised in admitting the claims of a previously-undiscovered species; but when the only obstacle to receiving it is, that people choose not to be convinced, and their only answer to unanswerable and reiterated proofs is, that an upright and honest man is forging a series of "unblushing falsehoods," we confess we would not waste another word on them; for they do not deserve any notice. If they think it less likely that a new British butterfly should be discovered than that a man of unblemished honour should tell a parcel of lies, we can only say, "Oh, infidel, great is thy faith."

In regard to the species admitted or rejected, Mr. Morris proceeds rather arbitrarily, at least in the suppression of the reasons of his selection, which ought to have been given—*e.g.*, at the close of his remarks on Pontia, Catophaga, Papilio, Ganoris or Pieris, Brassicæ (we are obliged to give all the generic names, as Mr. Morris has not informed us which he himself has adopted, and we do not wish to choose for him), he briefly adds—"Some have imagined a separate species under the name of Pontia chariclea;" but there is not a syllable of information as to whether this species differs from Brassicæ in size, colour, markings, form or neuration of wings, times of appearance, habits or appearance of larvæ, or in any other way; nor does he say who the "some" are, nor why he dissents from their "imagination." In a somewhat similar manner he speaks of a "variety" of Pontia (&c., &c., &c., &c., as before) Napi, "erroneously made into a species under the name of 'Pontia sabellicæ,'" except that in this case he enumerates the points of difference, though he makes no further observation on it. No allusion, however slight, is made to Parnassius Apollo, though its claims are so very slender that Mr. Morris

may be forgiven for excluding it. Not so easily, however, for his silent exclusion of three beautiful insects—Chrysophanus chryseis, Hippothoe, and Virgaureæ—the first and last of which can scarcely be denied, unless he will consider them extinct, and then they might have had a passing notice in the course of the θρηνος over the now extinct Dispar, while the Hippothoe, if not regarded as a variety of Dispar, has a good right to be noticed as a native species, as its claims to be indigenous, however traditionary, cannot be positively refuted, and, indeed, are by no means despicable. On the other hand, we have figure and notice of Cynthia Hampstediensis, which has no claim to be esteemed British, having been introduced into the lists by a merely accidental error.* The original figure of the insect has been copied and recopied from a sort of traditionary respect for this, we believe, unique discovery; but, certainly, in a work in which Chrysophanus chryseis, Hippothoe, and Virgaureæ do not appear, Cynthia Hampstediensis is out of place. Again, Cynthia Huntera, which Mr. Morris expressly calls "an American species," appears with figure and ample description. Similarly, Argymnis aphrodite—of which he says, "This is an American species"—is treated with great respect, we know not whether on account of the remarkable fact which our author sententiously announces, that "*it is unquestionable* that a specimen was taken *in an undoubted* [sic] *wild* state in Upton Wood, a few miles from Leamington." We never had the pleasure of capturing an undoubtedly *tame* butterfly, nor should we know how to define the expression.

We do not complain of the introduction of the figures of these insects; on the contrary, we should be glad if figures of all exotic species captured in this country were preserved, with particulars of their capture; what does seem objectionable is the introduction of such species, to the exclusion of others, which have a right to appear in a work like the present.

The descriptions of the insects are, in general, sufficiently accurate for identification, though they fall short of the scientific accuracy of some other works; this is, however, in all probability, the result of the principle which pervades the whole book, of excluding, as far as possible, all purely scientific terms and details, which, while it has its advantages in making the work more intelligible to the unscientific, for whom it is written, bends, in some degree, to diminish from the perspicuity of these minute descriptions, the necessity for which clearness first rendered the introduction of these terms requisite. The figures themselves are, for the most part, very good,

* Mr. Dale's remarks in a letter read before the Dublin University Zoological Association (*vide* "Proceedings of Societies," p. 115) explains how the mistake occurred in regard to this species.

particularly in the drawing, which is, in some instances, highly effective. The colouring is more variable, often evincing great carelessness and want of finish—*e.g.*, the nerves of the wings in Pieris brassicæ and rapæ are actually coloured a rather strong blue, with a greenish hue from the ground-colour of the wings being yellowish. And even Aporia cratægi is decorated with blue lines between the black veins, which greatly injures the effect. The ground-colour of the anterior wings of Vanessa io is much more of a brick red than the magnificent "rich, dark, brownish red" mentioned in the text. To the Apatura iris no brush can do any justice; but more might, we think, have been *suggested* to an entomological student's mind than Mr. Morris has succeeded in doing; no one, however, ought to be severe on failure where success is so impossible. On the other hand, many of the figures of the Hipparchiæ and some others are coloured with a most happy general effect, as is, we think, the upper side of the Vanessa C. album. On the whole, the figures are very creditable.

At the end of the book are given very elaborate and particular instructions in the arts of catching, killing, setting, and preserving insects, which will be found very useful and intelligible by the most inexperienced. Figures are given of all the instruments required, the mode of setting, the store-boxes, drying-case, and all the manifold impediments which this pursuit entails on its votaries. An engraving of the cabinet is promised, but, for some reason, does not appear. The clap-net is the favourite with our author; but we must say we cannot agree in the preference; it has always seemed to us vastly inferior to a good bag-net, as being much more unwieldy and less fitted to secure the captured insects. But, every man to his taste. With regard to the best mode of killing insects, we are glad to see that he gives the chloroform bottle a place among the ordinary essentials for a lepidopterist: most assuredly it ought to supersede every other method of ancient or modern invention. Why, in some places, he speaks favourably of the "lucifer-match" method, we cannot tell. It is only fit to be forgotten. The instructions given are admirable in the main, and will be found amply sufficient for all purposes.

And here our notice of this book, so far as it is a "History of British Butterflies," may be considered to end. To the scientific entomologist it will be probably of comparatively little assistance; but to the uninitiated, or the simple catcher of butterflies, it will be a considerable acquisition; while the general good temper and friendliness which pervade the whole must dispose every one to feel kindly and cordially towards the enthusiastic and Christian author. A few words must, nevertheless, be added on what seems to us to be the great defect in the book—viz., the vast quantity of

irrelevant matter introduced in all places. Not content with the clear definition of the only principles on which a Christian man should enter on these studies, which renders the preface so pleasing, where such comments are thoroughly in place, Mr. Morris profusely scatters minor prefaces, fragments of "improvements," over every page of the work, sometimes, as at pp. 116, 117, at a great length. What he says is very true, very good, but very commonplace, the "garden whites" of moralizing, and, in almost every instance, would be equally appropriate anywhere else; the interference with the matter in hand is conspicuous and offensive, and exceedingly uncalled for. It is true he defends himself by saying, that "moralizing is never out of place" (which we devoutly hope may never pass into an axiom); but the only good point in the defence is, that it shows that his conscience is a little uneasy. Such inopportune "reflections," where they have no connection whatever with the subject, do the holy cause he would further far more harm than good; his readers are fretted at the interruption of the "history" of some butterfly for the sake of introducing a sentiment which would be as much to the point in the "History" of any other butterfly from P. machaon to Cyclopides painscus, or in any book of natural history, or science, or history, or biography, or travels, or good storybook, or anywhere else. All such things are, we believe, much better confined to the preface, which is an introduction to the subject treated of in the book; when we enter on the book itself we want information about butterflies, not sermonettes, however good in themselves. But this is not all; Mr. Morris is as discursive as one of his own butterflies; he gives us an account of some of his friends' notices of his Oxford life, extracts from the University Calendar, thoughts on the introduction of railway travelling, and scraps of Mrs. Norton's songs; he touches on the pleasures of angling, and says, that to catch a *rare* butterfly is as great a treat in its way as to catch a trout of three pounds weight, &c., which last effusion, by the way, is an introduction to the common ringlet. He even takes the trouble to assure us that Captain Blomer is no relation of Mrs. Bloomer, which a moderate study of orthography would have suggested to any one, to say nothing of the bad taste of such a remark. These ghostly pleasantries are abundant throughout the work, and, amongst them all, religious observations are led up and down in a fashion that strongly reminds us of poor Christian and Faithful, in Vanity Fair. Thus a great deal of time, paper, and patience, is mercilessly wasted, which would have been far better employed in imparting some slight information about the leading characteristics of the different families and genera. Mr. Morris will, we hope, forgive these remarks, which may be strong, because we feel strongly the greatness of the

defect in a work of this nature; the author's goodness, kind-heartedness, and high spirits have misled his judgment, and we are sure that if he would remember this in future he would do more justice to both religion and science, and to his own sincere reverence for the one and devotion to both. And now, in all kindness, we take our leave of him and his book.

CONTRIBUTIONS TO BRITISH PALÆONTOLOGY; or, First Descriptions of Three Hundred and Sixty Species and several Genera of Fossil Radiata, Articulata, Mollusca, and Pisces, from the Tertiary, Cretaceous, Oolitic and Palæozoic Strata of Great Britain. By Frederick M'Coy, F.G.S., Hon. F.C.P.S., Professor of Natural Sciences in the University of Melbourne. Cambridge: Macmillan and Co. 1854.

THE work of which the title has been placed at the head of this notice is a reprint of contributions made by Professor M'Coy to the "Annals and Magazine of Natural History" from 1849 to 1854; and the additions made in it to the fossil fauna of Great Britain have been principally discovered by Mr. M'Coy during the arrangement of the valuable museum of the University of Cambridge. As a guide to the fossils named by Mr. M'Coy in that museum it may be found very useful, as the fossils may be compared with the descriptions contained in the book; but to persons not having access to that museum, Mr. M'Coy's work will not have anything like the same value, as it is not accompanied by any illustrations, with the exception of one plate and some woodcuts illustrative of new genera. It appears to have been originally intended to have issued a set of plates with this volume, and it is to be regretted that this intention was abandoned in consequence of the expense.

Professor M'Coy is well known to geologists in England and Ireland as the author of two most valuable *unpublished* works, illustrative of the carboniferous and silurian fossils of Ireland; and we may, perhaps, be permitted to express a hope that these works, which were printed for private circulation, will ultimately be accessible to the geological public at large, as it has not unfrequently happened that our well-known carboniferous fossils, figured and described in one of these books, have been described with other names by geologists unacquainted with Mr. M'Coy's labours. To these works on the fossils of Ireland, Mr. M'Coy has recently added his "Catalogue of the Cambridge Palæozoic Fossils," in which many of the fossils described in the present work are figured. Professor M'Coy does not appear to us to be altogether free from a fault, which was at one time more common than it is at present—we mean the fault of making more species than is absolutely

necessary for the purposes of description and recognition. Yet, on the whole, he has abstained from using his privilege of creating and naming unnecessary fossil species in this volume more than might have been expected from his previous works. Amongst his new genera, the geologist will gladly perceive several which ought to have been recognised before, and which serve to draw more distinctly the line of demarcation between recent and fossil forms. Among the most judicious of these changes we may mention the new genus *Aviculopecten*, of the middle and upper Palæozoic beds, to the separation of which from the recent *Pectens*, Mr. M'Coy was led by the examination of a series of fossils from the dark limestone of Lowick, Northumberland, at present preserved in the collection of the University of Cambridge. From these fossils it was evident that in the Palæozoic Pectens there was no mesial ligamentary pit beneath the beak, as in recent Pectens, but the ligament, as in *Avicula*, is confined to the hinge margin, while the external form of the shell closely resembles the recent *Pecten*, with the exception that the *posterior* ear is larger than the *anterior*, thus differing from *Pecten* and approaching *Avicula*.

We strongly recommend this handbook of Professor M'Coy to those geologists who have an opportunity of comparing its descriptions with the Cambridge fossils, and to those who are in possession of the works in which the fossils described in it are figured.

The Entomologists' Annual for 1853, comprising Notices of the new British Insects detected in 1854. Edited by H. T. Stainton. Pp. 153. With a coloured plate. London: John Van Voorst, Paternoster-row. 1855. Price 2s. 6d. Second Edition, with considerable additions.

"What are the additions?" will be the first question suggested by the above somewhat unlooked-for announcement of a second edition of the Annual. We shall at once supply the information by telling our readers that they consist of instructions for collecting, preserving, and arranging, lepidoptera and coleoptera, together with a few scattered notes of additional localities, &c., of different species, and an "Address to the Young Entomologists at Eton, Harrow, Winchester, Rugby, and at all other schools."

How the necessity arose for publishing this edition we shall allow the author to explain in his own words—

"The enthusiastic reception which 'The Entomologists' Annual' has

met with from all classes of entomologists, not only renders its continuance in future years a matter of certainty, but has rendered it necessary to bring out a second edition of that 'for 1855.' * * *

"I hope that the increase in the size of this edition will not render the purchasers of the first edition dissatisfied with their bargains; as the chapters added are quite elementary, they are comparatively useless to the 'old hands;' yet if any one feels himself aggrieved in this matter, if he wishes it, I shall be happy to give him a copy of the second edition in exchange for his copy of the first."

We need only remark on this quotation, that we rejoice to find that public opinion has so substantially confirmed our original estimate of the work, and that we have little doubt that our author's very liberal offer of exchange will suffice to allay any feeling that might arise alien to that of the delectable contentment whose charms he has ably depicted in his address to the young.

The only addition to the number of *species* noted will be found among the macrolepidoptera, at p. 32, but this is balanced by the unfortunate necessity of laying aside one of the new coleoptera figured, Lathrobium carinatum (*vide* p. 123); this seems to have been previously described on the Continent, and, moreover, to have occurred (for the first time in Britain) near Dublin, where it was taken by Mr. Haliday many years since. Among the additions, however, none of the entertaining chapters proposed in the preface to the first edition have yet appeared; nor can we regret their absence, seeing that the only apparent justification to their introduction—namely, the unpopularity of a strictly scientific book of the kind—has been dissipated by the rapid and unexpected sale of the first edition.

The proposal (put forward in the *new* preface) to publish a list of entomologists' names and addresses, is one which will bear timely consideration before it is carried into effect. If it were to include all who would consent to supply their names, &c.—though, on the one side, it would be no small convenience to the younger collectors to know how, where, and when to address for information their more exalted brethren, it might, on the other, tend to develop and encourage a morbid love of notoriety, very far wide of the true motives upon which the study of nature should be undertaken and pursued. Should it, therefore, in this, as in other matters, appear advantageous to follow in the steps of our continental brethren, who regularly publish such lists, our opinion is that the English list should not include any names but those which have already appeared in some of the periodicals, or before some of the learned societies of the day.

Ere concluding, we must express our pleasure at having seen the advantages derivable from the pursuit of entomology, both to the body and mind, so well and so judiciously advocated, in the address to young collectors at Eton, &c. We feel certain that his "sermon" is not in the least "too long" for the buoyant and volatile spirits that may now be scanning and (we will not hesitate to say it), perhaps, also, *questioning* the truths in those light-spirited, cheerily-written pages; we can truly say of the higher impulses to such pursuits, in the words of the poet—

> "This truth philosophy, though eagle-eyed
> In nature's tendencies, oft overlooks;
> And, having found his instrument, forgets,
> Or disregards, or (more presumptuous still)
> Denies the power that wields it."

Heartily do we commend to our readers the excellent and well-timed hints on collecting and preserving coleoptera, furnished by Mr. Wollaston when on the eve of departing once more, and for the third time, to the shores of the Madeira Islands; and we hope the second volume of the Annual will not appear without something similar being published as to the best means of studying the less known, but hardly less important order hymenoptera, which has been assigned to the long-tried and able hands of Mr. Frederick Smith.

The Fossiliferous Deposits of Scotland; being an address to the Royal Physical Society, delivered 22nd November, 1854. By Hugh Miller, Author of "The Old Red Sandstone," &c., &c. Edinburgh. 1855.

We have never read in the space of 32 pages more interesting or valuable matter than that contained in Mr. Miller's address to the Royal Physical Society of Edinburgh. It is the condensed result of upwards of twenty-five years of active geological exploration of his native land, and is intended to point out to younger Scottish geologists the *lacunæ* in Scottish geology, which may be filled up by their labours. In pointing out the wants, Mr. Miller gives a masterly sketch of the geology of Scotland, confined, however, to its palæontological point of view.

We shall select for our readers—so far as we can do so without absolute piracy—a few paragraphs relative to the old red sandstone and gravel beds of Scotland, in which questions of the highest interest are raised and suggested to the zeal of young explorers. A remarkable and thick conglomerate, as is well known, forms the base of the old red system in Scotland, above which Mr. Miller distinguishes three groups of strata—

lower, middle, and upper old red sandstone groups. Each of these groups of rocks is characterized by special forms of fish remains, the upper and lower most resembling each other, and differing widely from the fishes of the middle group. It would appear, also, that the fish remains occur in beds interstratified with others containing remains of plants, which have never been thoroughly described, but on which a new light is thrown by the fossil plants discovered by the Government surveyors at Kiltorcan, in the County of Kilkenny, and by Mr. Griffith, at Tallow-bridge, in the County of Waterford. We shall give our readers Mr. Miller's sketch of each of these three formations, and add a few remarks to illustrate their bearing upon the interesting questions relating to the Irish red and yellow sandstone beds—

"Above the upper beds of the great conglomerate, at distances varying from forty to a hundred and sixty feet, the fishes of the lower old red sandstone appear—curious, as the most ancient ganoids known to the geologist, and further, from the circumstance that, while the still older placoids of the upper silurian system exist merely as detached teeth, spines, and shagreen points, these old red fishes exhibit in the better specimens the entire outline of the original animals, with not a few of their anatomical peculiarities. It is from this formation that our knowledge of the oldest skulls, of the oldest vertebral columns, and of the oldest pelvic and thoracic arches, anywhere preserved, is to be derived. With the fish we sometimes find associated, though not often, specimens illustrative of what seems to be our most ancient terrestrial flora—club mosses—reed-like casts and impressions, streaked longitudinally, like the interior of the calamite, but apparently without joints—what appear to be ferns—and, in at least one unique specimen, a true wood of the araucarian family—the oldest which has yet presented its structure to the microscope."

Of the middle red sandstone system, Mr. Miller observes—

"There is, perhaps, no Scottish formation in which the palæontologist has still so much to do as in this middle old red sandstone. Our respected President, Dr. Fleming, called attention, a full quarter of a century ago, to some of its plants, and again took up the subject no farther back than last year, in an interesting paper read before our society; and Agassiz has figured and described some of its fishes, and, more particularly and incidentally, at least one of its crustaceans. But much still remains to be done. From what I have seen of Mr. Webster's collection, I should infer that materials have been already accumulated sufficient for the restoration of its great crustacean—one of the most gigantic of its family, whether recent or extinct; and as the Den of Balruddry has furnished, of itself, nearly a hundred specimens of *Cephalaspis* (still a comparatively rare ichthyolite elsewhere), most of which are now in the hands of Lord Kinnaird, it would be well that some ichthyologist had access to the collection, in order to determine whether in Scotland, as in England, we have more than one species of this singular genus. Dr. Fleming found in this middle old red formation an apparent fern, with kidney-shaped leaflets; and it yielded several years ago, near Clockbriggs, in Forfarshire, a large specimen of *Lepidodendron*, which exhibits the internal structure. I owe a fragment of this fossil to an intelligent geologist, Mr. William Miller, banker, Dundee; but so imperfect is its state of preservation, that, though it presents to the microscope the large irregularly-polygonal cells of its genus, it bears none of the nicer specific marks which might serve to distinguish it from the several greatly more modern species which occur in the coal measures."

The occurrence of Lepidodendra so far down in our geological scale as the middle old red sandstone is an important fact, if it be well ascertained.

A plant referred by the late Professor Forbes to the genus Lepidodendron, was found by the Government surveyors in the upper sandstone beds of Kiltorcan, near Knocktopher, a specimen of which is figured in Sir Charles Lyell's "Manual of Geology" (fifth edition, p. 418). This plant appears to be identical with the Lepidodendron minutum found in the carboniferous slate of Tallow-bridge, by Mr. Griffith. May not the "apparent fern, with kidney-shaped leaflets," of Dr. Fleming be the Cyclopteris Hibernica of Professor Forbes?

"Above this middle formation lies the upper old red sandstone, with its peculiar group of organisms, chiefly fishes. And of it, too, much remains to be known. Save that it has not yet produced a *Coccosteus*—a genus which seems restricted to the oldest ichthyic group of the system—its fishes more resemble those of the lower than of the middle old red. It has its three species of *Pterichthys*, its *Diplopterus*, and apparently its *Dipterus;* and its Celacanths, chiefly of the Holoptychian genus, represent, not inadequately, the Celacanths of the genera *Asterolepis* and *Glyptolepis*, which occur chiefly, though not exclusively, in the lower formation. The two formations appear, however, to have no *species* in common."

The absence of Coccosteus from the upper red sandstones of Scotland, is probably due only to its rarity, as this genus, associated with Dendrodus, has been found in the corresponding beds in Ireland.

"I must mention, ere concluding this part of my subject, a curious fact connected with the flora of the formation. When visiting, last spring, the Museum of Economic Geology, in Jermyn-street, under the friendly guidance of the late Professor Edward Forbes, he pointed out to me an interesting group of plants, in a fine state of keeping, which had been derived from the old red sandstone of Ireland. The genera seemed identical with those of the coal measures, but all the species were different. I marked, among the others, an elegant Cyclopteris (*Cyclopteris Hibernica*), of which Sir Roderick Murchison figures a single pinna in his recently published 'Siluria.' The professor also introduced me to the only ichthyic organism that had been found in the Irish deposit, with the plants, a ganoidal fish, apparently a Celacanth, and very much of the type of those of the upper formation, though I failed to identify the species with any of those already known. Professor Forbes, in return, visited my collection here only a few weeks ago; and in a fern of this upper deposit, laid open by our ingenious member, Mr. John Stewart, in Prestonhaugh quarry, near Dunse, he recognised his Irish Cyclopteris. As Mr. Stewart found the Scotch specimen associated with plates of *Pterichthys major* and scales of *Holoptychius Nobilissimus*—two of the most characteristic ichthyolites of the upper formation—there can be no hesitation in assigning to it its place in the scale; and, of course, its position as an upper old red fossil in Scotland may be held to determine that of the interesting group to which it is found to belong on the Irish side of the channel."

An interesting field is here opened up for Scottish geologists in the flora of their old red system, and it promises to connect the geology of that system in Scotland with the corresponding groups of the south of Ireland. The Irish Devonian beds are nearly destitute of fish remains, but contain occasionally abundant traces of vegetation, the remains of which are more or less well preserved, and it is not improbable that Scotch and Irish geologists may ultimately be enabled to compare their old red systems by

means of their fossil flora; indeed, "the club mosses—reed-like casts and impressions, streaked longitudinally, like the interior of the calamite, but apparently without joints"—of the Scotch geologists, remind us strongly of Lycopodiaceous-like remains we have seen from Kiltorcan, and of the Sigillaria dichotoma described by Professor Haughton, from Tallow-bridge.

We pass over—recommending it, however, to the earnest investigation of geologists who may have the opportunity of examining for themselves—the curious doubt which hangs over the true age of the famous Telerpeton Elginense; which, according to Mr. Miller, may belong to an outlier of the lias formation, such outliers being common in the part of Scotland in which this interesting fossil was discovered. If this conjecture should prove correct, and the Telerpeton be found not to be of Devonian age, it should serve as a caution to theorists not to press too hastily into the service of their systems supposed facts, the evidence for which may prove very doubtful. Our readers will remember the celebrated case of the supposed Chelonian footprints from the Potsdam (Silurian) sandstone of North America, which proved, on investigation, to be the traces of the passage of Crustaceans.

We pass on to the drift gravels of Scotland, in which Mr. Miller distinguishes three epochs. Of the shells found in the gravels of Banffshire, the oldest of these groups of gravels, Mr. Miller observes—

"The only peculiarity of the shells themselves, viewed in the group, is their intensely boreal character. The sole species of Astarte which I have yet found at either Gamrie or Castleton King Edward—and I have now visited these deposits five several times—is the Greenland shell (*Astarte Arctica*); *Natica clausa*—a shell of Spitzbergen and the North Cape—is the prevailing Natica; and the most abundant shell, of at least the Gamrie deposit, is a bivalve not yet found living in our seas, but common ten degrees farther to the north, *Tellina proxima*. Even the great size to which the latter shell attained in this locality is not without its bearing on the question. 'The few specimens which have been dredged [dead] in Britain,' says the late Professor Edward Forbes, in his admirable history of the British Mollusca, 'are much smaller than the exotic ones, none which we have seen exceeding three-quarters of an inch in length, and about half an inch in breath.' The mollusc is one of those which attain to their fullest development amid the frosts and snows of the higher latidudes; and it is a curious fact, that in the Gamrie and Castleton deposits we find it of a considerably greater size than anywhere else in Scotland. My largest specimens from the Clyde beds hardly exceed an inch in length; whereas my largest Gamrie specimens are nearly two inches long, and their *breadth* very considerably exceeds the length given as British by Professor Forbes."

Of the boulder clays of Caithness, the second of the groups of gravel beds, Mr. Miller states—

"The prevailing molluscs of the deposit are *Cyprina Islandica* and *Turritella communis*, especially the former; the prevailing *Astarte*, though the *Arctica* also occurs, is *Astarte elliptica*; the prevailing Tellina, *Tellina solidula*. *Tellina proxima* is of smaller size than in the Gamrie beds; and *Natica clausa* less common.

Still the deposit is very decidedly a boreal one in its shells, and in its mechanical phenomena, the most decidedly boreal of the group. Every rock-surface on which it rests is grooved and striated; almost every softer pebble which it encloses is scratched and furrowed, usually in the line of its longer axis; all its larger shells exist as broken fragments, often rounded as if by attrition, and bearing in their lines and scratches marks of the same agents that dressed the rocks and scored the pebbles—nay, the very substance and colour of its prevailing clays show that it is mainly composed of the dressings of the rocks on which it rests—all giving evidence, apparently, of a time when our half-foundered country sat from eight hundred to a thousand feet lower in the water than it does now, and vast packs of grinding icebergs went careering over what are now its lower hills and its higher table-lands."

The third and newest of the drift-beds, well developed on the borders of the Clyde, is thus introduced to his hearers by Mr. Miller—

"I had the pleasure of laying open, two years ago, at Fairlie, on the Ayrshire coast, a virgin deposit, unknown before, in which I found continuous scalps of *Pecten Islandicus* still occupying the place in which they had lived and died, and with their upper valves covered with large balani, such as we now dredge up from the outer limits of the laminarian zone, and all fresh and unbroken. Huge *Panopaæ* were there sticking fast in an unctuous clay, with their open siphuncular ends turned upwards; and entire specimens of *Cyprina Islandica* and *Modiola modiolus*, with their valves still connected by the sorely decayed ligament. *Tellina proxima* was abundant, but reduced in size to little more than half the Gamrie dimensions. I found *Astarte elliptica* the prevailing Astarte; and groups of younger Cyprinæ huddled together in the character—which they do not now assume on our coast—of gregarious shells. No crushing iceberg had passed over this deposit; a grooved and polished rock of old red sandstone lies beneath, overlaid by a thin stratum of red clay, apparently derived from it, but the higher-lying gray stratum in which the shells occur had a different origin; it is simply the partially consolidated mud of a quiet sea-bottom, and, though its group of organisms manifest decidedly the boreal character, I cannot doubt that they lived at a time when, either from some change in the currents of the coast, or from the elevation of the protecting islands outside, an effect of a general rising of the land, the sea was no longer an exposed one. They, in all probability, mark that later stage of the wintry period to which the last-formed group of our local glaciers belonged, and in which our gradually-emerging country presented, age after age, a broader and yet broader area, won from the deep."

We cannot part company with Mr. Miller without expressing our sense of the obligations under which he has placed his fellow-labourers in geology; not more by his valuable contributions to their common pursuit, than by the example he has set them of what may be accomplished by sturdy independence of mind and vigorous use of the means at our own disposal. So far as we know, Mr. Miller owes his present high position in the estimation of geologists to his own unaided exertions, and to his freedom from pretence; and we sincerely hope that his younger fellow-labourers in science may imitate, not only his zeal in the pursuit of science, but also his manly independence and uprightness of character. We take our leave of his Address with pleasure and regret—pleasure caused by its perusal, and regret occasioned by its brevity.

A List of British Species of Geodephaga: Intended for Marking Desiderata and Labelling Collections. Taken from Mr. Dawson's "Geodephaga Britannica." By G. Guyon, Richmond, Surrey. Post free for Four Stamps.

This list comes very opportunely for labelling collections of that portion of the Coleoptera which includes the Geodephaga or ground beetles. It is, however, printed on both sides of the paper; and for the purpose of labelling, two copies must be ordered. The typography is the same as Mr. Doubleday's "Catalogue of Lepidoptera," and is very correct throughout. The Catalogue will fail, in some measure, in being a catalogue for marking "desiderata," because entomologists will not recognise the insects under Mr. Dawson's nomenclature. A person might have scores of Agonum marginatum without knowing that he had a single specimen of Trichomenus marginatus; and here if Mr. Guyon had inserted the previously-used generic names in brackets, as Mr. Dawson has done in his index, it would have made his list very much more valuable. As it now stands, one must have recourse to the "Geodephaga Britannica" itself—a work which no coleopterist should be without.

Some Account of the Marine Botany of the Colony of Western Australia. By W. H. Harvey, M.D., M.R.I.A., &c. (*Transactions of the Royal Irish Academy*, Vol. xxii.—*Science*).

With feelings of more than ordinary sympathy we welcome this contribution to the botany of a coast hitherto but little explored. We welcome it as the production of one from whom we have learned much, and would gladly learn more; but, more than this, we welcome it as the record of a lonely observer's labours, pursued at a distance from his wonted haunts and the cheering applause of his fellow-students—a memoir which serves as a friendly link to connect the wanderer in a distant land with his work-fellows at home—a bright glimpse afforded of the rich harvest which will be laid before them upon his return, laden with the spoils of what, to the marine botanist, is, indeed, *terra Australis incognita*.

The present memoir gives a rapid, though masterly, review of the botany of a coast with which we were hitherto but very imperfectly acquainted, concluding with a catalogue of the algæ collected in Western Australia, between the months of January and August, 1854; characters of the *new* genera and species accompanying the latter. The land vegetation of Western Australia, Dr. Harvey remarks, is now tolerably well known, while that of

the sea-shore of the colony is much less so; our earliest acquaintance with its *algæ* is derived from small, but interesting collections made by some of the early French expeditions, and by Dr. Robert Brown, who accompanied Flinders; while the largest *collection* of algæ (141 species) *from this coast* was brought by Mr. L. Preiss, a nearly complete set of which were deposited by Senator Binder, of Hamburgh, in the Herbarium of Trinity College, Dublin, while they were described by Dr. Sonder. These, with other similar advantages, Dr. H. had availed himself of previous to the commencement of his own researches, which were carried on at King George's Sound and Cape Riche, on the southern coast, and Freemantle, Garden Island, and Rottnest Island, all in the immediate vicinity of Swan river, on the western coast. The peculiar features of the coast at each of these points are described with a happy brevity which we would gladly enrich our pages with were sufficient space afforded.

Some of the descriptions reminded us forcibly of the rock-pools in which Mr. Gosse pursued his researches on the Devon coast; while others present a curious contrast to the scenery which a European eye is accustomed to. Of these, the description of Rottnest Island, or rather its shore, interested us very much. This island, which is about seven miles long by three wide, is situated about twelve miles W. by N. from Freemantle, and is thus described—

"Almost the whole island is surrounded by limestone reefs, at greater or less distances from the shore. The limestone seems of very recent formation, and is of similar character to that at Arthur's Head, and in other localities near Freemantle, already described by several geologists. It is remarkable for very fantastic and diversified forms. The reefs are generally flat-topped, but the surface is very rough, either thickly bristling with sharp points, a few inches high, or broken into minature mountains and valleys—strongly recalling to mind the *raised map* of Switzerland. Other reefs are ridged; the ridges parallel to each other, but variously directed towards the shore. The outer face of the bordering reef is generally very steep, often perpendicular or overhanging; and frequently it goes down, like a quay-wall, into two or three fathoms of water. At the N.E. angle of the island, a very remarkable quay-like reef, called the 'Natural Jetty,' runs out many hundred yards into the sea. Its surface is laid bare, at low water, of spring tides, which rise and fall from two to three and a half feet. Many of the detached reefs are shaped like round tables, or mushrooms, being fixed on a slender central stalk, often only a few feet in diameter; the horizontal ledge, or table, spreading out to many yards on all sides. Sometimes two or three of these tables are joined together by narrow stone bridges; and sometimes large holes, through which you can look down two or three fathoms into the clearest water, are found in the table; and the swells rise through them, and flow over. I often wondered how these *filigree* reefs could so long withstand the beating of the waves in winter storms. Almost all of them offer good harvests to the algologist; and beautiful pictures to any one who can appreciate the loveliness of living vegetable forms. The surfaces of most are well clothed with the smaller *Rhodospermeæ* (*Laurenciæ, Hypneæ, Acanthophora, &c.*), and thickly studded with a *Caulerpa* (*C. lætevirens, Mont?*) with short stems, clothed with brilliant club-shaped leaves, resembling minature clusters of grapes. At every few yards, deep, basin-like hollows, of greater or lesser size, break the surface of the reef, and afford well-sheltered nooks for a

variety of beautiful algæ. The water in these basins is always intensely transparent; the bottom frequently of white sand; and the steep and craggy sides clothed with algæ vegetation, in which the brightest tints of green, purple, carmine, and olive, and the most graceful waving forms, are mingled in rich variety. Here is the favourite locality of some eight or ten species of *Caulerpa*, of several very distinct forms, and every one a beautiful object. All these are green; but the tints vary from the darkest bottle-green to the pale, fresh green of an opening *beech* leaf. Some resemble soft ostrich feathers; others, branches of the Norfolk Island pine; others, strings of beads; others, squirrels' or cats' tails; and *C. scalpelliformis* is like a double saw. Under the shelter of the *Caulerpæ* the smaller *Rhodosperms* (such as *Dasyæ* and *Callithamnia*) are often found. But these are most numerous on the perpendicular sides of the border reefs, where also rich meadows of *Caulerpæ* are seen waving in the clear water, from a foot beneath the surface to a considerable depth. Various *Fucoideæ* and *Ecklonia radiata* are scattered here and there through the deeper pools, and on the sides of the reef. None of these are ever left dry at low water. In many places a profusion of a *Bryopsis* (*B. Australis*) enlivens the rocks with its silky tufts of green, each tuft separate from its neighbour. Some of the shallower reefs, near high-water mark, are partially covered with sand; and this is the habitat of *Penicillus arbuscula*, a little green Alga, which may be compared either to a miniature tree, or to a shaving-brush. *Struvea plumosa* abounds on all the reefs, at about half-tide level, generally growing on the very edges of the rock-pools and border reefs. I obtained from Mr. Stanford, Colonial Secretary, a specimen of a new *Struvea*, sent by Mrs. Drummond from Champion Bay, differing from *S. plumosa* in its vastly larger size, and more compound network. The specimen has been bleached white, and in this state strongly resembles a beautiful pattern of *old point-lace*, and might be made into ladies' collars, as it is of a tough substance."

The catalogue contains 352 species, of which 277 appear peculiar to the Australasian flora, and 75 either to *pelagic* species or to more or less distant botanical regions; these may be grouped as follows:—

	Whole number collected.	Australian.
Ser. 1.—Melanospermeæ ...	42 ...	26
,, 2.—Rhodospermeæ ...	270 ...	216
,, 3.—Chlorospermeæ ...	40 ...	35
	352	277

In reviewing the algæ collected in this tour, not the least interesting feature is the comparison of the connecting links which may be traced, showing affinity with the vegetation of other coasts. 27 species, common to both the British Islands and Western Australia, have been observed by Dr. Harvey; for an enumeration of these, as well as those which associate this very rich marine flora with other lands, we must refer our readers to the pages of a memoir which, like everything that has issued from the same pen, will be gladly received by all who feel an interest in the subject of which it treats. Our regret at the brief way some points are touched upon is, however, removed by the promise of copious descriptions, and a fuller memoir, on its author's return to Europe, when we hope to call our readers' attention to the result of his labours.

A Classified List of British Mosses. Compiled by George Dixon, Great Ayton, near Stokesley, Yorkshire, from Wilson's "Bryologia Britannica." Price 3d. each, or 5s. 6d. per 100, free by post.

Though there are other lists of mosses published, yet none of them approach the one before us in accuracy of detail, and beauty of its typography. A great advantage in this list is, that all the varieties, as given in Wilson's "Bryologia Britannica," are given; and whenever the varieties are distinguished by Greek characters, they are spelt in full—thus not excluding them from the list, because they boast of names consisting of a single letter.

Each species has both the generic and specific name given in full; and the list being only printed on one side, gives it great advantage for labelling collections. It is entirely free from typographical errors in the orthography—in fact, as a list, nothing better could be wished for. And after examining and criticising it in every way, we can find no fault with it, except that the paper might be a little weightier, and thereby show the printing to better effect. Hitherto a list must needs be printed on very light paper to come under the post-office regulations; now, however, that by the more enlightened policy of our Chancellor of the Exchequer all printed matter under four ounces can be sent through the post for the small sum of one penny, we would wish to see all lists and catalogues printed on such good paper as the matter may require.

Obituary.

JAMES R. GARRETT, ESQ.

It is with extreme regret we announce the death of James R. Garrett, Esq., of Belfast, one of the Council of the Natural History and Philosophical Society of that town. He was by profession a solicitor, and as such possessed an extensive practice, and enjoyed the esteem and respect both of his clients and of his professional brethren. He had, from an early period, given attention to the habits of our native birds; gradually he was led to regard them as a naturalist, and, in course of time, became an acute, skilful, and well-informed ornithologist. His name is of frequent occurrence

in Thompson's "Birds of Ireland." The distinguished author of that work gave an expressive intimation of his high opinion of Mr. Garrett's capability and judgment, by appointing him one of the literary executors, to whom the publication of his extensive MSS. was confided. Mr. Garrett did not restrict himself to ornithology; he studied all departments of vertebrate zoology, and for the last two or three years of his life had given considerable attention to our native fishes—especially to the points of distinction laid down by ichthyologists, as existing among nearly allied species. His residence at Holywood, County Down, extended the sphere of his observations, until they embraced portions of the marine invertebrata of its shores, and the flora of the neighbourhood. The subject, whatever it might be, which engaged his attention at any time, was examined with the utmost diligence; and in critical points, such as come under the notice of the naturalist, he delighted to compare the specimens before him with the recorded descriptions of the best authorities on the subject, and then to form his own opinion. This great assiduity and care, which was with him habitual, found exercise in the copious manuscripts which his deceased friend, Mr. Thompson, had entrusted to him; and we believe we are correct in stating, that the mammalia, reptilia, and fishes were almost entirely revised and arranged for publication by Mr. Garrett, in the very limited leisure his professional duties allowed.

He was of remarkably unassuming manners, kindly disposition, and simple, yet refined, tastes. It was natural, therefore, that he should have acquired a large circle of sincere and zealous friends He was, in point of fact—

> "One who in life, where'er he moved,
> Draw after him the hearts of many."

And his death has occasioned in his native town a corresponding degree of regret.

He was elected a corresponding member of the Dublin University Zoological Association in February, 1853. He died of fever, the 2nd of April, 1855, in the thirty-eighth year of his age.

Reviews.

THE BUTTERFLIES OF GREAT BRITAIN. By J. O. Westwood, F.L.S., &c. With coloured Plates. 8vo. London: W. S. Orr and Co., Paternoster-row. 1855. Price 15s.

WE have read of two good hermits who lived together, and never fell out, until, weary of being so unlike the rest of mankind, they agreed together to have a quarrel as other men had; but, being unused to the thing, no better way occurred to these simple-hearted men than to place a stone between them, and for one to say, "This is mine," and the other, "Nay, it is mine;" and so they hoped to get up a quarrel. The present work bids fair to rival the reputation of the stone in the legend, though it is not the ownership, but the age, of the book which is the grave subject of debate. Mr. Bladon, on its appearance, rises up and says, "This is an old book;" and Mr. Westwood says, "Nay, it is a new book;" and so they have got up a very pretty dispute for the columns of the "Athenæum." The end of the hermits' quarrel may not be inapropos—"Well, brother, if it be thine, then take it;" "and so," adds the historian, "they could not quarrel, having been so long accustomed to peace." Whether the fraternity of entomologists be as peaceful naturally as that of the hermits, let those who sit in the seat of the judges decide. The joke of the matter is, that in this case the dispute was settled ere it was begun. "It is an old book," says Mr. Bladon. "The proprietor of the work, entitled 'British Butterflies and their Transformations,' and 'British Moths and their Transformations,'" says Mr. Westwood, in the first words of his preface, "having determined to *re-issue* the former," &c. One calls it an old book, the other a re-issue. What are they fighting about, then? "If it be old, brother, why, then, it is old." "Nay, brother, if it be a re-issue, then it is a re-issue." Much ado about nothing. The truth is, it is a new edition, considerably improved, with certain valuable additions, and the results of the experience of the years that have elapsed since its first appearance. At the same time, in order to reduce the bulk and price of the work, many omissions have been made, but not of "any important or necessary information." We commend the story of the hermits to the consideration of the combatants, and retire ourselves from the lists, with the single remark,

that, whether old or new, our relish for the present work was not destroyed by the possession of the original one.

The principal variations from the first edition are—1st, A much more full introduction, "containing the general characteristics of the butterfly tribes in greater detail than in the original work;" 2ndly, An entirely fresh set of plates, drawn by the author, which, however, scarcely equal the other in finish or accuracy of colouring; 3rdly, "Two elementary plates, devoted to the illustration of the general characteristics of the butterfly tribes, and containing a great number of microscopical details, both of their perfect and preparatory states, which, in conjunction with the full description given of these two plates, it is hoped, will be of great service to the entomological tyro," which, we think, will fulfil the hopes of the author, and deserve to do so; 4thly, The Index Expurgatorius, at the end, is greatly increased; in the first edition, it was modest, and contained but six species; it now numbers no less than forty-three, among which figure many species admitted into the original work, but now regarded as doubtful, or only varieties of other species. This index in the re-issue takes the form of an "Appendix of reputed British Butterflies." Besides these, there are admitted of greater precision—*e.g.*, Pieris Chariclea, P. Metra, and P. Sabellicæ are treated as *undoubted* varieties of Brassicæ, Rapæ, and Napi respectively; while in the former edition it was left in each case, at many minor alterations in the body of the work, as advanced science least, an open question. One error, however, and an amusing one, has been left unaltered, and has even, with one author at least (Mr. Morris), been regarded as an authority. We are told that G. Rhamni varies from 2 inches to $3\frac{1}{2}$ inches in expansion of the wings—*i.e.*, it sometimes attains a size exceeding by $\frac{3}{4}$ths of an inch the largest dimensions given for P. Brassicæ, and equals the average of P. Machaon, which is said to vary from 3 inches to 3 and *nearly* $\frac{3}{4}$ths. The blunder arose from a misconception of Stephens's description, "2 inc. 3—6 lines—*i.e.*, from 2 inches 3 lines to 2 inches 6 lines. That Mr. Westwood should have not only made the mistake at first, but repeated it in the re-issue, is odd enough; but that Mr. Morris should have deliberately adopted it is truly surprising.

The introduction in the present edition is divided into six sections, of which the original introduction forms the first, while the fifth consists of "directions for collecting and rearing caterpillars and preserving the perfect insect," mainly taken from the chapter on that subject, appended by Mr. Humphreys to the original edition. The remaining sections are new, and greatly enhance the general interest of the work. The second is headed "Characters of the Rhopalocera, Lepidoptera, Diurna, or Butterflies in

general," but contains very little information, merely stating that many of our native species are very beautiful, though not rivals to the tropical species, and alluding to the interest excited by the fact—no less wonderful, truly, for being known to most—that the transformations of butterflies are but successive rejections of its outward skin by an animal always one and the same in all stages of its existence.

The general characters of the Imago are treated of in section third, which contains an outline of the principal features of their external anatomy, and the general structure, neuration, and clothing of the wings, with much interesting information about the scales, especially those recently discovered to be peculiar to the males of various species of Diurna, belonging to the genera Pieris, Argymnis, Hipparchia, and Polyommatus, and "chiefly found in those species of which the males have the upper surface of the fore wings ornamented with patches of velvet-like hairs." Several figures of these "male scales" are given in the second of the two elementary plates, and are very curious. In the close of the section, Mr. Westwood observes, that the variations in the flight of the different species and tribes have been as yet but slightly investigated. We should be glad to see more attention paid to this subject, as it may not improbably prove of considerable value, and it is difficult to see why a well-defined variation in the modes of flight should not be as important as a difference of structure, on which, indeed, such variations often depend. It may probably be pretty safely affirmed that no two species of our native Diurna have exactly the same kind of flight; and a careful observation and record of their variations would be at once interesting and instructive, and would, at any rate, save the young collector the trouble of many a laborious chase, ending in fruitless capture. We speak from experience and the memory of past years.

Section four is devoted to "the preparatory states of Diurnal Lepidoptera," giving a general sketch of the progress of the insect from the egg to the imago, illustrations of which, from Sepp and Herold, are found in elementary plate B.

Section six is a description of the two elementary plates, consisting of details of the perfect and preparatory states of butterflies, and forming an important and valuable addition to the work.

"In this introduction," says Mr. Westwood, "I have embodied the results of a very minute and microscopical examination of a vast number of species, which had been rendered necessary for my completion of the great work on the genera of Diurnal Lepidoptera, commenced by Mr. Edward Doubleday, and in which several important characters, hitherto

almost or entirely neglected by the lepidopterists, were examined in detail—such as the structure of the palpi and fore legs, the veining of the wings, the articulation of the antennæ, the ungues and their appendages, and the external marks of distinction between the sexes in the different groups. Many of these neglected characters were found to be of great value, not only as indicating family and generic, but often specific distinctions." Such is the introduction, which, as being the great novelty of the re-issue, has received a more detailed notice. We have reason to congratulate the students, for whose sake this addition has been made, on the decided improvement in the constitution of "the old book."

With regard to the species excluded from the re-issue, though there are as many as seventeen, of which descriptions and, in nearly all cases, figures were given in the original work, there are but four which were admitted as unquestionably genuine. These are—P. Podalirius, M. Dia, H. Briseis, and C. Hero. The supplemental plate given in the former edition is also omitted. The beauty of the book, as a book, is, perhaps, somewhat diminished by these extensive omissions; but its practical utility is but little impaired, and this is more than made up for by the additional matter which the author has, by these means, been enabled to introduce, while greatly reducing the size and price of the book.

The bulk of the work, consisting of descriptions of, and observations on, the various species, remains as it was, except where the difference of the specimens figured renders some change necessary, or additional observations are inserted when fresh light has been thrown on any point, as occasionally happens—*e.g.*, under Colias Edusa, mention is made of the two vars. considered by Stephens as C. Chrysothema and C. Myrmidone, both of which were allowed distinct places in the original work, the latter as having some claims to be considered as British; and in the remarks on the genus Melitæa additional reasons are given for adhering to the usual division of the Fritillaries into the two genera Melitæa and Argynnis, instead of several sub-genera, as suggested by the author. Here and there we find traces of a too lax revision of the original letter-press where minor changes were necessary, as, where we read in the old edition—"The number of British species of this genus (Pieris) has been the subject of much recent inquiry, it having, *until within the last fifteen years*, been considered that there were but three. In 1827, however, Mr. Stephens increased the number to seven," &c., which is all very well in a work published, according to the title-page, in 1841; but when we find the same words reproduced verbatim in a book published in 1855, the effect is not so good, and would be rather puzzling to one who never saw the first edition, and

had learnt a few elementary lessons in arithmetic. A little ordinary care would have prevented such oversights as this, which impart an appearance of haste and slovenliness, by no means advantageous to such a work as the present professes to be.

As for the plates, we do not, on the whole, think them an advance on the prior edition; they are sometimes harshly executed, though these are the exceptions, and occasionally they even have the advantage of their predecessors. The desire of economizing both space and price has sometimes, also, we think, carried the author too far—*e.g.*, so fine and striking an insect as Aporia cratægi, and such a rarity as P. daplidice, deserve more than a half-view of the under side (which is all we are favoured with), especially while we have full-sized portraits of much commoner and in no way striking insects, as Pieris Brassicæ, &c. On the other hand, we have several interesting figures of gynandromorphous specimens, particularly a most remarkable one of Argynnis paphia, which mingles not only the male and female characters, but those, also, of the type and the variety. Such figures add greatly to the interest of the work.

Although, therefore, taken as a whole, this book is but a re-issue, it presents many of the features and possesses many of the advantages of a new work; and, in spite of sundry incidental defects, it may be considered as representing the latest, most matured, and, therefore, most valuable opinions of a man than whom few could be found more competent to discharge the office which he has here undertaken, and, we doubt not, it will be appreciated accordingly.

In taking leave we would suggest to Mr. Westwood that he would confer a great benefit on British entomologists if he would subject the remaining volumes of the original work—viz., British Moths and their Transformations—to the same process of revision and re-issue through which the butterflies have passed. He would find much more to do in that field, of which our knowledge has increased more rapidly, because, probably, there was more to be known—consequently, more changes have taken place, and a more complete work than we, as yet, possess, is somewhat imperatively called for. We sincerely hope that the success of his recent labours will be such as to encourage him to go through with the re-issue, and that speedily.

Popular British Conchology; A Familiar History of the Molluscs Inhabiting the British Isles. By George Brettingham Sowerby, F.L.S., Author of "Manual of Conchology," &c., &c. London: Lovell Reeve. 1854. With twenty Coloured Plates. Royal 16mo. Price 10s. 6d.

The work before us is essentially popular in its character and design, and may be considered to form one of a series of such works from time to time appearing, some of which have already received notice in our pages. Useful and attractive, they serve greatly to lessen the apparent repulsiveness of long scientific descriptions and tedious research, which, in former days, were the only means of gaining any insight into nature's works, and which still must continue the single path for scaling the high eminence of real distinction in scientific knowledge.

Mr. Sowerby opens with a very brief preface, in which we are informed that he adopts, without hesitation or reserve, the scientific arrangement of the classes, orders, and genera given by Messrs. Forbes and Hanley, in their great work on British mollusca; having announced which fact, he speedily commences his work, proceeding to enumerate the British species under each genus, and to interweave with the descriptions many of the most interesting details that can be collected in regard to the economy of each. *Scientific* descriptions he has entirely waived, and in their place he mentions of each of the species any peculiarity, whether of form or colour, that may be calculated to strike the eye; indeed they are mostly those signs by which naturalists are wont to discriminate the species as they see them cast upon the shore, although not, in many cases, the really distinctive characters of each.

In one point, however, which would have been no small assistance to his readers, the author has shown a strange neglect—we mean in hardly ever alluding to the *comparative size* of different species, either in the descriptions or figures; some of the more minute are represented in the plates by highly-magnified figures, some of the larger on a diminished scale, while others appear their natural size. But how, under the circumstances, any one previously unacquainted with the subject is intended to identify the shells, we are at a loss to imagine.

Moreover, we must notice another fault in the work, which might still more easily have been avoided; it is the wide separation of the plates from the descriptions of the species figured in them. It is our opinion that it would have been better to collect them all together at the end, than that Plate X., facing page 136, should relate to the shells mentioned from page 69 to page 74; while Plate XI. might, with more convenience to the reader, have taken the place of Plate VI.

Yet, notwithstanding these faults, which we have felt it our duty not to pass over, we consider this work well calculated to have a good effect in arousing a taste for so interesting a study as that of our native shells, and of their inhabitants more especially. The figures are accurately drawn, and very fairly coloured; besides which, the reader will find at the end some useful explanations of scientific terms, incomprehensible to many at first sight, though, it may be, rather more necessary than our author seems willing to acknowledge.

Gladly as we would spend a little longer in reviewing the very pleasing subject before us, and in telling our readers of each lovely form or more instructive story that rises to our sight as we turn from page to page, it is here our place to conclude; therefore, with our best wishes for its success, we would close at once both our book and our review.

YOUNG NATURALIST'S LIBRARY—BEAUTIFUL BUTTERFLIES; BRITISH SPECIES. By H. G. Adams, author of "Nests and Eggs of Familiar British Birds," &c., &c. London: Groombridge and Sons. Price 1s.

IN these days of cheap literature we are not often arrested by the low price of a book, but, in this case, we were, at the first sight; and, having read it, confess that we should call it singularly cheap at double the money. Written for the young—the *very* young, we should say, from the overdone childishness which peeps out here and there under the plea of simplicity and entertainment—it is, in the main, admirably adapted for the end designed—"to fasten and encourage in the minds of the young a taste for the study of natural history, to lead them to a close examination of the wonderful works of the Creator, and to teach them how to read the great book of nature." We get, for our shilling, a good introduction of twenty-six pages on the history of a butterfly, its preparatory states, the more prominent features of its structure in all of them, with several nicely-executed illustrations in the margin, and a liberal seasoning of poetry to boot, which, to say the worst, cannot do any harm; coloured figures and descriptions of twenty-two species of native butterflies—the figures, if we mistake not, after Mr. Morris, of whom the author is a devoted admirer and, may we say without offence, occasionally an imitator in points where imitation had better been avoided; sixty pages are devoted to the descriptions of these species. Lastly, we have a list of all the British species, with the scientific name, time of appearance, and place of resort of each—the last particular too generally treated to be of much use; and under

"Time of Appearance," we find such entries as "very rare," "only one taken," &c.; still we approve of the table on the whole—the idea is very good.

The author, Mr. H. G. Adams, is fond of hunting out derivations, and the origin of names, &c., which are sometimes far-fetched, as the derivation of Machaon, from "the Latin Machera, a dagger or knife" (he might have said the Greek at once, from which the Latin adopted it), in allusion to the pointed tails of the insect; and the name of the comma butterfly from the "outline of the wings, which, forming the kind of curve presented by the stop called a comma, gave occasion to the name." Oddly enough, in the very next sentence he gives the true derivation while accounting for the addition "album," which we should have thought so plain as to need no comment, much less to excuse such a recondite absurdity as we have just quoted. These are minutiæ which we can laugh at and pass by; the little book has a good aim, and is well written, is uncommonly cheap, nicely got up, and has our hearty commendation and recommendation.

Ere passing from the subject, we may inform our readers that this little book is one of a series of similarly cheap and illustrated works now being issued by Mr. Adams, two of which have already appeared—one on British Birds' Nests, and their Eggs, the other on Mollusca. Some of these we hope to give an account of on a future occasion.

Reading Lessons. First Book. Edited by Edward Hughes, Head Master of the Royal Naval Lower School, Greenwich Hospital. Longman, Brown, Green, and Longman.

Mr. Hughes is already well known to the public as a successful writer on educational subjects. His excellent "Outlines of Physical Geography," and "Scripture Geography and History," need no commendation of ours to make them better known to those who are engaged in the arduous and responsible work of education. One of the prominent features of this age is the effort which is made in every quarter to imbue the minds of the young with a knowledge of scientific subjects. There exists, in fact, a *rage* for scientific education, and in this, as in every similar instance where there is a great public desire to be satisfied, abundant opportunity is given to quacks and pretenders of every kind to palm off on the unsuspecting their spurious wares. There exists at present an anxious and, we think, a reasonable desire to appoint a commission to examine "Adulterations of

Food;" would it not be well, following out this idea, to institute a kindred commission, whose duty it shall be to investigate "Adulteration of Knowledge?" Is it more culpable, we ask, to put copper in our pickles, or blue vitriol in our bread, than to supply the minds of the rising generation with wrong ideas or false information? To adulterate a book is, in our opinion, no less a crime against society than to adulterate our food. We, therefore, hail with pleasure the appearance of Mr. Hughes's Reading-book; in his good intentions, and in his thorough experience as a teacher, we have, at least to some extent, a guarantee that no deleterious element is to be found in the food he offers, and that we may, with safety, put his books into the hands of our youth.

Mr. Hughes's object is, no doubt, a good one; how well or how ill he may have accomplished it cannot well be told until the series be completed. A review, however, of his first volume may serve to encourage him in the prosecution of his useful labour, and, at the same time, warn him against the dangers to which a project such as his is peculiarly liable. His reading lessons—comprising, as they do, so great a variety of subjects—may be compared with a cyclopædia; and who is it that does not know the difficulties and dangers of such an undertaking? No man, be his learning or information ever so extensive, is competent to write on every branch of knowledge, to delineate παιδεία in all its parts—he must call in the aid of others; and although he may preface each man's performance with his name, the responsibility of the work, as a whole, must, nevertheless, fall upon him—his reputation must depend on the character and reputation of those with whom he may associate himself. What judgment, then—what determination—what discrimination of character—will he not require to carry him safe through his arduous undertaking? His work is like that of an engineer engaged in some ponderous construction—every rod and beam, every bolt, nut, and screw, must be looked to with an experienced and suspicious eye; no part of his material is good until it be thoroughly tested and examined; his production, in fact, is a striking instance of the maxim that "nothing is stronger than its weakest part." Mr. Hughes himself seems to have some such idea of his work; his "well-considered plan," as he states in his preface, is "to make each book of the series a complete *platform* of knowledge, upon which the mind may, as it were, rest, and take a general view before ascending to a higher stage." What becomes of the platform if it have a faulty plank—or, rather, beam—just at the point where the weight most needs support? In this consists the danger peculiarly incidental to his task, and through which we would desire to see him safe.

The subjects discussed in this volume present great variety. We have an excellent article from Mr. Hughes's pen on physical geography, a subject on which he is so well qualified to write. The form of the globe on which we live, its dimensions, the mode of ascertaining these, the relative amount of land and water, their distribution, &c., all these questions, so capable of being laid before the minds of boys in a simple and entertaining form, are treated in a manner worthy of the author's former reputation. These lessons, with their excellent wood-cut illustrations, and interesting facts, form a most pleasing feature of the book.

Mr. Edward Purcell—his able coadjutor, we understand, in the Lower Naval School—has contributed two articles; one on practical mechanics, of which it is not our intention to speak, the other on mental culture; on this subject, notwithstanding its rather metaphysical aspect, it does come within the proper province of this review to speak. "How to get Knowledge," and "How to Observe," two of the questions discussed, are, and must always be, of prime importance to every student of nature. These lessons are written in a pleasing, familiar style; the suggestions which are intended to guide us in our search after truth are, in the main, judicious, and such as have evidently proceeded from a thoughtful man, himself accustomed to follow the thread in Nature's labyrinth. If we were to venture on criticism, might we not say that matter of this kind is, perhaps, one grade too high for boys? On this, however, we shall not insist, as in the class-room there are often found, even at an age which we may think unfavourable to reflection, individuals of a thoughtful cast, who may, perhaps, derive nutriment and growth from such mental food.

The next lesson, or lessons, to which we shall advert are by Mr. J. B. Jukes, on a subject of quite another character—geology. Here we have an opportunity of laying facts—facts, too, of the most interesting nature—before the youthful mind. What boy is there who will not be glad to learn something more about the earth, which, with Mr. Hughes, he has already circumnavigated and measured? Of what stuff it is made—how this stuff comes to be where we find it—whether laid down by water or protruded upwards by the agency of unruly subterranean fire. Not only how these layers and mountains of stuff differ in material, but how they may be proved, by the interesting remains of animal and vegetable life, to belong to different ages of the world, suited by atmospheric and other conditions to different stages of organic existence. On casting our eye over Mr. Jukes's production we confess we felt somewhat disappointed; three out of his four lessons seemed to be taken up with a description of minerals, their composition, form, colour, degrees of hardness, &c.—a sub-

ject, to say the least of it, not calculated to engage the attention of boys, and certainly, if at all properly handled, not level with their capacity. One chapter we have on rocks, in which, as a matter of course, we are told the difference of aqueous, igneous, and metamorphic rocks, but not a word about a fossil—not so much even as to lead the boy who reads of geology to know what the great business of geology is—namely, from the exuvia of defunct species of animals and vegetables to trace out the ages, groupings, and relative positions of the rocks which lie apparently in such utter confusion on the earth's surface.

Let us now return, no matter how unsatisfactory the task may be, and examine whether this food provided for the sustenance and growth of the youthful mind is merely insipid and innutritive, or whether it may not contain some noxious ingredient—whether, in fact, the baker has not put alum or plaster of Paris in our bread.

The author begins by cautioning his boy-reader against the exploded error of the old philosophers, who taught the existence of four elements—earth, air, fire, and water; and informs him that, in the present state of chemical knowledge, we believe in upwards of sixty elementary bodies, which he proceeds to classify. Our reader, perhaps, expects to find the old-fashioned division of metalloids and metals, of the metals into alkalies, alkaline earth, earths, &c.; if so, he will be disappointed, perhaps not justly. We all know the extreme difficulty which so frequently recurs in the natural sciences of accurate and scientific division. We all know, for instance, the doubt that is felt in placing magnesian with the alkaline earths, rather than with the earths—in considering arsenic as a metal, rather than a metalloid, isomorphous with phosphorus. And if this be so, why should not Mr. Jukes be allowed the privilege of proposing a new classification? His division is three-fold; we quote his words—"First of all, there are all the pure metals—such as gold, silver, iron, lead, copper, tin, antimony, manganese, zinc, and a great many others which do not ordinarily occur; secondly, there are six substances, called sulphur, phosphorus, carbon, silicon, boron, and selenium; and, lastly, there are seven substances which, when pure, are always found in the state of gas, or aeriform fluid; these are called oxygen, hydrogen, nitrogen, iodine, chlorine, bromine, and fluorine."

We can readily conceive the astonishment of the chemist who reads this page; but for the sake of the general reader, and lest any mistake arise, we shall enter into particulars. We are told that iodine, is a gas; on referring to "Turner's Chemistry," we find it described as "a soft, friable opaque *solid*, of a bluish-black colour, and metallic lustre; it occurs usually

in crystalline scales, having the appearance of micaceous iron ore." Bromine, too, we are told, is a gas; this Turner tells us "is a *liquid*, the colour of which is blackish red," and that it is three times heavier than water. The gaseous nature of fluorine also is dogmatically taught, although every one that has learned chemistry knows that the properties of this substance, in an insulated state, are not known, and that Baudrimont's imperfect guesses on the subject are all we have.

Are these lessons intended to be the boy's first introduction to the Temple of Science, or merely as interesting summaries of what he may have learned before in the lecture-room of his school? In the former case the boy believes all that he is told, and then we have to contemplate the melancholy picture of his pure mind being burthened with three—at any rate two—grievous errors, almost before he takes his first step. In the latter case, if the effects be not so positively injurious, they are, at least, confusing. Which of the two is the boy to believe—his lecturer, who exhibits a bluish-black solid in one phial, and a dark red fluid in another, calling one iodine and the other bromine, or the so-called leader of science, who pronounces them both gases?

We are exhorted by an ancient moralist to reverence youth. The duty is incumbent in intellectual no less than in moral culture. A single error or careless statement uttered before a boy tends to check his mental growth just as much as an indecent word or a pernicious doctrine to ruin his morals. We have dwelt, perhaps, too long upon this topic, and shall, therefore, pass over, without criticism, the other parts of this absurd attempt at classification. A single error in a book should not procure its condemnation—it may occur through inadvertence, through haste in transcribing, or some cause difficult to explain. The fact of its being an error of this pardonable kind is not unfrequently proved by a correct statement of the same thing in the next paragraph or next page. Can this be the case in the present instance? the reader may ask. We regret to say that it is not so. The next paragraph shows the error to be deliberate; and the remainder of the article abounds in errors which it would be difficult, in the same number of pages, to parallel in any other book that ever saw the light. We shall dismiss the subject by briefly noticing those which are most prominent in the order in which they occur.

Iron pyrites is called a sulphuret of iron; it is a bi-sulphuret.

"Although each mineral has one simple crystalline form, yet that form admits of many modifications, according to the ways in which it may be split or cleaved." This statement is altogether erroneous, although it is commonly believed by sciolists.

"Potash and soda both occur native." Not only is this untrue, but the nature of these substances forbids the possibility of its being true.

"Common salt," we are told, "is formed by the combination of soda with hydrochloric acid, or muriatic acid, as it is sometimes called." This is also untrue; common salt is composed of the metal sodium and the metalloid chlorine.

"Alabaster and plaster of Paris are made of gypsum." Plaster of Paris is an article of manufacture, alabaster is not.

"Fluor-spar—the beautiful mineral called blue-john in Derbyshire—is fluorate of lime." Such a substance as is here described is unknown to chemists; the mineral spoken of is fluoride of calcium.

Alum is spoken of as a substance "of which there are many varieties, all combinations of alumina and sulphuric acid, together with other matters. Common alum is a sulphate of alumina." A rare substance, called "feather alum," is a sulphate of alumina. Common alum is a sulphate of potash *plus* a ter-sulphate of alumina.

Silicates of magnesia are represented as "all easily melted by the heat of the flame of a blow-pipe." The exact reverse is the case; they are, in general, most refractory substances, and can never be fused, except in cases where they include abundance of lime or iron.

"They (the metals) are commonly combined either with oxygen or with some of the various acids—such as the sulphuric, the carbonic, or the nitric." No mention whatever is made of sulphur and arsenic, the great companions of the metals; and, as for the acids, we need not refer the reader to works on metallurgy or mineralogy to prove the well-known fact, that the metals are only *sometimes* combined with carbonic, but *rarely* with sulphuric, and *never* with nitric acid.

Meteoric stones are said to contain, as well as iron, "almost invariably a small proportion of the rarer metal (nickel) combined with sulphuric acid." This is not only untrue, but impossible.

"Copper is not unfrequently met with native, but not often in any considerable quantities." There is a specimen from Cornwall, in the hall of the Museum, in Jermyn-street, with which our author should be familiar, which weighs some tons; and at Lake Superior native copper exists in great abundance, and is worked with profit.

We have done with our unpleasant labours, and greatly regret, for the sake of Mr. Hughes's series, that in its first volume an article should have occurred which is so bad as to be past mending in a second edition. We can see no remedy but in its removal; it is a case for the surgeons; no cure but complete excision. With pleasure we turn to an article,

somewhat farther on, in the book by Mr. Tyndall, of the Royal Institution. The subject treated is "Natural Philosophy." This gives the writer a wide range; and, therefore, as his space is limited, he must choose a few subjects to illustrate his views. We confess we were charmed with the lucidity of his style, his clearness of thought, and vivid illustrations. It is well for Mr. Hughes that, if mistakes be made in one part of his series, we can often find their correction in another. Thus, in Mr. Tyndall's prefatory remarks on Natural Phenomena, and those agencies called forces, by writers on Physics, we get a rational account of what the "cleavage of minerals" means. When common salt is referred to, for the sake of illustration, its composition is correctly given. Of the subjects he selects for treatment, we shall not speak much, as they do not properly fall within our province; but we cannot refrain from saying, that he has succeeded, to a marvellous degree, in making plain and simple that difficult elementary notion in dynamics—viz., that the force which exists in a body in motion is measured by mass $\times$ velocity, or by its momentum, as Newton defined it. We have alluded to the vividness of his illustrations; we cannot omit the following, which is most felicitous. He is speaking of the impact of two equal and perfectly elastic balls, moving in opposite directions, with the same velocity:—"If, for example, each ball possessed a velocity of nine feet a second before impact, this velocity is not only destroyed in each case, but is converted into one in the opposite direction; and in this case it is usual to say that the loss of velocity is doubled. I know that this will appear a new notion of loss to many boys, inasmuch as the *absolute velocities* after impact are the same as before. The case may be illustrated by a parliamentary candidate, who reckons on the support of a certain voter; if the voter dies, the candidate may be said to lose a vote; but if the voter change his opinion, as our ball has changed its direction, and votes for the opposition candidate, then the loss may be said to be doubled."

A Manual of Marine Zoology for the British Isles. By Philip Henry Gosse, A.L.S. Part I. Pp. 204. Price 7s. 6d. London: John Van Voorst, Paternoster-row. 1855.

Britain is a favoured country so far as natural history is concerned. Monographs on various subjects connected with the natural sciences are continually pouring from its press, and, with all this, her naturalists are still bringing before our notice new forms and new species, plucked from the world of chaos, and proving to us how much is still to be done in these

sea-girt isles of ours, and showing us the folly of sighing for other worlds to conquer.

And its natural history is not confined to the few and to the learned, but is daily becoming the study of the many, and they are beginning—it may be by slow degrees, but yet surely—to find it sweet to look round them, and behold the things which a bountiful Creator has strewed in living perfection about them, and of which, when he had made them, he pronounced to be very good; and when man takes an interest in any of God's creation, he delights to place upon it some token by which he may talk of it to others; and hence he gives to it a name. It was early in the world's history, while man reigned by himself in Paradise, that the beasts of the field, the fowls of the air, and every living creature, appeared in one long array before him, and Adam gave to them all a name. Would that that nomenclature was still extant, and then we should be able to know and to recognise all creation, and be freed from the Babel that modern men's devices have raised.

And now let us suppose that an inquirer, one who wishes to know somewhat of the animated nature of this our native land, should apply to us to know how he was to discover what names had been attached to the objects of his search, we would direct him to the many and costly monographs that have from time to time made their appearance, and tell him he would get the information he needed in some one of them. Oh! but, he might say, I want some single volume that may contain, in a condensed form, all the instruction that I need. Surely, if Linnæus wrote a Systema Naturæ meant for the whole world, some of our many naturalists have done the same kind office for this much smaller world of ours; and until but very recently we should, albeit reluctantly, have answered him in the negative, and told him to wait for some better time.

But now we can introduce to the notice of such inquirers as these the book which stands at the head of our notice. Previously we told them of monographs, whose very perfection put them far beyond their reach; now we can tell them of a manual whose chief perfection is, that it will be within the reach of all, that the tyro, or even the more advanced student, may, with the greatest ease, carry in his pocket, and refer to as he sits upon the weed-fringed rock, or stands upon the tide-washed shore.

This manual of British Marine Zoology is the production of a naturalist well-known to our readers, whether they think of him as the sojourner in the Bluefields of Jamaica, under the shade of the calabash trees, or by the sea-coast and the rock-pools of sunny Devonshire. View him as we may, we still see the genuine naturalist, one who woos Nature in her own

retreats, and wishes others to do so also; hence the publication of the present work, which is to be completed in two parts, the first of which is before us.

"Knowing," says our author, "by experience the difficulties which lie in the way of identifying animals by published characters, I have laboured to remove or to lessen these difficulties as far as was possible. I have endeavoured to make these pages *practically* useful to the beginner, while yet they should be precise enough to serve the advanced zoologist as a convenient medium of reference; and I believe the student will find here the means of learning, with as little trouble and doubt as possible, the generic name of *every animal* that has been recognised by naturalists as inhabiting the British seas, from the lowest sponge up to the whale; and it is not only upon descriptions that the student has to rely, but he has also for his assistance figures, the majority of which are striking as faithful likenesses of the animals they represent." Indeed this is one of the most remarkable features of the present work, that while it is published at so very small a price, it should yet be most copious in the number of illustrations, containing figures of no less than three hundred and forty species (a figure of every genus named), of which one hundred and thirty are drawn from *living* and one hundred and two from preserved specimens, the remainder being copies from Johnston, Forbes, and others. We do, indeed, acquit the author of all vainglory when he affirms that upwards of one hundred figures, taken from living animals in these low forms, constitute a somewhat unusual feature in a book of this size and price.

The part before us contains the following classes:—I. Poriphora; II. Infusoria; III. Rhizopoda; IV. Zoophyta; V. Acalepha; VI. Echinodermata; VII. Turbellaria; VIII. Annelida; IX. Rotifera; X. Crustacea; XI Cirripedia; XII. Arachnida; and, XIII. Insecta. In the synopsis of the classes which part two is to contain, we find, greatly to our surprise, that the class Aves is to be omitted. Why leave out the birds, and include the insects? Surely many of the former have their home, almost always, in the great deep? Ask the stormy petrel where its home is. It would, doubtless, say on the crest of the briny wave. We will not deny that it visits, and that often, the dry land; but if so, why we should convict Aepus marinus of constantly doing the same. And, then, we have known the Saxicava—and, we presume, it will be included in part two—have its hiding-place but a little below the nesting-place of some of the to-be-neglected class—Aves. We would ask Mr. Gosse to reconsider the subject. Our opinion is, that British marine zoology will be incomplete without the addition of this very interesting class.

And now having acted the part of champions for the "Birdies fair," in order that they may be *included* in the future part, we must also defend the right of some smaller fry that have been *excluded* from the present part. If we turn to the 178th page, we find that of all the classes that come under marine zoology, that of Insecta is the smallest in respect of numbers. We are aware that of this—the most populous class, beyond all comparison, of animals, embracing as it does more than ten times as many species as all other living beings put together—the sea is singularly destitute. It has, indeed, been frequently said that no true insect is marine; and, though this is not literally true, the minuteness of the exception makes the rule even more striking than it would have been if absolutely universal. Of the hundreds of thousands of insects known to exist, but *two*, says Mr. Gosse, live in the sea. Now, if we can help it, this solitary pair shall no more pine alone; for, we fancy, we shall be able to add to this small band, at least, *two pair* more.

We would sincerely wish for Mr. Gosse's company as far as the Portrane sands, not far from Dublin, where we would show him one, at least, of the two pair; but, meanwhile, we must tell him of them, and this shall be done in the words of an entomologist of whom we are justly proud, and who was the discoverer of one of the insects:—"I found," says Mr. Haliday, "Cillenum laterale under stones, near *low*-water mark. They prey upon the sand-hoppers, and the tide retiring has scarcely uncovered the sand, when these little depredators are abroad from their hiding-places, and alert in the chase." We forbear to quote more of this interesting history; but Mr. Gosse will find it in No. 18 of the "Entomological Magazine" for January, 1837.

In company with the Cillenum, Mr. Haliday discovered a new and singular minute brachelytrous insect, which he has described under the name of Diglossa mersa, and which is, like its companion, buried beneath the ocean surge on every incoming tide. (A description of its larva will be found, with a figure, at page 116, of the "Natural History Review," vol. ii., Proceedings of Societies.) So far for the first pair, which have often come beneath our notice.

Mr. Spence, if we mistake not, also tells us of two of the coleoptera having very similar habits—namely, Pogonus Burrellii—the habitation of which is entirely covered, during the winter and part of the summer months, with water; and Bledius tricornis, which inhabits the sand-hills near the sea at Ely, in Norfolk, and also the North Bull sands, near Dublin.

The Rev. G. Rudd, writing in the "Entomological Magazine" for April, 1834, on the habits of Hesperophilus arenarius, says—"I saw great flights

of this insect alighting below high-water mark. The tide rolled on, covered the sands, with all their inhabitants, and again receded. I disturbed the little insects in their retreat; they were as lively as if they had been sporting in the sunshine." This species is abundant at Baldoyle, near Dublin, in the same localities as the Cillenum and Diglossa. We hope to see these, and it may, probably, be others with them, added to the list of Mr. Gosse's Marine Insecta, in the shape of an appendix.

In making these remarks we have considered that every animal that is dependent on the salt-water for its sustenance—in fact, that cannot live without its presence—has a right to be included in a Manual of Marine Zoology. We know it is difficult to draw a line of demarcation; but we think it would be better, if necessary to err at all, to do so on the safe side.

When part two makes its appearance we shall return once more, and notice the present one; and we would now take our leave of it, assuring our readers, that as a Manual of British Marine Zoology, it need fear no rival; as a sea-side book, it will be the constant companion of the student of nature, who will find it a most useful work. We prophecy a long run of prosperity to it, and hope the author will have frequent occasion, as new editions make their appearance, of keeping its contents up to the standard of the day.

Catalogue of the Bees of Great Britain. By Frederick Smith, M.E.S. Printed by Order of the Trustees of the British Museum. 8vo. London. 1855, with ten plates. Price 6s.

Twenty years of intimacy—for so far back, as he has told us himself, do his continuous observations date—have eminently qualified the author to commend to his readers a theme in itself attractive—

> "The bee with honied thigh,
> That at her flowery work doth sing."

—(exquisite picture of cheerful industry!) does not the very name conjure up fragrant memories of long bright days of delicious summer, of childhood's pastime, and the fresh face of smiling nature. Bees—blithe, busy bees, thrifty withal, and valiant in the defence of your well-earned store and darling brood—we, too, have heard your carol, have watched you, too, at rosy morn, and noon, and dewy eve, with interest and curiosity that have grown and ripened since that early moral lesson by thee sug-

gested, little busy bee, was lisped in artless rhyme, till such time as the tomes of Reaumur, of Huber, or of Kirby, wiled us from repose, and lighted up again the waning hours, then sent us forth, with the return of day, in the fields and woodlands, to verify the more than fabulous wonders and yet unexhausted secrets of your true history. Where the garden blends gay colours and grateful scents in voluptuous profusion, there ye are found; in open forest glades, and deep-hollowed lanes, where the full gush of concentrated sunshine reverberates from the wayside bank, searching every nook and cranny, and flooding all with genial warmth and brilliance, there your countless dwellings are, populous cities of Troglodytes. Free commoners of nature, yours, too, is the wide range of purple heather mantling the mountain slope far above the track of the gleaming ploughshare, high aloft beyond the murky veil that wraps the clanking forges, and the atmosphere of carking cares hanging about the marts of human traffic; where the skylark's song is silent and the chirrup of the grasshopper, and no voice awakes the quivering ether but your glad hum, unless it be the mellow tinkle of a sheep-bell, or the low gurgle of some tiny brook, treading its way unseen among huge, moss-clad stones, or that the distant boom of mighty ocean may come up, stealing faintly, as a ghost of sound, upon the uncertain ear. We welcome you, winged elves of the realm of flowers, and your historian, who comes to tell us of your families and kin, to teach your proper names, particular tastes and qualities. For, among bees, there are many shades and diversities of instinct; not all alike exemplify the character, moral and poetical, that is conventionally attributed to the race at large. There are domestic bees and wild, social and solitary, honey bees and parasites. Man's wholesale pillage indeed is limited, in this country, to one species, the highest in the scale of instinct and intelligence; but many others bear witness also to the poetical truth, that

Vos non vobis mellificatis, apes.

It is gratifying, however, to have such incontestable authority as Mr. Smith has adduced, to clear the reputation of sundry families of bees from the unmerited charge of setting up an establishment for self and family, without working, at the cost of their more industrious neighbours. Appearances indeed were against some of them, but our author teaches us that appearances are deceitful: "Observation alone can be relied upon, when the history of an insect is to be written; all classification, based upon structural differences alone, will frequently be at fault." On behalf of the whole family *Andrenidæ* the general plea is put in "not guilty." "The

result of my observations," Mr. Smith declares, "leads to the conclusion that no species of the *Andrenidæ* is parasitic." Indeed, the genus *Prosopis* was the only one against which grave suspicions of this nature were, till lately, entertained, resting, as it appears, upon no stronger evidence than their being destitute of the usual apparatus for collecting pollen. The first person that had a word to say for them, as we are informed, was Mr. Thwaites, who bred two species from bramble-sticks, in which the larvæ were found arranged in the same regular order as is the case with the acknowledged working bees.

Mr. Smith, from his own observations, also has vindicated the industrious habits of *Sphecodes* against Lepelletier St. Fargeau's imputation of parasitism, almost unnecessarily we think, since that hypothesis was framed in disregard of the distinct testimony of such accurate observers as Reaumur and Kirby. Concerning the kindred *Halicti*, Kirby has simply said, "the insects of this family nidificate much in the same manner with those of the preceding *(Sphecodes)* in bare banks."

Among the genuine bees (*Apidæ*) the genus *Ceratina* has been qualified as parasitic by St. Fargeau, again in opposition to the express statement of Spiniola, the correctness of which has been confirmed by the late observations of Thwaites and of our author. They construct their cells, like *Prosopis*, in the dead shoots of brambles. The veritable parasites belong to the genera *Nomada*, *Epeolus*, *Cœlioxys*, *Stelis*, and *Melecta*, composing the tribe *Cuculinæ* of Latreille. The *Apathi*, also, are known to live, on a rather ambiguous footing, in the nests of the humble-bees (*Bombi*), which they resemble so closely. We will leave Mr. Smith to state the case for them, as he will make the best of it—

"What office these bees perform in the economy of the nest has not been discovered; they live on the most friendly terms with the industrious part of the community, and it is probable that upon them devolves some important office, the nature of which it would be very interesting to discover. It has been supposed, from the very close resemblance of the Apathi to the Bombi, that the former are an idle race, reared at the expense of the industrious bees, and wearing a livery in imitation of them, for the purpose of deception; but there can be little doubt of these aristocrats of the community performing important and necessary duties highly conducive to the general prosperity of the whole. That the close resemblance of these bees is not for the purpose of deception is at once proved by the fact of A. Barbutellus, a yellow-banded bee, being found in the nest of B. Derhamellus, a black species having the tip of the body red; and we have already seen that, amongst the solitary bees, the greatest difference in appearance exists; we would instance Epeolus and Colletes, Andrena and Nomada, also Melecta and Anthophora."

But, in truth, these same humble-bees are a much-enduring race of drudges, as many a schoolboy can testify, who has learned to "pluck the

honeybag o' the bee," before his acquaintance with the sweets of Shakspeare's Muse has gone much further. We turn to Kirby's homely, but faithful, picture of their awkward feats in the science of self-defence. "When these animals are walking upon the ground, if a finger be moved to them, they lift up the three legs of one side to defend themselves, which gives them a very grotesque appearance." Mr. Smith has noticed more particularly—

"The various degrees of pugnacity which they exhibit when their dominions are invaded; the moss-builders exhibit little or no courage in the defence of their citadel, they may be taken with impunity; but a far different race are those which build underground; these are bold and daring insects, which defend their nests with great courage.

"The term moss-builders must not be taken literally, since many nests are composed entirely of grass and leaves; but in situations where moss is plentiful, the nests will be found to be constructed entirely of that material. To show that humble-bees avail themselves of such materials as are most readily found, and suitable to their purpose, I may instance a very remarkable nest found near a farm-house. One of the brown species of humble-bees was observed frequently flying into a stable through the latticed window; the bee was busily engaged in collecting bundles of short horse-hair accumulated from the currying of horses; this she flew off with to a short distance, and settled down with it amongst some grass; on examining the spot, a nest composed entirely of horse-hair was discovered; this interesting nest was destroyed before the bee had quite completed its construction. Another very interesting deviation from the usual economy of the moss-building bees was observed by Dr. William Bell. During the summer of 1854, a robin built its nest in the porch of his cottage at Putney; some time after this had been observed, an humble-bee took possession of the nest, and adapted it to her own purpose; he was, unfortunately, unable to identify the species by capturing a specimen, the nest having been destroyed; but Dr. Bell saw the bee on one occasion, and observed that it was black with yellow bands, probably Bombus pratorum."

The economy of the "cuckoo-bees" has been hitherto so imperfectly investigated, that Mr. Smith may justly claim credit for the additional materials he has contributed towards their biography. Of the *Nomadæ*, the most numerous in species among the parasitic genera, we have the following account:—

"The bees belonging to this genus are popularly known by the name of wasp-bees, from their close resemblance, in their gay colouring, to the smaller species of Vespidæ; they are, however, true bees, and constitute the most beautiful of all the genera found in this country; notwithstanding the generally-received history of their economy, we shall search in vain for much precise information. . . . No one appears to know anything beyond the mere fact of their entering the burrows of Andrenidæ and Apidæ, except that they are found in the cells of the working bees in their perfect condition; it is most probable that they deposit on the provision laid up by the working-bee, that they close up the cell, and that the working-bee, finding an egg deposited, commences a fresh cell for her own progeny. My reason for thinking it probable that the parasite closes the cell is, that I have frequently captured Nomadæ and Melectæ with masses of clay attached to their posterior tibiæ; and in the well-known genus of exotic parasitic bees, Crocisa, specimens are of frequent occurrence which have masses of clay or mixed earth on their tibiæ; this, however, requires, and is deserving of, further investigation. I have found several of the species in the cells of Andrenidæ—these will

be mentioned under the respective species. It is, however, necessary to record one instance which throws some light upon the economy of the genus. Some years ago, in the month of June, I met with a large colony of Eucera longicornis, and observed great numbers of Nomada sexfasciata flying about amongst the bees, and occasionally entering into and issuing from their burrows. In the beginning of April of the following year I visited the locality for the purpose of obtaining males of the Nomada, as very few were found when the colony was first discovered; the cells of Eucera were found at about the depth of eight inches in a stiff clayey soil; of these a considerable number were obtained; on examination, many of the bees were found to be in the pupa state, some far advanced towards their perfect condition, others still larvæ; on opening one cell, it was found to contain two specimens of Nomada sexfasciata. Since the former visit I have, on several occasions, obtained the cells of Eucera, and have endeavoured to find the larva of Nomada, but in vain; perfect individuals of N. sexfasciata have been found in the cells of Eucera on several occasions, usually two in each cell, and once a pair of N. alternata."

Of *Epeolus variegatus*, again (the only indigenous species of this genus), the author informs us—

"This pretty little bee is very abundant in many parts of Kent, Surrey, and Hampshire; it is also met with at Southend, in Essex; it is, however, local; wherever Colletes Daviesana is found, Epeolus, its parasite, is to be met with; it has been found in the burrows of that bee. It usually appears early in July; the males pass a great portion of their time reposing in flowers, particularly on the heads of the ragwort; they are also partial to the mouse-ear hawkweed, and may frequently be found enclosed in the petals of the flowers; the habit of this bee is very sluggish; they are easily captured by hand; their sting is very acute."

The preceding extracts may give some idea of the Natural History touches which are interspersed among the descriptive portions of the volume, so abundantly, that there is scarcely one, except the rarest species, with regard to which Mr. Smith has not some particulars to communicate. Having drawn so freely already from the source, we will venture to extract only one more bit of biography before we proceed to the technical details, indispensable in reviewing a work of such scientific character—

"If I were asked which genus of bees would afford the most abundant materials for an essay on the diversity of instinct, I should, without hesitation, point out the genus Osmia. I propose to notice in this place all that has occurred to me during an attentive observation of their economy for the last twenty years. Mr. Kirby, in the 'Monographia Apum Angliæ,' has quoted the history of Reaumur's mason-bee, which, although not included in the present genus, is still so nearly allied that its history might be taken as a parallel to that of Osmia; but as it is not a British species, I merely allude to it to call attention to the highly-interesting history given by Reaumur of its economy. The most abundant species is Osmia bicornis; its economy is varied by circumstances; in hilly country, or at the sea-side, it chooses the sunny side of cliffs or sandy banks, in which to form its burrows; but in cultivated districts, particularly if the soil be clayey, it selects a decaying tree, preferring the stump of an old willow; it lays up a store of pollen and honey for the larvæ, which, when full-grown, spin a tough, dark brown cocoon, in which they remain in the larva state until the autumn, when the majority change to pupæ, and soon arrive at their perfect condition; many, however, pass the winter in the larva state. In attempting to account for so remarkable a circumstance, all must be conjecture, but it is not of unfrequent occurrence; this species, also, frequently makes its burrows in the mortar of old walls. Osmia leucomelana may be observed availing itself of a most admirable, and almost ready, adaptation for a

burrow; it selects the dead branches of the common bramble; with little labour the parent bee removes the pith, usually to the length of from five to six inches; at the end she deposits the requisite quantity of food, which she closes in with a substance resembling masticated leaves—evidently vegetable matter; she usually forms five or six cells in one bramble-stick. The bee does not extract the whole of the pith, but alternately widens and contracts the diameter of the tube, each contraction marking the end of a cell. The egg is deposited on the food immediately before closing up the cell; it is white, oblong, and about the size and shape of a caraway-seed. The larva is hatched in about eight days, and feeds about ten or twelve, when it is full-grown; it then spins a thin silken covering, and remains in an inactive state until the following spring, when it undergoes its transformations, and appears usually in the month of June.

"Osmia hirta burrows in wood, seldom in any other material; the same habit will be observed in Osmia ænea; but I have observed this bee more than once constructing its burrow in the mortar of walls, and sometimes in hard sandbanks. Osmia aurulenta and O. bicolor are bees which commonly burrow in banks, the latter being very abundant, and forming colonies in some situations; but although it appears to be the natural habit of these species to construct tunnels in hard banks, with great labour and untiring perseverance, still we find them at times exhibiting an amount of sagacity, and a degree of knowledge, that at once dispels the idea of their actions being the result of a mere blind instinct, impelling them in one undeviating course. A moment's consideration will suffice to call to mind many tunnels and tubes ready formed, which would appear to be admirably adapted for the purposes of the bee—for instance, the straws of a thatch, and many reeds; and what could be more admirably adapted to their requirements than the tubes of many shells? So thinks the bee. O. aurulenta and O. bicolor both select the shells of Helix hortensis and H. nemoralis; the shells of these snails are, of course, very abundant, and lie half-hidden beneath grass, mosses, and plants; the bees finding them in such situations, dispense with their accustomed labour, and take possession of the deserted shells. The number of cells varies according to the length of the whorl of the shell selected, the usual number being four, but in some instances they construct five or six, commencing at the end of the whorl; a suitable supply of pollen and honey is collected, an egg deposited, and a partition formed of abraded vegetable matter; the process is repeated until the requisite number is formed, when the whole is most carefully protected by closing up the entrance with small pellets of clay, sticks, and pebbles; these are firmly cemented together with some glutinous matter, and the bee has finished her task.

"We will now observe the intelligence of the bee under different circumstances. She has selected the adult shell of Helix aspersa; the whorl of this species is much larger in diameter than that of H. nemoralis or H. hortensis—too wide, in fact, for a single cell; our little architect, never at a loss, readily adapts it to her purpose by forming two cells side by side, and as she advances towards the entrance of the whorl, it becomes too wide even for this contrivance; here let us admire the ingenuity of this little creature; she constructs a couple of cells transversely! And this is the little animal which has been so blindly slandered as being a mere machine.

"I will take this opportunity of correcting a very widely-diffused error, which appears to have originated with Reaumur; or, if his account of the development of Xylocopa be correct, it differs from that of every wood-boring bee which inhabits this country. He says—'When the larva assumes the pupa, it is placed in its cell with its head downwards; a very wise precaution, for thus it is prevented, when it has attained to its perfect state and is eager to emerge into day, from making its way out upwards, and disturbing the tenants of the superincumbent cells, who, being of later date each than its neighbour below stairs, are not yet quite ready to go into public.' Mr. Kirby also quotes from a letter by the Rev. George Ashby, who, after describing the nest of Megachile centuncularis, says—'The lowest and first born passes out through the bottom of its own (lowest) cell, and so escapes without disturbing the rest, who are not yet ready to emigrate.' All such conclusions originate in conjecture. In the case of Osmia aurulenta constructing her cells in the spiral tube of a snail's shell, where is the possibility of

escape? when burrowing in a sand-bank the same difficulty presents itself; when Chelostoma florisomnis avails itself of the tube of a straw or reed, how is the insect to pass the first knot which opposes its escape? Such are the results of theoretical conclusions; let us seek for knowledge in the careful investigation of the operations of nature.

"A bee is observed to alight on an upright post, or other wood suitable for its purposes; she commences the formation of her tunnel—not by excavating downwards, as she would be incommoded by the dust and rubbish which she removes—no, she works upwards, and so avoids such an inconvenience. When she has proceeded to the length required, she proceeds in a horizontal direction to the outside of the post, and now her operations are continued downwards; she constructs a cell near the bottom of the tube, a second, and a third, and so on to the required number; the larvæ, when full fed, have their heads turned upwards; the bees which arrive at their perfect condition—or, rather, those which are first anxious to escape into day—are two or three in the upper cells; these are males; the females are usually ten or twelve days later. This is the history of every wood-boring bee which I have bred, and I have reared broods of nearly every species indigenous to the country. I have observed in the instance of Chelostoma florisomnis, that whilst one bee was carrying on her operations as detailed above, another was tunneling in a horizontal rail; here no lower opening was required, the bee pushed the chips out at the entrance, and as no outlet was necessary at the end of the tunnel, the bee in this case made none.

"There is still another species of this genus whose habits are so different to the rest, that our admiration of the ingenuity of these bees is greatly increased when we consider its curious details, and reflect upon the degree of care and foresight exhibited by the provident parent—this is the Osmia parietina, a bee only found in the northern parts of this country. This species selects the underside of a slate or stone lying on the ground, and having a hollow space beneath; to the stone the bee attaches the little balls of pollen. A stone of this kind was found at Glen Almond, Perthshire, on the Grampians, 800 feet above the level of the sea, by Mr. J. Robertson, who, on turning it up, observed a mass of cocoons; although he was not much acquainted with entomology, still he knew them to be the production of some insect; he presented the stone to the British Museum, and it was placed in my hands for observation. The size of the stone was ten inches by six; the number of cocoons attached to it two hundred and thirty. When first discovered, about one-third of them were empty; this was in the month of November. In the beginning of the following March, a few males made their appearance, and shortly afterwards some females; they continued to come forth occasionally until the end of June; at this time there remained thirty-five undeveloped cocoons; on opening one or two of them, they proved to contain active larvæ; these I carefully closed, and left the whole undisturbed until the following April, at which time, on examination, they proved to be still in the larva state; but at the end of May they changed to pupæ, and about the end of June began to come forth perfect insects. This, then, was the result—a portion of a deposit of eggs made in 1849 had been three years in arriving at maturity: when found, one-third were developed; the following year a second brood came forth, and whilst in my possession a third. In the first instance, the whole deposit was subject to the same influences, and had produced larvæ; what was the cause of the retarded development of the rest, it were vain to attempt to determine."

We cannot but respect the modesty that has left untouched those higher problems of system and philosophy, on which the undying fame of the "Monographia Apum Angliæ" mainly rests. After the lapse of more than half a century, and when the peaceful and honoured age of the Patriarch of Entomology in Britain has sunk into the grave (the evening that precedes sunrise), the groups, and the disposition of them which he has indicated, still form the groundwork for the arrangement of these families; while the

very discrepant and boldly original views which Lepelletier St. Fargeau has more lately proposed appear to have gained few converts. But still after that, much remained, which could hardly be accomplished by a work produced at a time when war had almost wholly interrupted the communications with the Continent, then, at the best, and for long after, tardy and precarious in matters of literature—produced, too, from materials nearly limited to his private collections and observations, made in the leisure hours of a life consecrated then, as it was afterwards, for a period exceeding the average duration of human life, to the duties of the ministry in a country parish. Kirby himself was aware of many imperfections in his own work. Of the last of his groups he has remarked—"I know no family of which it is more difficult to distinguish the species than the present, for there is little difference in the form of the *Bombinatrices*, and the hue of their bodies, at least of all our English ones, is the same, so that the describer must rely almost solely upon the colour of their hirsuties for his characters, and this is so subject to vary, even in the same individual in different periods of its existence, that it is not safe to depend upon it, but under particular restrictions. An insect recently disclosed, in this respect appears a different species from the same where it has long been exposed to wind and weather." And again—"But this is not all the difficulty with which the describer has to struggle; the males, in general, resemble the females sufficiently to be known as such, but there are several so unlike them, as to be easily mistaken for different species; and I am by no means certain that I have not, in more instances than one, described the sexes under different names; till all can be traced to their nidi this is not easy to be avoided."* Such instances as are here anticipated have afforded scope accordingly for correction by further observation. Large additions, too, have accrued to the list of indigenous species through the industry of collectors, during the fifty years, and upwards, that have passed since Kirby wrote. And while collections have increased and multiplied at home, the growing facilities of communication with the Continent, and the interchange by traffic of scientific publications, have tended to disseminate the literature of the science, and to harmonize the nomenclature. Mr. Smith has availed himself with judgment and ability of these advantages, for the production of a volume which may be considered a necessary supplement to those of Kirby. It might seem, at first sight, that little had been added, in respect of numbers, since the commencement of this century; two hundred and twenty-one species having been given by

* Monographia Apum Angliæ I. 207, 208.

Kirby, at that time, as indigenous, while Smith's Catalogue embraces two hundred and six only. The actual additions among these, however, amount to seventy; four, treated by Kirby as mere varieties, have had their right acknowledged to specific distinction; and three out of his list are excluded as of exotic origin.* The resulting disparity is to be explained by more extended observation having eliminated many supposed species as mere differences of sex, and by the reduction to their proper specific type of many of the varieties which are apt to arise from the wearing away and bleaching of the pubescence through age or accident. Let us take for an example the group of bees to which Kirby's remarks above quoted directly applied. Under the first of these, *Bombus muscorum*, Mr. Smith remarks—

"Having included seven of the species of our great monographer in that of *B. muscorum*, I must observe that it has not been done without having repeatedly examined the communities of a large number of nests; in some, all the varieties described were found; in different nests, one or other of the varieties will usually be the most numerous; in nests found in the north of England, the variety *B. agrorum* is much more numerous than in the west. This species is found in all parts of the United Kingdom, and is undoubtedly the true *A. muscorum* of Linnæus: the typical specimen preserved in the cabinet at the Linnean Society is a female."

The specific marks to which Audovin first directed attention have been employed by Mr. Smith to fix the species of this difficult genus found in Britain. The result has been that while four species, unknown to Kirby, have been added since, his original list has been reduced from thirty species to fourteen, retained in the pages of Smith. Of the parasitic genus *Cœlioxys*, on the other hand, of which Kirby actually knew but one species (for his *C. inermis* would seem to be but a male variety of the first), four more have been since discovered in Britain.

Kirby, as various notices in the Monographia show, had not neglected to consult the authentic specimens of Linnæus, which had become the property of his accomplished friend, Sir J. E. Smith, not very long before; but he did not deem it necessary to follow out the consequences so rigidly as later authors have done; and many of those notes remained forgotten or unregarded, until Mr. Smith resuscitated, and enlarged them, by a fresh collation of the Linnean types, which has led to the restoration or corrected application of several of his trivial names. Thus the *Sphex gibba* of Linnæus, appropriated by Scopoli (whom most later authors have implicitly followed in this) to a genuine Linnean *Sphex*, now *Pompilus*, is properly recognised as a bee *Sphecodes gibbus*. And while *Apis retusa*

* *Apis violacea, A. pollinaria, A. druriella.*

of Kirby appears as *acervorum* Fabr., an *Anthophora* unknown to Sweden, where Kirby's *A. hawortliana* is common, this last is proved, by a reference to the authentic original, to be the true *Apis retusa* of Linnæus. The common yellow-tailed and yellow-banded humble-bee* turns out to be the *A. terrestris* of Linnæus, while the nearly similar bee, with a white tail, that has been more generally considered as such, is identified as the female of his *A. lucorum*, a male with different marking. The results of a scrupulous examination, by Dr. Nylander, of the collection in the University of Kiel, have been, in like manner, made available for the more certain identification of the species which Fabricius had described. The strict application by Mr. Smith of the rule, that where the sexes of one species have been contemporaneously described as distinct, the trivial name given to the male should have the preference, has led to some changes in the commonly received nomenclature. So *Cœlioxys conica* sinks in the *quadridentata ; Apis bicornis* L. is found under *Osmia rufa*, *A. cœrulescens* L. under *Osmia œnea*, and *A. ursina* K. as a synonym of *Panurgus banksianus*.

It seems to be tacitly assumed by the author that the reader comes prepared by the previous study of Kirby's Monograph, and Westwood's Modern Classification, as regards the families and their primary subdivisions, since no characters of these are given in the Catalogue. For the aggregate group ANTHOPHILA, or bees in the widest sense, including both the families, *Andrenidæ* and *Apidæ*, we are, indeed, provided at the outset with a sort of Natural Character. We feel no sort of doubt that Mr. Smith can tell a bee at sight, with unerring certainty; but we do greatly misdoubt whether the author himself, or his readers either, would be enabled to distinguish the same from (almost) any other winged Hymenopterous insect of the section Aculeate, by means of any or all of the structural characters there given, unless it be the single one, which is specifically invalidated by exceptions. It may be said to be of little moment; *how* we know—*so* we know ; if so, commend us then to the life-like pictures of Sturm or Curtis for our study, in place of the painful poring over crabbed phrases. Nevertheless, it is not a difficult matter, in fact, to know a bee from all the rest of the Hymenoptera; but that *by* means of characters, not *without* them, by definite marks, and a peculiar aggregate of them, not by such as are vague, or common, or applicable but partially.

* Not just a corruption of humming-bee, as Mr. Smith conjectures; but of much older origin, since all the branches of the Teutonic stock have got the name in forms little altered; Dutch *Hommel-by ;* Swedish *Humla (bi) ;* Danish *Humle-bi ;* German *Hummel* (*biene*), &c.

Of the plates, ten in number, one-half are devoted to exemplify the varying forms of the oral organs, which are of so much moment for generic division in these families. The rest present examples of the principal genera, with the veining of the wings, and other details of structure. The eye of the entomologist has guided the hand of the artist here; and these illustrations are calculated to please more generally than Kirby's own rude, but instructive, etchings. The generic characters, which the plates seem to elucidate, are drawn up with care and neatness, without unnecessary diffuseness. The veining of the wings has been made to afford the ground for a natural subdivision of the extensive genus *Andrena*, to which Kirby had confessed himself unable to discover any clue. In the delineation of the species, we are glad to see that Mr. Smith has adhered to the good old Linnean pattern, neither swelling out the diagnosis to the amplitude of a description, nor wholly dispensing with it, as has been done by some late Monographers, whose merits, in other respects, have been of the highest order. It is easier to give a good diffuse description than a *good* concise one, but the apt construction of the diagnosis is the hardest test of all such skill.

In conclusion, we would say that this Catalogue, whether as a manual of reference for naming a collection, or a pocket-companion on entomological rambles, may be considered as indispensable to every one intending to collect and study the British bees.

Mollusca Testacea Marium Britannicorum. A History of the British Marine Testaceous Mollusca, Distributed in their Natural Order on the Basis of the Organization of the Animals, with Reference and Notes on every British Species. By William Clark. London: John Van Voorst. 1855. 8vo. Pp. 536. Price 15s.

There is, says Adanson, in his "History of the Shells of Senegal," published one hundred years since, something more to consider in shell-fish besides their shells. The animal that inhabits them should guide our methodical arrangements—should be our only regulator—since it is the principal part, and that which gives to the shell its form, size, hardness, colours, and all the other peculiarities in it which we admire so much. Though by no means subscribing to the truth of the above extract, we have quoted it for the purpose of introducing to our readers' notice the volume on British Marine Testaceous Mollusca, by William Clark, who, in some particulars at least, might be called the Michel Adanson of the present century. Our

space will not permit us to enter into details, or to write a history of all that has been said and done for conchology or malacology, from the time that Aristotle, with unwearied industry, and ever-to-be-admired ingenuity, tracked out for himself a path in this neglected desert, down to our days, when this desert has become a fruitful field, and names like Cuvier, and Blainville, Milne-Edwards, Müller, Owen, and our ever-to-be-lamented, but never-to-be-forgotten, Forbes, with a whole host of others, stand like beacon-lights, showing us the broad, distinct track which each and all have left behind them, some few shining steadily, with an enduring brightness—while other of the lights but flicker and die; and others still shine, like the light-house on a barren rock, but to show us where danger lies, and to warn us off the coast. For, truly, to again quote from Adanson, the details of the study is, by no means, childish play; far from it; but the way thereto is a thorny one, and beset with much difficulty.

In our opinion, the fate of malacologists and conchologists must be very like, indeed. Finding fault, as they almost invariably do, with the systems of their predecessors, they found some new one of their own, which, in its turn, shall, perchance, be stigmatized by some fresh candidate for the withering laurel, as so much ingenious trifling, supposing he gives it no harder name.

Now, it must be well known to our readers that, since the year 1757, when the "History of the Shell-fish of Senegal" was published, and even before that date, naturalists, at least the major part of them, have, in the study of shells and their inhabitants, fallen into one or the other of two extremes—by either describing the shell as if it had no inhabitant, or else describing that inhabitant as if it had no house of its own wherein to live in; and as each successive naturalist glides slowly into either of them, he is called (as in the former case) a conchologist, or (as in the latter) a malacologist. To the latter of these divisions the author of this volume most unquestionably belongs; one extract will prove this, if it be not already known. Under the head of Littorina rudis, in page 342, we find the following synonymic list:—

L. patula, Brit. Moll., iii., p. 36.
L. tenebrosa, Brit. Moll., iii., p. 39.
L. saxatilis, Brit. Moll., iii., p. 43.
L. fabalis, Brit. Moll., iii., p. 49.
L. palliata, Brit. Moll., iii., p. 51.
L. gonaria, L. nidissima, L. jugosa, L. neglecta, Auct.

and the following reason why it is given—"To describe the above, which are the pseudo-species of authors, would be to say, that the *organs* of all, both external and internal, do not vary in the slightest degree in

form." Now, we do not mean to query the truth of this reform among the Littorinidæ; they, undoubtedly, wanted some change. We know that one of the authors of the British Mollusca was of opinion that some of the species above quoted might be varieties of each other; *but still* we cannot say we are quite satisfied at some eighteen or nineteen pages of Messrs. Forbes and Hanley's works being so very roughly handled, particularly by an author who seems hardly to be aware of when he has made up his mind upon a subject, and when, for all we know to the contrary, we may find him at some future time telling us that, on *reconsideration* of the subject, he has found himself unable to make two species out of one.

We do not wish to be harsh in our criticism of this book, but there is about it an undigested look, which detracts much from its value as a scientific work, and much from its author's reputation as a modern malacologist. Many of the memoirs in this volume have been published in the "Annals of Natural History" from time to time, and are reprinted in exactly the same form as they appeared in that journal; so that, when opportunities presented themselves of examining the mollusc, and mistakes were discovered, they, instead of being incorporated in the text, are appended to it; and hence we are frequently annoyed, after reading the account of an animal, to find just at its close the words "since the above was written;" and then follow statements that not unfrequently are diametrically opposite to the ones we have been perusing. A curious instance of this occurs in the author's description of the branchiæ of Pandora obtusa. We find in the British mollusca of Forbes and Hanley, a note, by Mr. Clark, stating that this animal possesses "two palpi, one branchial lamina, and (perhaps) an obsolete one, on each side of the body;" but as fresh specimens were examined, we find that (see p. 151 of the present work) he can now say, beyond dispute (*sic*), that there are two palpi and two branchiæ on each side, and that he has preparations that can prove it; whilst in the appendix, in spite of saying and proving, our author returns to his original opinion! For our author's credit, we may say, *en passant*, that this is the worst case our ingenuity could find; but we do meet, and that frequently, with cases where old opinions are made, and that without ceremony, coolly to give place to new ones. Now, new or old, which is the reader to patronize?

The system followed is based on sexual organization; and following his predecessors in this method (for it is, by no means, of Mr. Clark's devising), he gives us the following divisions:—Hermaphrodita sine concubitu, Hermaphrodita sine congressu, Hermaphrodita congressu, (and here we find the Trochidæ: what will malacologists say to this?), and, lastly, Bisexual—the most obvious meaning of this latter word is the very

opposite to what it is used by Mr. Clark to represent in this division of the mollusca.

Perhaps the most astounding portion of this work is the part devoted to the Muricidæ. Here we find the well-known genera, Buccinum, Fusus, Pleurotoma, Purpura, Nassa, Trichrotropis, and Cerethiopsis, all placed under the one genus—Murex. No difficulty is there in believing that this must be an enormous genus, when the shores of Great Britain itself affords so many antiquated (?) genera—so many species. We perfectly agree with the author when he, on reviewing this awful ruin caused by his own hand, says it will be hard to cast off these old names. Yes; hard it will be —so very hard, that we must declare our intention to follow the bent of our inclinations in retaining them, though old, and though, as Mr. Clark says, they represent objects without the *slightest* generic *pretension.*

In conclusion, we would say that this work is not a history of *all* the British mollusca, but only of those that came beneath Mr. Clark's notice in the southern part of Devonshire; and, as it is illustrated with no figures, it remains yet to be seen whether our author's description, as he fondly imagines, will more than take their place.

Notwithstanding its defects—notwithstanding what its author might call our prejudices—we must, and we do it willingly, record our opinion that this volume is a most important addition to our British Malacology; it contains a vast amount of valuable observations, and is a work that must be consulted by any future British naturalist who will write upon this subject. The crudeness of our author is almost atoned for by his industry; and his manifest inclination to record his observations for the benefit of others, is deserving of our highest esteem; at the same time, we would observe that in order to do malacology a good service, our author should cling less devotedly to those dicta with which this work abounds.

Obituary.

GEORGE JOHNSTON, M.D., EDINBURGH.

Within the last twelve months, when fire and the sword have been slaying their thousands on the battle-field of a foreign land, the grim arm of death has not been less vigilant in this, our native soil. Already have we penned the brief tribute of respect to one whose talents and kindliness of disposition raised him high among the admired of mankind; and now we

are called upon to record the departure from among us of another of our most distinguished members.

George Johnston was born on the 20th of July, 1797, at Simprin, in Berwickshire. About the year 1813 he commenced his medical studies in Edinburgh, and entered as a pupil of the well-known Dr. Abercrombie. He took out his degree of M.D. in 1819, and soon afterwards became a Fellow of the Royal College of Surgeons of Edinburgh. He then removed to Berwick, where he established himself as a physician, and was not long in becoming one of the leading medical men of that town. He devoted himself with the greatest assiduity to the duties of his profession; and we believe that he never completely recovered from a severe wetting to which he was exposed while visiting a patient in the country. He sought, in the retreat afforded by the Bridge of Allen, some slight relaxation from the harassing duties that devolved upon him, and it was here that he was attacked with a fit of paralysis. He was quickly removed to his residence at Berwick, where he shortly afterwards fell into a state of unconsciousness, which lasted, with a few and brief intervals, until, on the morning of the 30th July, he calmly passed from the scene of his labours.

Thus was finished the life of a great as well as a good man. Dr. Johnston was essentially a British naturalist—perhaps we had better said that Dr. Johnston was the naturalist of the Eastern Border; for, although the author of the "British Zoophytes and Sponges," yet he always felt, to quote Southey's words, "The better, as well as the happier, for local attachment;" and one of the most charming productions in the English language is his "Botany of the Eastern Borders." Some months since, he informed us that the second volume of his "Terra Lindisfarnensis" was nearly ready. Let us hope that some one will be found to follow up the work that our lamented friend had begun.

The driest details became interesting when they flowed from Dr. Johnston's pen. Ever forward in the pursuit of the natural sciences, he lost no opportunity of advancing their interests, and to this we owe the formation, about two-and-twenty years since, of the Berwickshire Naturalists Club. Some of the excursions of this club will be found narrated by his poetical pen in the pages of his last work, just referred to. His favourite flower was the wood sorrel (Oxalis acetosella). Well may we say with Wordsworth, that—

> "A flower is not a flower alone—
> A thousand sanctities invest it;
> And as they form a radient zone,
> Around its simple beauty thrown,
> Their magic tints become its own,
> As if their spirit had possess'd it."

THE

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NOTICES

OF THE

FOR THE MONTHS OF

October, November, December, 1854; January, February, March, April, May, June, July, August, and September, 1855.

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SAMUEL HIGHLEY, 32, FLEET-STREET.
1855.

Notices of Serial Publications.

Annales des Sciences Naturelles. Comprenant la Zoologie, la Botanique, l'Anatomie et la Physiologie comparée des deux règnes, et l'Histoire des Corps Organisés Fossilles, rédigées pour la Zoologie, par M. Milne Edwards—pour la Botanique, par M.M. Ad. Brongniart et J. Decaisne. Tome II. No. 1. Paris: Victor Masson.

Zoologie—Mémoire sur l'Organisation de l'Anomie, par le Docteur Lacaze-Duthiers. This is a most valuable and interesting paper on the anatomy of the Anomia. The species which Dr. Duthiers has selected is ephippium, which is common to our shores. The memoir is accompanied with two beautiful plates, one of them coloured. Note sur la multiplication des Nématoides, par le Docteur Gros (de Moscow); Résumé d'un travail d'embryologie comparée sur le développement du Brochet, de la Perche et de l'Ecrevisse, par M. Lereboullet (suite). *Botanique*—Mémoire sur les glandes nectarifères de l'ovaire dans diverses familles de plantes monocotylédones, par M. Ad. Brongniart, with four plates illustrative of the ovarian glands in the Liliaceæ, Amaryllidaceæ, Bromeliaceæ, Cannaceæ, and the Musaceæ; De la nécessité de faire disparaitre de la nomenclature botanique les mots de torus et de nectaire, par le Dr. D. Clos, Professeur et Directeur du Jardin des Plantes, à Toulouse; Tentamen methodicæ divisionis generis Aristolochia, additis descriptionibus complurium novarum specierum novique generis Holostylis, auctore P. Ducharte, with two plates.

The Annals and Magazine of Natural History. No. 82, October; No. 83, November; and No. 84, December, 1854. 8vo. With plates. London: Taylor and Francis. Price 2s. 6d. each.

No. 82, October:—(Thomas Williams, M.D.) On the Mechanism of Aquatic Respiration, and on the Structure of the Organs of Breathing in Invertebrate Animals, with three plates—continued from page 57; (J. S. Bowerbank, F.R.S.) On the Remains of a Gigantic Bird (Lithornis Emuinus), from the London clay of Sheppey; (E. L. Layard) Notes on the Ornithology of Ceylon; collected during an eight years' residence in the Island—concluded from page 115. This is the conclusion of a valuable and interesting series of notes on the ornithology of Ceylon; 315 species are recorded. We trust we may soon see these notes presented to the natural history world in a more permanent form; we think they would equal in beauty Mr. Gosse's "Birds of Jamaica." (W. Hofmeister) On the Fertilization of Ferns; (W. V. Guise) On a new species of Alpheus; (P. H. Gosse) Descriptions of three new species of British Actiniæ. We have here the descriptions of three new

Actiniæ—viz., A. aurora, A. venusta, and A. thallia. Since the Aqua-vivarias have become the fashion of the day, numerous have been the searchings after sea anemones; and we were surprised, during the first fortnight of an "Actinia hunt," to supply the tanks of the Zoological Gardens, Dublin, to find that among some hundreds of anemones collected, at least *five* were not described in Johnston's "British Zoophytes;" some of them may be varieties, but we recognise among them the A. thallia, Gosse, and, if we mistake not, the A. venusta, which we recollect seeing in the large cavern in St. Catherine's, Tenby. We have little doubt but that further investigation will bring to light several more new species both among the Actinias and Antheas. Bibliographical Notices—The Ferns of Great Britain, by Sowerby. Proceedings of Learned Societies—Royal Society, June 15; Earl of Rosse, President, in the Chair. Zoological Society, November 25, 1851; W. J. Broderick, F.R.S., in the Chair. A paper was read by Professor E. Forbes, on a species of Æquorea, inhabiting the British seas. December 9; W. Yarrell in the Chair. March 23, 1852; Professor Owen in the Chair. Linnean Society, January 17, 1854; Robert Brown, V. P., in the Chair. Botanical Society of Edinburgh, July 13, 1854; Professor Balfour in the Chair. Miscellaneous—On the Cœnurus cerebralis of the Sheep, by Dr. Küchenmeister; On the Occurrence of Zinc in the Vegetable Organism, by A. Braun; Notes on the Bovine Animals of the Malay Peninsula, by G. W. Earl; Meteorological Observations for August, 1854.

No. 83, November:—(A. Schneider) Contributions to the Natural History of the Infusoria; (H. J. Carter) Zoosperms in Spongilla; (J. Miers, F.R.S.) On the Genus Lycium—concluded from page 194; (W. Thompson) On the Occurrence of the Bottle-headed Whale (Hyperooden bidens, *Flem.*) in Portland Roads, and remarks thereon; (L. Agassiz) On the Primitive Diversity and Number of Animals in Geological Times. This paper is a reprint from Silliman's American Journal for May, 1854; it is deeply interesting, and in every way worthy of its author. (Robert Warrington) Memoranda of Observations made in small Aquaria, in which the balance between the animal and vegetable organisms was permanently maintained; (Professor J. W. Bailey, U. S.) On a Mode of giving permanent Flexibility to brittle specimens in Botany and Zoology. We learn here, that by dipping specimens of Chara Corallina, Crustacea, and other brittle specimens, either of zoology or botany, in a neutral saturated solution of chloride of calcium, and then letting them drain in the open air, they will lose their excessive brittleness, and become flexible; the salt being neutral, no fear need be apprehended of its injuring colour or texture, while its antiseptic properties will aid in the preservation of matters liable to decay. Manual of Natural History, for the use of Travellers. Proceedings of Societies—Zoological Society. Miscellaneous—On the Natural and Artificial Fecundation of Ægilops by Triticum, by M. Gordon; The Ounces and African Seal, by Dr. Gray; On the Development of the Actiniæ, by M. Haime; Rare Irish Mollusca, by S. Wright; On a new species of Suthora, from China, by G. R. Gray; On some Fishes allied to Gymnotus, by A. R. Wallace; Meteorological Observations and Table.

No. 84, December:—(George Dickie, M.D., Professor of Natural History, Queen's College, Belfast) Remarks on Associations of Colour, and the Relations of Colour and Form in Plants. This is a most interesting paper. We extract some of the principal conclusions at which Professor Dickie has arrived—First, "that the primaries, red, yellow, and blue, are generally present in some part or other of

a plant;" secondly, "when a primary occurs in any part of a plant, its complement will usually be found in some other part, or at some period or other of the development of the plant, as was suggested to me by Professor M'Cosh." Then Dr. Dickie examines the relation which subsists between *form* and *colour*, and lays down the following laws:—First, "In regular Polypetalous and Gamopetalous corollæ, the colour is uniformly distributed, whatever be the number of colours present; second, Irregularity of corolla is associated with irregular distribution of colour, whether one or more colours are present; and, thirdly, different forms of corolla in the same inflorescence often present differences of colour; but all of the same form agree also in colour." (C. C. Babington, M.A., F.R.S.) On Linaria sepium of Allman. In the second edition of the "Manual of British Botany," Mr. Babington stated, as his opinion, that the L. sepium, *All.*, was only a variety of L. italica; and, in the third edition, that it and L. italica were but hybrids between L. vulgaris and L. reptans. However, the examination of fresh specimens, forwarded by Dr. Allman, led Mr. Babington to believe it not to be a variety of L. italica; and the fact that L. vulgaris was totally absent from the spot where L. sepium grew, renders the fact of its being a hybrid improbable. Again, in a place about one mile distant from the locality of L. sepium, L. vulgaris and reptans grow, and yet not a trace of L. sepium is to be found within a mile of them. (W. H. Benson) Characters of four Indian species of Cyclophorus, *Montfort*, followed by Notes on the Geographical Distribution of the Genera of the Cyclostomacea in Hindostan; (H. and A. Adams) Description of a new Genus of Bivalve Mollusca; (Robert Warrington) On Artificial Sea-water. It appears that in the copy of the analysis of sea-water, given in the July number of the "Annals," Mr. Gosse was slightly in error as to quantity of the materials; it, however, makes very good salt-water; and the Sea Anemones and Ulvæ seem to grow well in it. We append the more accurate statement of Mr. Warrington, in order that our readers may adopt it as having the nearest resemblance to the original ocean—viz., chloride of sodium, $43\frac{1}{4}$ ozs.; chloride of magnesium, 6 ozs.; chloride of potassium, $1\frac{1}{4}$ ozs.; bromide of magnesium, 21 grains; sulphate of magnesia, in crystals, $7\frac{1}{2}$ ozs.; sulphate of lime, crystallized, $2\frac{3}{4}$ ozs.; carbonate of lime, 21 grains. The above will amount, in round numbers, to 60 ozs., which is equal to three pints; deducting this from 10 gallons of fresh water, leaves 9 gallons and 5 pints, to which the above is to be added. Perhaps the best way of obtaining the above would be, evaporate a certain quantity of the salt-water at the sea side, preserving the resulting salts in closely stopped vessels to prevent the absorption of moisture; the proportion of this dry saline matter being $56\frac{1}{2}$ ozs. to the 10 gallons of water, minus the three pints. (Dr. W. I. Burnett) On the Genus Mermis, by Dr. G. Meissner—an analysis of, from Silliman's American Journal for July, 1854; (Dr. W. Hofmeister) On the Fecundation of the Coniferæ. Proceedings of Learned Societies—Royal Society, June 15, 1854; the Earl of Rosse, President, in the Chair. Zoological Society, November 23, 1852; Dr. Gray, F.R.S., in the Chair; December 14, 1852. Botanical Society of Edinburgh, November 9, 1854; Professor Balfour, President, in the Chair. Linnean Society, January 7, 1854; R. Brown, V.P., in the Chair. February 7; T. Bell, President, in the Chair. April 18; W. Yarrell, V.P., in the Chair. Miscellaneous—On a New Species of Rock Kangaroo, by Dr. J. E. Gray; Meterological Observations for October, and Table; Index and Title-page to vol. 14, second series.

Quarterly Journal of Microscopical Science. No. 9. October, 1854. Price 4s. With Woodcuts and Lithographic Illustrations. London: S. Highley, 22, Fleet-street.

No. 9, October:—Original communications—(J. Gorham) On the Enlargement and Multiplication of the Images of the Objects, when viewed by the light admitted through small apertures, and on the Diascope, a new Optical Instrument—continued from vol. ii., page 234; (F. Currey) On the Spiral Threads of the Genus Trichia; (G. J. Allman, M.D., F.R.S.) Observations on Aphanizomenon flos-aquæ, and a species of Peridinea. The former of these is a very minute alga, which appeared in great abundance in the large pond of the Zoological Gardens, in Phœnix Park, Dublin. The best account we have hitherto had of this little plant is by Mr. Ralfs, in his paper in the "Annals and Magazine of Natural History," on the Nostochineæ; but, as he describes it from the dried specimens, many important facts have escaped his notice, which are amply recorded in this paper by Professor Allman. We have also an account of a new species of Peridinea, which we annex—"During the last three weeks, a spectator on the banks of the large ponds in the Park must have been struck by a brown colour assumed by the water. This colour was sometimes uniformly diffused through the water; at other times it appeared as dense clouds, varying from a few square yards to upwards of 100 in extent. A microscopic examination of the water proved the brown colour to be entirely due to the presence of a minute organism, which, though it does not exactly agree with any published generic description, I have thought it better, by slightly modifying the genus *Peridinea*, as characterized by Ehrenberg, to place it in that genus rather than construct for it a new one. It varies from the 1-1000th to the 1-500th of an inch in diameter, and approaches in form to a sphere, divided by a deep annular furrow into two hemispheres, on one of which is situated another furrow, springing vertically from the annular furrow, and terminating at the pole. The organism under consideration may be regarded as essentially a solitary cell; it encloses reddish-brown granular contents, and a large, well-defined, central nucleus. In the midst of the contents are numerous clear spaces, of various sizes, which, however, appear to be oil-drops rather than true vacuolæ. In most instances, a deeper-coloured ocelliform spot was evident near the polar extremity of the vertical furrow. It is eminently locomotive, swimming with great activity by the aid of a flagelliform appendage, which springs from the vertical furrow near the point of junction with the other, and of very minute vibratile cilia, which seem distributed over the surface, and not confined to the furrows, as maintained by Ehrenberg, in the species of *Peridinea* described by him. Before death, and also when only passing from a motile to a quiescent state, most likely preparatory to undergoing some important developmental change, the contents contract towards the centre, and then an external transparent and perfectly colourless vesicle becomes visible, while the flagellum and cilia disappear. The contracted contents present a very definite and generally spherical boundary, and are evidently included in a distinct cell; the resemblance of this internal cell to the primordial utricle, and that of the external investing vesicle to the cellulose wall of the vegetable cell, are too obvious to be overlooked, though the iodine and sulphuric acid test failed in indicating the presence of cellulose. The external investing vesicle is non-contractile; under pressure it is easily ruptured; and the minutely-granular contents, mixed with large oil-drops (?), escape upon the stage of the microscope. The

nucleus is then easily isolated; it is of an irregular, oval form, quite colourless, and marked on its surface with curved striæ. Individuals were frequently seen undergoing spontaneous division, which takes place parallel to the annular furrow, and in the unfurrowed hemisphere. This process appears to be invariably preceded by a division of the nucleus; and the author had succeeded in isolating nuclei, presenting almost every stage of transverse fission, Believing the species now described to be new, I have named it *P. uberrima.*" (F. Okeden) On the deep Diatomaceous deposits of the mud of Milford Haven and other localities. By means of a new boring apparatus, Mr. Okeden was enabled to examine the mud, at the great distance of fifty feet below the surface. (W. Gregory, M.D.) On a post tertiary Lacustrine Sand, containing Diatomaceous Exuvia, from Glenshira, near Inverary. In this very interesting paper Professor Gregory enumerates 234 species as occuring in the Glenshira sand; twenty-three species are figured in a plate, annexed to this paper, by Mr. Tuffen West. (Dr. F. d'Alquen) A few remarks on a paper read before the Royal Society, by Dr. J. W. Griffith, on the Angular Aperture of Object Glasses; (T. H. Huxley, F.R.S.) On the structure of Noctiluca Miliaris. We have full details of a very singular and anomalous creature which plays a most important part in causing that silvery, sparkling, phosphorescent light, which is so often seen on dark nights gleaming from the boat-oars as they rise to the surface of the water, or defining the contour of the waves as they break upon the shore. (Hon. and Rev. S. G. Osborne) Economy of Closterium lunula. Translations—On the Male Reproductive Organs of Campanularia geniculata, by Dr. Max S. Schultze; Memoir on the Coloration of the China Sea, by M. Camille Dareste; On the Life and Growth of Nematoids, by MM. Ercolani et Louis Vella. Reviews—Lectures on Histology, by J. Quekett, vol. ii. Notes and Correspondence. Proceedings of Societies—Geological Society. On the Microscopical Structure of Freshwater Marls and Limestones, by H. Clifton Sorbey, F.G.S. Index and Title-pages to vol. ii.

THE ZOOLOGIST. No. 144, October; No. 145, November; and No. 146, December, 1854. 8vo. London: J. Van Voorst. 1s. each number.

No. 144, October:—(Rev. George Gordon) A list of the Mollusca, hitherto found in the Province of Moray and in the Moray Firth—concluded from page 4435. Mr. Gordon is well known to the readers of the "Zoologist" by his lists of the fauna of Moray, which have, from time to time, appeared in its pages; and the present catalogue we regard as the most valuable of them all, but are sorry that the Rev. George Gordon should, in his table comparing the Molluscean Fauna, of Moray, with those of Northumberland and Durham, Aberdeenshire and Dublin, have given the number of species frequenting the latter place so very incorrectly, as actually to make it appear that the well-investigated County of Dublin, second, we hold it, to none for natural history, should have no less than fifty-nine species less than his favourite province of Moray. Our readers are, doubtless, aware, that Mr. W. W. Walpole's list of the Dublin Mollusca, which is the one Mr. Gordon refers to as his authority for the Dublin species, only gave that gentleman's *own* experience; and numerous as any one's investigations may be, we yet hold it impossible that, without aid, they could give anything like a complete catalogue:—for example, Mr. Walpole gives the names of 49, not 50, of the Pulmonifera as inhabiting

Dublin; omitting, for the present, Helix hortensis (as Mr. Gordon follows Forbes and Hanly), he leaves 48 as the number given by Mr. Walpole in Dublin—thus, with our superior natural advantages, giving us a majority of only 2 over Moray; when, as we know, that instead of 48, we possess at least 57, thus raising the majority to 11: farther, whole families are omitted in Mr. Walpole's list, as the "Tunicata," "Brachipoda," "Nudibranchiata," and the "Cephalopoda," all of which have their representatives with us. As it is intended shortly to give a complete catalogue of the Molluscean Fauna of Dublin and Dublin Bay, and to institute a more equitable comparison between it and our northern friends of Moray; we shall dwell no longer on the subject here. If we have any other fault with this catalogue, it is that of giving the *English* names; and we think this trivial in the extreme. We do not feel inclined to ridicule; but, which of the readers of the "Zoologist" would know the Physa hypnorum under the title of "*Ferruginous Bubble-shell*"—and so in countless instances. Mr. Gordon professes himself to be a follower of our deeply-lamented friend, Professor E. Forbes, and of Silvanus Hanley; but, surely, he never learnt this of them. (W. F. Templer) Some remarks on the Marine Fauna of the South of Devon. We trust Mr. Templer will not forget to favour the editor of the "Zoologist" with his list of Zoophytes, as their distribution is a subject of much interest. (H. T. Stainton) Entomological Botany, with more special reference to the plants frequented by the Tineina. This is a most interesting paper, and we hope to see the subject fully treated in future numbers. (E. T. Ingpen) Extract from a Letter of a Gold-digger; (O. Mosley) Remarkable Anecdote of a Hedgehog; (E. H. Rodd) Occurence of the Short-toed Lark at Scilly; (E. C. Taylor) Cuckoo's eggs, in nest of tree pipit; (T. Catchpool) Bee-eater, in Essex; (E. H. Rodd) Glossy Ibis, at Scilly; (W. K. Bridgeman) Amphipeplia involuta; (H. Stainton) On the want of some Systematic Record of the New Additions continuously made to our Entomological Fauna. The idea contained in this notice, which deserved the most conspicuous part of the "Zoologist," our readers will find fully carried out in the "Entomologists' Annual."* (J. N. Winter) Capture of Catocala Fraxini at Brighton. Proceedings of Societies—Entomological Society, September 4, 1854; Tyneside Naturalists' Field Club. The fifth field meeting for the year was held at Alnwick, on the 31st August. Society of British Entomologists, September 6, 1854.

No. 145, November:—(J. C. Dale) Remarks on Mr. F. Smith's "Catalogue of British Hymenoptera Aculeata." What the *remarks* are, we are perfectly unable to make out. (W. T. Burnett, M.D.) Researches on the Development of Viviparous Aphides. This is a reprint from Silliman's Journal for January, 1854. Our readers will find the most important part of this paper given in page 216 of the first volume of the Review (G. B. Buckton) On the Application of Cyanide of Potassium to Killing Insects for the Cabinet; (H. T. Stainton) Entomological Botany—continued from page 4472; (H. Stevenson) Honey Buzzard, in Norfolk; (O. Pickard-Cambridge) Occurrence of rare Hawks near Blandford; (W. Borrer, jun.) Sylvia galactotes, *Temm.*, on the South Downs, near Brighton, Sussex; (J. J. Briggs) Pastor roseus, in Derbyshire; (W. H. Slaney) Poisonous effects from eating Cherry Stones; (E. H. Rodd) Schinz's Tringa (Hawfinch and White-fronted Geese), at Scilly; (W. Borrer, jun.) Grus cinerea, in Sussex; (E. L. King) Lestris Rich-

* See page 1., vol. ii.

ardsonii, at Lynn; (J. J. Briggs) Occurrence of the Pomarine Skua in Derbyshire, and of the appearance of a Fish, supposed to be the Fox Shark, off Scarborough. Proceedings of Societies—Entomological Society, October 2, 1854.

No. 146, December:—This part contains the Index and Title-page for the Twelfth Volume. Proceedings of Societies—Society of British Naturalists, October 3, 1854. Notices of New Works—The Annals and Magazine of Natural History, Nos. 80, 81, and 82; Shells and their Inhabitants, parts 15 and 16; The Transactions of the Entomological Society of London, vol. iii., part 2; (T. Catchpool) Anecdote of a Terrier; (J. Dutton) Occurrence of Hoopoes in the Isle of Wight; (E. H. Rodd) Red-necked Phalarope, near Penzance; (J. Thorne) Capture of Deilephila Galii; (A. R. Hogan) Elachista triseriatella, near Dublin; (G. Norman) Note on Sirex Juvencus; (J. J. Reading) Capture of Carabus intricatus in Devonshire; (T. J. Bold) Description of Lathrobium carinatum—an apparently undescribed British Coleopterous insect. (O. Pickard-Cambridge) On the Transformation of Heliothis dipsacea; (Rev. H. Clark) Notes on the Capture of some of the rarer British Hydrocantharidæ. This is a most interesting paper, and we would wish to call our readers' attention (especially those who study the Coleoptera) to it. Several new species are enumerated.

Hooker's Journal of Botany, and Kew Garden Miscellany. No. 69, October; No. 70, November; No. 71, December, 1854. 8vo. London: Lovell Reeve. Price 2s. each. With a plate.

No. 69, October:—(Dr. J. D. Hooker) On some African species of Amomum; (G. H. K. Thwaites) Descriptions of some new genera of Ceylon plants. Jumping or moving seeds—three of these seeds were forwarded to Sir W. Hooker, from Mexico, by the English Minister at that place, and appear to belong to the Colliguaya odorifera, *Hook.* When placed on the convex back, they shortly began to stir; the motion was continued for some minutes, and always in jerks. On one of the seeds being opened, the cause of all this strange jumping was found to be the presence of a fine fat and white larva; in all the three seeds the seed or kernel had been completly devoured—leading to the idea that the larva had first taken up its habitation in the shape of an egg, and, compelled by the double necessity of satisfying the cravings of hunger and enlarging its domicile, had, by degrees, eaten the entire inside of the hard shell, and, in all probability, had ideas of entering the pupa state when introduced to the broad daylight by the scalpel of Sir W. Hooker. The query now is, of what insect is this the larva? It would appear that a perfect insect has escaped from one of the seeds; and by the description (which is not long enough for an accurate opinion) it would strike us to be an Ichneumon; but whether it represents the larva, or is only its parasite, still remains to be told. Mr. Westwood, to whom we must look to clear up this matter, inclines to this view, and has lately asserted that he is satisfied that the larva is Lepidopterous. Might it not be an Ichneumon larva? A perusal of Reaumur's case, and that mentioned by Messrs. Kirby and Spence, militate more for, than against this opinion, we think. Botanical Obituary; Botanical Information; Extract of a Letter from Professor Harvey, dated from Freemantle, West Australia, May 19, 1854. Dr. Harvey writes in good spirits. On the Discovery of Epipogium Gmelini, *Rich.*, as a British Plant, by Mrs. A. Smith, on the 9th September. Notices of Books.

No. 70, November:—(George Bentham) On the North Brazilian Euphorbiaceæ, in the collection of Mr. Spruce; (Richard Spruce) Extract of a letter relating to Vegetable Oils; (George Bentham) On Henriquezia verticillata, a new genus of Bignoniaceæ, from the Rio Negro in North Brazil; (J. S. Roe) Report of a Journal of Discovery into the Interior of Western Australia, between 8th September, 1848, and 3rd February, 1849—continued from page 247. Botanical Information—(James Edward Winterbottom, Esq.) Note on Cyperus polystachyus. A specimen of this curious plant was lately received at the Kew Botanic Gardens, from its only European locality—viz., the mouth of the crater of the extinct volcano of the Island of Ischia, where it flourishes with steam continually issuing around it, at 150 degs. Fahrenheit. It is essentially a tropical plant, being a native of the Cape of Good Hope and East Indies; and to account for its finding its way to this isolated spot, Professor Tenore offers the following bold theory:—"That the successive reproductions of this plant have resisted the force of ages, and enabled it to perpetuate itself through all those atmospherical catastrophes which have attended the climate of Europe; because its seeds have been developed in that high temperature, which the half-extinguished volcanoes still preserve in the bowels of the Island of Ischia." Notices of New Books.

No. 71, December:—(John Macgilivray, Naturalist of H.M.S. *Herald*) Letter from, dated Sydney, March 3, 1854. Our readers may be aware that H.M.S. *Herald* is on a voyage for the purpose of making a scientific survey of certain islands in the South Pacific. This letter gives us a short sketch of the visits paid to Lord Howe Island, Isle of Paris, and others. (George Bentham) On the North Brazilian Euphorbiaceæ, in the collection of Mr. Spruce; (J. S. Roe, Surveyor-General) Report of a Journey into the interior of Western Australia, between the 8th of September, 1848, and 3rd of February, 1849; (J. D. Hooker, M.D., F.R.S., and T. Thompson, M.D.) On Maddenia and Diplarche, New Genera of Himalayan Plants, with plates 11 and 12; (Berthold Seeman, Ph. D.) Note on the Genera Streptostigma, *Regel*, and Streptostigma, *Thwaites*. Title-page and Index for vol. vi., 1854.

The Naturalist: a popular Monthly Magazine, with numerous Engravings; conducted by B. R. Morris, Esq., M.D. No. 44, October; No. 45, November; No. 46, December, 1854. 8vo. Price 6d. each. London: Groombridge and Sons.

No. 44, October:—(James Scrymgeour) On the Domestic Cat; (S. Stowe) A Glance at the Feathered Residents in, and Visitants to, the Grounds of Terrick House; with a few remarks, from personal observation, upon their habits and peculiarities; (H. Moss, M.D.) On the Gray Heron; (J. B. Clarke) Ornithological Notes; (T. Edwards) Occurrence and Capture of a few rare Birds and Fishes, at Fraserbrough, Aberdeenshire; (George Stockby) Notice of some Insects occurring in Hainault Forest; (J. W. Watson) Airy Holme Wood as a Locality for Land Shells; (W.) Contributions to the Ichthyology of Banffshire; and Notes on the Star-fishes found in the Moray Frith, at Macduff, near Banff. Miscellaneous Notices—Notes on Eggs; Attack of a Magpie's Nest by Crows; Note on a Sandpiper; Occurrence of the Nightingale near Barnsley; The Dotterel at Brighton; Occurrence of Pied Rooks; The Mountain Finch; The Skylark; Note on a Willow Wren; Is it a Ghost? The Greater Spotted Woodpecker; The

Reed Warbler; Luminosity of a Snake; The Phalacrocorax Graculus; The Liparis Vulgaris; Zylophala Dorsalis; Limosa Melanura; Phalaropus Hyperboreus; Physalia Pelagica; Entomological Captures near Cartmel; The Small White Butterfly; The Wolf-fish; Note on the Nemophila; Second Budding of Deciduous Trees; The Hawthorn; Possible Source of Fallacy in the Formation of a Local Fauna; Note on Honey Dew.

No. 45, November:—(T. Edwards) The Birds of Strathbeg and its Neighbourbourhood, with a few remarks upon their habits, &c.; (O. S. Round) The Ring Ouzel, Inland Migration; (J. Longmuir, jun.) The Findhorn Heronry; (J. Garland) Local Jottings—Dorchester, Dorsetshire; (T. Southwell) Rollesby Gullery; (William Sawers) List of Algæ gathered in the North of Ireland. This list embraces those which were discovered, in the course of several years, in Loughs Foyle and Swilly, and is an evidence of the assiduity with which that well-known Irish algolologist, Mr. Sawers, devoted himself to the study of our sea-weeds. Among the names we find that of Desmarestia pinnatinervifolia, which was added to our fauna by Mr. Sawers, from specimens taken in Lough Foyle. We hope other botanists will publish local lists of algæ, as their distribution around the Irish coast is a subject of much interest. Miscellaneous Notices—Hybrid between Anser Leucopsis and Anser Canadensis; Red-necked Phalarope; Tufted Duck breeding in England; On the Note of the Cuckoo; Notice of the Night-jar, near Barnsley; Thrushes feeding on the backs of Sheep; Little Stint; Great Ash-coloured Shrike; Red-breasted Merganser; Hobby; Appearance of the Hirundinidæ, &c., at Bawburgh Hill; Note on Sirex Gigas; Occurrence of the Opah, or King Fish, near Buckie, Banffshire; Prunella Vulgaris with White Flowers. The Querist. Proceedings of Societies—Scarborough Philosophical and Archæological Society.

No. 46, December:—(T. Edwards) The Birds of Strathbeg and its Neighbourhood, with a few remarks upon their habits, &c.; (O. S. Round) A Trip to Selborne, in 1854; (G. R. Twin) Farewell Facts and Fancies from Norfolk; (E. Parfitt) A List and Notes on the Fungi found in the Neighbourhood of Exeter. Miscellaneous Notices—Nesting of the Chaffinch; A Memory from Moseley Pool; Late Stay of the Cuckcoo; Departure of Swallows; Spring Arrivals in Guernsey; Occurrence of the Yellow Wren, or Warbler, near Huntly, Aberdeenshire.

Annales des Sciences Naturelles. Comprenant la Zoologie, la Botanique, l'Anatomie et la Physiologie comparée des deux règnes, et l'Histoire des Corps Organisés Fossilles, rédigées pour la Zoologie, par Milne Edwards—pour la Botanique, par MM. Ad. Brongniart et J. Decaisne. Tome II. No. 2. Paris: Victor Masson.

No. 2—*Zoologie*—Résumé d'un travail d'embryologie comparée sur le développement du Brochet, de la Perche et de l'Ecrevisse, par M. Lereboullet (suite). Publications nouvelles—Mémoire sur l'alimentation de quelques Insectes gallicoles et sur la production de la graisse, par MM. Lacaze-Duthiers, et A. Riche; Memoire sur l'organisation des Physalies (Physalia), par M. A. de Quatrefages.

Botanique—Tentamen methodicæ divisionis generis Aristolochia, additis descriptionibus complurium novarum specierum novique generum Holostylis, auctore P. Ducharte (suite); second Mémoire sur les Uredinées et les Ustilaginées, par M. L.-R. Tulasne, de l'Institut, with five plates.

THE ANNALS AND MAGAZINE OF NATURAL HISTORY. No. 85, January; No. 86, February; No. 87, March, 1855. 8vo. With plates. London: Taylor and Francis. Price 2s. 6d. each.

No. 85, January:—(Rev. W. Smith) Notes of an Excursion to the South of France and the Auvergne, in search of Diatomaceæ, with a plate; (W. H. Benson) Amended Characters of the singular Lymneadous genus, Camptoceras, and a Description of a new Ancylus, inhabitants of north-western India; also, Characters of the genus Opisthoporus, an eastern form of Cylostomacea, with remarks on its Affinities, and notes on several Opercula; (P. H. Gosse) On Artificial Sea-water. When noticing Mr. Warrington's analysis of sea-water in the previous number of the "Annals," we observed, that sea-water made according to Mr. Gosse's plan seemed to agree with the sea-weeds and anemones as well as their native element; and in the remarks now made by Mr. Gosse, we are glad to find this view corroborated, and that in the most decisive manner, by the statements here made. (J. Gwyn Jeffreys) Notes on Swiss Mollusca. Mr. Jeffreys employed a summer and autumn at Lausanne, on the Lake of Geneva, in collecting and investigating the Swiss mollusca; and a goodly list he presents for the assistance of those who are interested in the subject of the geographical distribution of species. He also records the discovery of a new Pupa—viz., P. Halleriana—and gives us a list of those species that are Swiss, but not yet recorded as British; and British, but not hitherto indicated as Swiss. From this latter we miss Helix nemoralis and Limneus stagnalis, both common British mollusca, but not recorded, at least in Mr. Jeffreys's list, as frequenting Switzerland. (J. H. Balfour, M.D., Professor of Botany, Edinburgh) Sketch of the Life of the late Professor Edward Forbes. From this sketch, which was read before the Botanical Society of Edinburgh, on the 14th December, 1854, we select the following:—Edward Forbes was born in the Isle of Man, in the 12th of February, 1815. When not more than twelve years old he had imbibed a taste for natural history. He visited London at the age of sixteen, and was engaged there in studying the art of drawing, under Sass. He came to Edinburgh, in 1831, and entered the medical class. Though he attended nearly all the classes required for gradation, yet he did not take out the M.D. degree. In 1833 he visited Norway, and made considerable collections, both geological and botanical. He became a member of the British Association in 1834, and was one of the most regular attendants on its meetings. He was the first who called the attention of the association to the subject of dredging, and secured their co-operation and aid in this most important matter. He appears to have visited the Alps in 1835; and about this time he, with other eminent naturalists, founded the Botanical Society, which held its first meeting on the 9th of February, 1836. In 1839, at the Birmingham meeting of the British Association, he, and other naturalists, finding that they had not their proper place at the convivial meetings, instituted a separate ordinary. The first Natural History Section Dinner happened to take place in an inn of that town having the sign of the Red Lion; and, ever after, the Natural History Club thus commenced was designated "the Red Lion Club." The Red Lions have had their annual social reunions at every meeting of the association since that time. In 1841 he published his beautiful monograph on the "British Star Fishes." In the following year we find him engaged in the Ægean, and coasts of Asia Minor, where his life was placed in

imminent danger by a severe attack of fever, brought on by malaria. In 1845 he became a fellow of the Royal Society; in 1846 he was again attacked by a severe illness, from which he also rallied; in 1848 he married a daughter of the late General Sir. C. Ashworth; in 1850 he completed, with Mr. Hanley, the splendid work on the "Natural History of the British Mollusca and their Shells." In May, 1854, on the demise of Professor Jameson, he was called to the Chair of Natural History in the University of Edinburgh. This had long been the darling object of his ambition, and he was actively engaged in forming collections to add to the museum. He commenced his lectures on 1st November, 1854, and lectured for five or six days. During all this time he complained more or less of febrile symptoms; these, at last, increased so much, that he consulted Dr. Bennett, who at once ordered him to give up lecturing; which he did on the 9th of November. He appeared to be amending up to the 15th, when the symptoms became of a more alarming nature. On the evening of Friday he gave his last directions, leaving his specimens to the college museum, and his papers to R. G. Austen, Esq. He continued to sink, and died at $5\frac{1}{4}$, P.M., on Saturday, 18th November, being sensible to the last. Bibliographical Notices. Proceedings of Learned Societies—Zoological Society. Miscellaneous—Notes on the Reproduction of Ligula, by M. Druille; Description of the animal of Cyclina sinensis, by Dr. J. E. Gray; Observations on the Development of Actiniæ, by M. Lacaze-Dutheirs. Meteorological Observations and Table, for November, 1854.

No. 86, February:—(R. C. R. Jordan, M.B.) Some account of the Actiniadæ, found on the coast, near Teignmouth, Devon. During the month of April, 1854, Dr. Jordan proceeded to investigate the various species of Actiniæ, and other allied genera, found upon the coast, near Teignmouth. The part examined extended from the small rocks between the beach at Dawlish and the Warren on the one side, to the rocks bounding the Torre Abbey Sands on the other—being rather more than ten miles of coast. The Actiniæ found—A. mesembryanthemum, common; A. alba, rare; A. troglodytes, very abundant; A. aurantiacea, *Jordan*, local—a new species, being, when contracted into a cone, of a deep orange, with a central spot of deeper tinge; A. n. sp. (?) pulcherrima, *Jor.* Only one example of this Actinia was found, and it appears to differ from A. rosea, *Gosse*; however, it will require some comparison with that species before it is satisfactorily made a new species. A. parasitica, very common; A. clavata, *Thomp.*, var. rosacea, *Gosse*, only one specimen found; A. coriacea, common; A. dianthus, cast rather frequently on the beach during the winter storms; Anthea cereus, common. (G. Busk) On a Monstrous Oyster-shell, with a plate; (C. C. Babington) On Hypericum anglicum; (A. R. Wallace) On the Ornithology of Malacca. From these short notes of Mr. Wallace's it would appear, that Malacca is nearly as productive a country for the ornithologist as for an entomologist, as he was enabled to make a large collection of the native birds during about seven weeks. (S. P. Woodward) Descriptions of the Animals of certain genera of Bivalve Shells; (T. Wright, M.D.) On Fossil Echinoderms from the Island of Malta, with notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds; (Rev. T. Hincks) Notes on British Zoophytes, with descriptions of new species, with two plates. The new species are, one new Sertularia (S. alata), a new Polyzoon (Halia prætenuis); and, also, notes of the occurrence of Cellularia cuspidata, at Brixham; of Caberea boryi, at Devon; and of Laomedea lacerata, at Exmouth; also, a

description of the Polype of Beania mirabilis, and of the vesicle of Campanularia integra. (C. S. Harris) On the Marine Vivarium. Proceedings of Learned Societies —Zoological Society, January 11, 1853, Dr. Gray, V.P., in the Chair; January 25, 1853, Dr. Gray, V.P., in the Chair; February 8, J. Gould, F.R.S., in the Chair; March 8, Dr. Gray, V.P., in the Chair; March 22, Dr. Gray in the Chair; April 12, J. Gould, F.R.S., in the Chair. Linnean Society, February 7, 1854, T. Bell, Esq., President, in the Chair; February 21, T. Bell, Esq., President, in the Chair; March 21, Thomas Bell, Esq., President, in the Chair. Royal Society, November 16, 1854, Col. Sabine in the Chair. Botanical Society of Edinburgh, December 14, 1854. Miscellaneous Observations—On the Nests of Humming-birds, by John Gould, F.R.S.; On a Marsupial Frog from Venezuela, by Dr. D. F. Weinland; Descriptions of two new species of Ptilonopus, by Dr. J. E. Gray. Meterological Observations and Table for December, 1854.

No. 87, March:—(E. Blyth) A Monograph of the Indian species of Phylloscopus and its immediate affines; (T. Wright, M.D.) On Fossil Echinoderms from the Island of Malta, with notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds; (J. Miers, F.R.S.) On the Genera Pionandra, Cliocarpus, and Pæcilochroma; (B. Dowler, M.D.) On the Discovery of Viviparous Fish in Louisiana. This is an extract from Silliman's American Journal for January, 1855. The fish is determined by Professor Agassiz to be the Pæcilia multilineata, and is found abundantly in the lagoons in the immediate vicinity of Mobile and New Orleans; it is of very minute size—its whole length being only two inches. The specimen examined by Dr. Dowler contained twenty-two fœtuses, each about half an inch long. This family of fishes contains the smallest representatives of the great type of Vertebrata. The Heterandria formosa of Agassiz is, when full grown, not quite an inch long, and does not weigh more than five grains. (Dr. J. E. Gray) On the Anomalous Oyster-shell described in the "Annals" for February. This shell, which was described in the last number of the "Annals" by Mr. Busk, appears to be that of an oyster growing on the inside of a valve of Pholas candida; also, it appears that the shell of the Pholas must have been that of a dead specimen, since it had growing upon it a Membranipora or Flustra, which was impressed on the outer surface of the oyster; and, hence, a further proof is afforded, that the Pholas was external, and served as a mould to the oyster-shell. We have found oysters which have grown upon the large operculum of Fusus antiquus, which was completely enveloped in the shelly matter, and projected like a wing from the side of the shell. (E. Claparéde) On Actinophrys sol, with a plate. Proceedings of Learned Societies—Zoological Society, May 24, 1853, Dr. Gray, V.P., in the Chair; June 14, Dr. Gray, V.P., in the Chair; July 26, Dr. Gray, V.P., in the Chair; November, Dr. Gray, V.P., in the Chair. On the Anatomy of the Walrus, by Professor Owen. Royal Society, November 23, 1854, J. Bell, Esq., V.P., in the Chair; December 21, 1854, Lord Wrottesley, President, in the Chair; January 11, 1855, J. Bell, Esq., V.P., in the Chair. Botanical Society of Edinburgh, January 11, 1855, Professor Balfour, President, in the Chair. Miscellaneous—On the Movements and Reproduction of the Naviculæ, by M. Focke; On Lottia zebrina and L. scurra, by Dr. J. E. Gray; Description of a new species of Sorex from India, by R. Templeton; Meterological Observations and Table for January, 1855.

QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE. No. 10, January, 1855. Price 4s. With Woodcuts and Lithographic Illustrations. London: S. Highley, 32, Fleet-street.

No. 10, January:—Transactions of the Microscopical Society of London; (F. H. Wenham) Some Remarks on Obtaining Photographs of Microscopic Objects, and on the coincidence of the chemical and visual foci of the object-glasses; (C. B. Rose) On the Discovery of Parasitic Borings on Fossil Fish Scales; (W. Gregory, M.D.) On a Remarkable Group of Diatomaceous Forms, with remarks on shape or outline as a specific character in the Diatomaceæ. Original Communications—(C. Johnson, M.D.) Auditory Apparatus of the Culex Mosquito. Many and long have been the papers written to prove the presence of an auditory apparatus in that portion of the articulata to which the common term "insect" is applied. In some of the articulata—for example, in the crustaceans—we find this apparatus present, though in a very rudimentary state, consisting of a simple vestibule. We might, therefore, by analogy, infer its presence in others of the same class; besides, the majority of the insect tribe are noted for giving utterance to sounds of various sorts, and these, vibrating through the air, produce an evident effect upon other insects, and are even, in some cases, responded to, as in the bee. Now, one is naturally led to conclude, that an insect which can appreciate a certain sound or vibration must possess organs for their reception, which organs would be analogous to the ear in man. The aim of this paper is to prove the presence of these organs in the Culex Mosquito; and this, we think, has been done very satisfactorily; and we have little doubt, if this subject were followed up, that the majority of the articulata would be found possessing an auditory apparatus—rudimentary, it might be, but still present. (W. Webb, M.D.) On the Noctiluca Miliaris; (P. Redfern, M.D.) On the Nature of the Torbane-hill and other Varieties of Coal; (T. H. Huxley) On the Enamel and Dentine of the Teeth; (Rev. W. Smith) On the Determination of Species in the Diatomaceæ. We would recommend these remarks to every student who studies the Diatomaceæ. Translations—On the Structure and Systematic Position of the Rotifera; Reviews; Notes and Correspondence; Proceedings of Societies.

THE ZOOLOGIST. No. 147, January; No. 148, February; and No. 149, March, 1855. 8vo. London: J. Van Voorst. 1s. each number.

No. 147, January:—(Robert Warrington) Memoranda of Observations made in small Aquaria, in which the balance between the animal and vegetable organisms was permanently maintained. These memoranda were read at the Liverpool meeting of the British Association. In memorandum No. 3, we are recommended to be careful to exclude the common polype, or Hydra fusca, from our fresh-water aquaria, particularly when the minnow is kept, as the Hydra, insignificant though they appear, after a short time, cause their death. In No. 3 of the marine memoranda, we have the following form of aquaria (after five years' experience on this subject) recommended by Mr. Warrington:—It consists of a four-sided vessel, having the back gradually sloping upwards from the bottom, at an angle of 45 to 50 degrees, and the consequently extended top sloping slightly downwards, and resting on the upper part of the back; the bottom, therefore, becomes necessarily

narrow. The front, for the purposes of observation, and the top, for the admission of light, are to be of glass; the back, ends, and bottom, being constructed of slate; the whole fixed in a stout frame-work. (R. Stretch) A List of Land and Fresh-water Mollusca, found in the neighbourhood of Banbury, Oxfordshire. None of the mollusca mentioned can be called rare; but Mr. Stretch says, when mentioning the occurrence of Limax flavus, that it is difficult to find, as it does not come out of its hiding-places (cellars) until midnight. We think it would require a good deal of attention to find when the village clock would strike the hour of twelve, in a dark cellar, unless, perhaps, by hearing; but, for our own part, we have found this slug at all hours, and at times when it was light enough to see it devour bread. (A. M. Norman) On the Introduction of forms of Animal and Vegetable Life into new localities. If the idea here stated be *faithfully* carried out, it will save much confusion hereafter in making local lists. (Rev. A. Hussey) Ravages of Caterpillars. Proceedings of Natural History Collectors in Foreign Countries—(Mr. H. W. Bates) Santarem, March 27, and April 27, 1854; (H. T. Stainton) Entomological Botany, with more especial reference to the plants frequented by the Tineina (continued from page 4,472); Professor Bailey's mode of giving permanent flexibility to natural history specimens (see "Nat. Hist. Rev." for January, 1855, page 2, Notices of Serials); (A. Roberts) On Rare Birds killed near Scarborough, and on the occurrence of the Larus Islandicus near the same place; (Rev. A. Hussey) Occurrence of the Short-toed Lark, Lapland Bunting, and Richardson's Skua in Sussex, on a White Swallow in East Kent, and an inquiry respecting the name of an Australian Spider; (J. J. Briggs) Note on the Congregation of Swallows; (N. Cooke) Pigmy Curlew and little Stint, near Warrington; (T. J. Bold) Occurrence of the Ruff and little Auk in Northumberland, and the Egyptian Goose near Newcastle; (Edward H. Sargint) Capture of the Tetrodon Pennantii, at Ardmore, Co. Waterford; (F. Walker) List of Spiders found in Piercefield, near Chepstow, in 1853; (A. R. Hogan) Entomologist's Annual; (W. Machin) Variety of Anthocaris cardamines, Capture of Notodonta carmelita, and early appearance of Cucullia umbratica; (B. Smith) Note on Ptilophora plumigeria; (G. Guyon) Remarkable vitality in a specimen of Sitonca fusca; (Octavius Pickard-Cambridge) Curious Capture of Pœcilocampa populi. Proceedings of Societies—Entomological Society, November 6, 1854; December 4, 1854. Society of British Entomologists, November 7, December 5, 1854.

No. 148, February:—(R. Warrington) On Artificial Sea-water; (W. F. Templer) Some remarks on the Marine Fauna of the South of Devon (continued from page 4,468). If space allowed us, we would compare this fauna with that of the Bay of Dublin,* as given by Rev. A. Irvine; his list contains 105 species, and Mr. Templer's not more than 46; yet some common species, such as Antennularia ramosa, Lucernaria auricula, &c., are absent from our Bay, and that not on account of their being southern species, as we have found L. auricula in great abundance in the extreme north of Ireland. The geographical distribution of the Zoophytes is a most interesting subject; but much cannot be known about them until some *more local* lists are published. (O. Pickard-Cambridge) On the Corporeal Sensations of Insects. This paper commands the attention of the readers of the "Zoologist;" for ourselves, we took our ideas on the subject from the first

* *Vide* Nat. Hist. Rev., vol. i., p. 244. London: S. Highley.

book that fell into our hands relating to insects; and these ideas our readers can find in chap. i., sections 836-840, of a Grammar of Entomology, by E. Newman, published some twenty years ago. Notices of New Books—Zoology of the Voyage of H.M.S. *Herald*, part 3; Transactions of Linnean Society of London, vol. xxi., part 3; Annals of Natural History, Nos. 83 and 84; Transactions of Entomological Society of London, vol. iii., part 3. (C. Collingwood) Birds in the neighbourhood of Blackheath in 1854; (W. M. E. Milner) Occurrence of the Snowy Owl in Sutherlandshire; (G. Norman) Singular Conduct in a Robin; (J. Hogg) Notice of a Tunny, stranded in the Estuary of the Tees; (E. T. Higgins) Supposed new species of Flounder; (E. Newman) White specimen of the Flounder; (E. Charlesworth) Shell-fish Burrowing into Rocks. Proceedings of Societies—Entomological Society, January 1, 1855; Anniversary Meeting, January 22, 1855.

No. 149, March:—E. Newman, Esq., President of the Entomological Society of London, delivered his annual address at the anniversary meeting. Mr. Newman gives us a very able resumé of the progress entomology has made for the last twelve months and a sketch of the late secretary of the Society, Mr. Wing, who was cut off at the very threshold, as it were, of a brilliant and successful career. Our readers will find a brief notice of his decease in our obituary portion. He also gives a notice of Abel Ingpen, George Newport, Major Champion, and Count Mannerheim, all of them distinguished as entomologists, though not connected with the London Society. We have then a list of those serials, published throughout the year, that contained aught of interest to entomologists—such as the "Annals and Magazine of Natural History," &c. The "Zoologist" itself, as one would naturally expect, is also mentioned. At this part of the address, we must say, we expected that the talented and amiable president would have condescended to have noticed our humble labours. Surely, the Rev. J. Greene's carefully compiled Catalogue of Irish Lepidoptera, or Mr. Hogan's list of Dublin Coleoptera, would have been as interesting novelties to mention to the society as the fact that Anthrocera minos was taken in the Co. Galway, an account of which capture, Mr. Newman tells the members, they will find in a January number of the "Zoologist." We have then a very accurate list of Entomological works published, with short criticisms upon nearly all of them, which will be extremely useful. We think the praise given to Mr. Wollaston highly deserved, and we are glad to see it so cordially given. (C. R. Bree) Black Hare, shot at Brome; (A. G. More) On the three species of Divers or Loons; (C. R. Bree) Rare Birds captured near Stowmarket; (J. H. Gurney) Note on the Eagle which is said to attack the trained Falcons of Asiatic Falconers; (H. Stevenson) The Lapland Bunting in Norfolk; (E. Newman) Remarkable variety of the Woodcock; (A. Roberts) Occurrence of the Shag, the American Scaup, and the Continental Wagtail, near Scarborough; (A. S. Taylor) Note on the great Vulture of California; (R. H. Stretch) Correction of an error; (A. R. Wallace) The Entomology of Malacca. It will give an idea of the richness of this part of the world in entomology to say, that the result of Mr. Wallace's collecting in Singapore and Malacca, for about four months, was a collection of 2,000 species of insects. Proceedings of Societies—Entomological Society, February 5, 1855, J. Curtis, President, in the Chair. Society of British Naturalists, annual meeting, January 2, 1855, Mr. H. Harding, President, in the Chair.

Hooker's Journal of Botany, and Kew Garden Miscellany. No. 72, January; No. 73, February; No. 74, March, 1855. 8vo. London: Lovell Reeve. Price 2s. each, with a Plate.

No. 72, January:—Original Information—(Richard Spence) Journal of a Voyage up the Amazon and Rio Negro; (George Bentham) On the South American Triurideæ and Burmanniaceæ, from the collection of Mr. Spruce; (M. Louis Kralik) Botanical Tour in the Regency of Tunis; The late Professor Reinwardt. Botanical Information—Plaintain Fibre; "The Big Tree" (Wellingtonia gigantea, *Lindl.*). We have here extracts from the *Californian Farmer*, a weekly journal, published at San Francisco, relative to the "Big Tree," and written by a Dr. C. F. Winslow, and which certainly appears to be composed in that "go-a-head" style, so characteristic of the Yankees. Some of these gigantic sons of the forest, measured by the Doctor, were ninety-four feet in circumference at the root, and one of them was four hundred and fifty feet from head to foot (!). Another was ten feet in diameter, at three hundred and fifty feet from its uptorn root (!!). Dr. Winslow is very severe upon Professor Lindley for applying to it the name of Wellingtonia, and, without much regard to the rights of priority, subtitutes, what we suppose can only be regarded as a synonyme, that of the famous Washington. Bourgeau's Plants of the Canary Islands; M. Huet du Pavillon's Plants of Sicily; Mr. Botteri's Mexican Plants; Mr. Spruce's Plants of the Amazon. Notices of Books—Stark's Popular History of British Mosses; Archer's First Steps to Economic Botany.

No. 73, February:—Original Papers—(George Bentham) Florula Hongkongensis; (James Mosley) Extract of a Letter from; (Dr. Harvey) Extracts of Letters from, dated Melbourne, September 5, and September 15, 1854; (Dr. Harvey) Characters of some Genera of Plants recently discovered by Mr. James Drummond in Western Australia. Botanical Information—Note on the Vegetation of Roumelia and Bulgaria; Nomenclator Filicum; Botany of Ceylon, and Botanic Gardens of Peradenia; Expedition to Sicily and the Abruzzos; New Collections of Dried Plants; New Proteaceæ of Australia.

No. 74, March:—Original Papers—(C. F. Meisner) New Proteaceæ of Australia; (James Mosley) Extract of a Letter from; (T. C. Archer) On Two Fibres from Brazil, with a Note by Sir W. J. Hooker. Botanical Information—Information respecting the Mora Tree (Mora excelsa, *Benth.*) in Trinidad; Note from Sir John Bowring, relating to the Flowering of the Rice-paper Plant. "This," writes Sir J. Bowring from Hong Kong, December 2, 1854, to Sir W. J. Hooker, "is one of your desiderata—the flower of the rice-paper plant. The flowers which I enclose, grow in wand-like branches, some of them four feet long, which, to your all-learnedly botanical eye, will be a sufficient description. The plant from which I plucked the flowers is about seven feet high, and covers, I should think, a circumference of twenty feet." Notices of New Books—Index Filicum, a Synopsis of Ferns, by T. Moore, F.L.S.; Victoria Regia, or the Great Water-lily of America, by J. F. Allen; Flora van Nederland en zijne overzeesche Bezittingen, by Tuinbouw.

THE NATURALIST: a popular Monthly Magazine, with numerous Engravings; conducted by B. R. Morris, Esq., M.D. No. 47, January; No. 48, February; No. 49, March, 1855. 8vo. Price 6d. each. London: Groombridge and Sons.

No. 47, January:—(Thomas Edwards) On the Fishes of Banffshire; (John Dixon) Notes on the Frog (Rana temporaria); (W. Kidd) Notes on the Redbreast. We have here a short though pleasant account of the "sayings and doings" of Mr. Robin in no less a place than the Crystal Palace in Sydenham. In this world of glass the redbreast lives and brings up his young ones, quite regardless of the living mass that continuously pass beneath him, who—with but few exceptions, such as the writer of these notes—care as little for him. (G. R. Twin) Nesting of the Water-ouzel (Cinclus aquaticus); (John E. Daniel) Notes on the Ferns found near Woolbridge, Dorset; (J. P.) Notes on the Botany of North Lancashire. We see nothing in these Notes of which the writer could be ashamed, and, this being the case, wonder he did not give his name in full—naturalists, not being very numerous, like to know the names of their friends. Review—The Heart's Proper Element, by W. Kidd. Proceedings of Societies—Natural History Society of Glasgow, July 4, August 1, September 5, October 3, 1854; Royal Physical Society of Edinburgh, November 22, 1854. The Retrospect and the Querist.

No. 48, February:—(S. Stowe) A Glance at the Feathered Residents and Visitants to the Grounds of Terrick House—continued from page 223 of vol. iv.; (Geo. Donaldson) The Swamps of the Mississippi. This paper was read before the Natural History Society of Glasgow. Mr. Donaldson appears to be an enthusiastic ornithologist, and no wonder that the glories of the American woods—in the day-time alive with the brilliant woodpeckers, and resonant with the tones of the mocking-bird, and, in the night-time, all lit up by the fire-flies, while the hooting of the owls and the solitude-impressing sounds of the whip-poor-will, make the music of the woods still interesting, albeit of a mournful character—had a strong fascination for him. (J. M'Intosh) Injurious Insects, No. III., the Common Wasp; (W. Kidd) Progress of the Seasons—January. It would be well for those suffering from *ennui* to take a hint from this paper; they little know the pleasure of a converse with nature. Review—A Supplement to Baines's Flora of Yorkshire. Proceedings of Societies—Proceedings of Natural History Society of Glasgow, November 7, 1854. Miscellaneous Notices; The Querist.

No. 49, March:—(Rev. F. Tearle) On the Occurrence of Bartram's Sandpiper. This is the second record of the occurrence of this rare Sandpiper in England. The specimen in question was shot in a field about ten miles from Cambridge. Its sex is unknown; and, seeing the rarity of the bird was known to the taxidermist who preserved it, we feel surprised he did not use more diligence in settling this question. The other specimen that was obtained in England was shot in Warwickshire, a year or two ago. It appears that the bird is a great wanderer, being found in America and in Australia. We have little doubt, but that if a careful watch was kept after this species, that other specimens would be obtained. (G. Donaldson) The Swamps of the Mississippi—continued from page 52; (S. Stowe) A Glance at the Feathered Residents and Visitants to the Grounds of Terrick House—continued from page 28; (Thomas Edwards) The Fishes of Banffshire—continued from

page 4; (J. Dixon) Notes on the Frog—concluded from page 8; (G. Stockley) Notice of the Red Spider (Dysdera erythrina), with Remarks on a few others; (W. Kidd) Rambling Reflections amidst Snow and Frost. Miscellaneous Notices.

The Annals and Magazine of Natural History. No. 88, April; No. 89, May; No. 90, June, 1855. 8vo. With plates. London: Taylor and Francis. Price 2s. 6d. each.

No. 88, April:—(C. Jenner) A Comparative View of the more important stages of development of some of the higher Cryptogamia and Phanerogamia; (R. Warington) Observations on the Natural History and Habits of the Common Prawn (Palæmon serratus); (R. K. Greville, LL.D.) Report of a collection of Diatomaceæ made in the district of Bræmar, by Professor Balfour and Mr. George Lawson. In this Report no less than thirteen species are added to the British lists. (T. Wright, M.D.) On Fossil Echinoderms from the Island of Malta, with notes on the Stratigraphical Distribution of the Fossil Organisms in the Maltese Beds; (P. H. Gosse, F.L.S.) On Monopus medusicola, a new species of Leech. This leech was discovered parasitically attached to the medusa (Willsia stellata); it is less than one line in length; pellucid; eyes, hyaline; the generic name was suggested by the foot-like appearance of the posterior sucker. (W. Clark) On Ancylus oblongus and A. fluviatilis. We are glad to see that this veteran malacologist has entered upon the subject of our native fresh-water shells. The result of his investigation in this Paper is, that the Ancylus fluviatilis and A. oblongus hold the places assigned to them in Professor Forbes and S. Hanley's "British Mollusca," although we must say that, on our beginning to read the article, we were of the opinion that they would have been made out one and the same species. (E. Claparéde) On Actinophrys sol. Proceedings of Learned Societies—Royal Society, January 18, 1855, Sir B. Brodie, Bart., in the Chair. Zoological Society, December 13, 1853, R. C. Griffith in the Chair. Linnean Society, April 4, 1854, Thomas Bell, President, in the Chair; June 6, Thomas Bell, President, in the Chair; June 20, Thomas Bell, President, in the Chair. Botanical Society of Edinburgh, February 8, 1855, Professor Balfour, President, in the Chair. Miscellaneous—On the Anomalous Oyster-shell, by Professor J. S. Henslow; Description of a new species of Corynactis; On the Species confounded under the name of Laminaria digitata, with some observations on the Genus Laminaria, by M. A. Le Jolis; Descriptions of two new species of Hummingbirds, from Peru, by J. Gould, F.R.S.; Meteorological Observations and Table for February, 1855.

No. 89, May:—(Hugo von Mohl) On the Structure of Chlorophyll; (W. H. Benson) Notice on the question of the presence of an Operculum in the Genus Diplommatina, *Benson*, and description of a new species; (W. H. Harvey, M.D., M.R.I.A.) Short Characters of some New Genera and Species of Algæ, discovered on the coast of the Colony of Victoria, Australia We have here short descriptions of five new genera of algæ, and seven new species, which are but a foretaste of the many new discoveries Professor Harvey is making in the "far west," and which we hope soon to have recorded in a more substantial form than in the pages of a periodical. We may observe, that all the new generic names are given in honour of persons who have attained celebrity for their scientific investigations; this we think but right. (J. Cleland) Some Remarks on Vegetable Placentation. The

object of these remarks is to bring forward some evidence against the "axile" theory of placentation, and to show that the "free central" placenta found in many plants is really composed of a second whorl of carpels, with inverted edges. (Dr. J. E. Gray) On the Attitudes and Figures of the Morse or Walrus. This paper is illustrated with woodcuts representing this animal as figured by Gesner, in 1560, down to the same animal figured, in more recent days, by Shaw, in his "Zoology." (J. Gould, F.R.S.) Descriptions of Eight New Species of Birds from South America; (Dr. Pringsheim) On the Impregnation and Germination of the Algæ. Bibliographical Notices—A History of the British Marine Testaceous Mollusca, by W. Clark; The Ferns of Great Britain, by J. E. Sowerby; First Steps in Economic Botany, by T. C. Archer; The Entomologists' Annual for 1855. Proceedings of Learned Societies—Royal Society, March 1, 1855; March 22. Linnean Society, June 20, 1854; November 11; November 21. Zoological Society, January 10, 1854; January 24. Botanical Society of Edinburgh, March 8, 1855. Miscellaneous—Origin of Wheat; Mr. Busk's Anomalous Shell, by Professor Henslow; On the Fructification of Arachis, by H. M. Neisler, Esq.; On the Structure of the Starch Granule, by Mr. Grundy; Description of a New Species of Aulacorhamphus, by J. Gould, F.R.S.; Meteorological Observations and Table for March, 1855.

No. 90, June:—(R. H. Meade, F.R.C.S.) Monograph on the British Species of Phalangiidæ, or Harvest-men—with two plates. Of this interesting family of Arachnidæ, we have here enumerated and described no less than fifteen species. We trust that Mr. Meade will turn his attention to other families of the spiders, and rescue this portion of the creation from the oblivion into which it seems to have fallen. (Hugo von Mohl) On the Structure of Chlorophyll—concluded from page 329; (John Lycett) On Perna quadrata, *Sow.*; (Edward Vernon Harcourt) Notes on the Ornithology of Madeira. The only bird which is truly indigenous to Madeira appears to be a new species of wren, now, for the first time, described by Mr. Harcourt, under the title of Regulus Maderensis. It is a brightly-coloured little bird, and lives secluded among the laurel forests, or arborescent heaths, in the least frequented portions of the island. (M. Alphonse De Candolle) On the Characters which Distinguish the Vegetation of a Country. Proceedings of Learned Societies—Zoological Society, January 7, 24, 1854, Dr. Gray, Vice-president, in the Chair. Royal Society, February 15, 1855, Thomas Bell, V.P., in the Chair; April 24, Sir B. Brodie, Bart., V.P., in the Chair. Miscellaneous—On Phœnicura Tithys, by Dr. Jordan. We give the following account by Dr. Jordan of this bird:—"This bird may be regarded as a regular winter visitor to the south coast of Devon, and, though local in its distribution, as, indeed, is also its more frequent congener, in its own peculiar haunts it may be met with every year. Our first acquaintance with it began in 1844; we then shot two specimens—a male on January 4, and a female on the 10th of the same month. They are apt to keep in pairs during the time of their sojourn with us, a male and a female usually frequenting the same spot. For some winters after this, circumstances prevented our searching for the birds; nor did we think the visit was other than an accidental occurrence, especially as the season had been unusually mild; and one of my brothers was fortunate enough to shoot an *Accentor Alpinus* on the cliffs near the same spot upon the 9th of January in the same year. But in 1851 we met with our old friends again, and a splendid male was killed by us on the 30th of January, and a female on the 21st

of February. We again shot a male bird on the 3rd of January, 1852, a female on the 27th of December in the ensuing winter, and another, also a female, on the 26th of December, 1853. Its time for remaining with us seems very short, indeed usually to be limited to three months—December, January, and February; yet during the late winter one was killed early in November, and my brother shot a female as late as the 23rd of March; this may, perhaps, be owing to the long duration of the cold weather, or, which is less probable, we may have overlooked its stay in other years. With the single exception of the last-mentioned bird, all our specimens were shot within fifty yards of the same place—a sheltered cove by the Parson and Clerk rocks; but others have met with it along the whole line of coast from Dawlish to Torquay and Paignton; and as it has occurred at Plymouth, and, if my memory does not fail me, at Penzance, and also at the Isle of Wight, the probability is that it might be met with every winter along the whole south-western coast of England. Many are killed every year in the neighbourhood of Teignmouth and Torquay; one was shot on the telegraph wires by the side of the River Teign; but it is usually a coast bird, and haunts the cliffs. The female procured on the 23rd of March was killed on some trunks of trees laid upon the beach near the town—a situation much resembling one in which I often remember seeing them in the summer months at Coblentz, where they were frequently to be found settled on some timber by the banks of the Rhine; they were there abundant, and very tame and domestic in their habits, often perching on the low slate roof of a washhouse in the garden of the Hotel de Belle-Vue." On the Transmission and Metamorphoses of the Intestinal Worms, by MM. Milne-Edwards and Valenciennes; Note on the Trichomonas vaginilis of Donné; On a Lunar Vapour Bow, by C. Clouston; Meteorological Observations and Table for April, 1855.

Quarterly Journal of Microscopical Science. No. 11, April, 1855. Price 4s. With Woodcuts and Lithographic Illustrations. London: S. Highley, 32, Fleet-street.

No. 11, April:—(William B. Carpenter, M.D., F.R.S.) On the Development of the Embryo of the Purpura lapillus; (George J. Allman, M.D., F.R.S.) On the Occurrence, among the Infusoria, of Peculiar Organs, resembling Thread-cells —with a plate. This paper was read at the meeting of the British Association, at Liverpool, September, 1854. It would appear that some of the continental naturalists are of opinion that certain long bristle-like processes, which project from some animalcules when dead, are the cilia abnormally lengthened. That these naturalists have erred somewhat in their explanation of these processes, Professor Allman, in this notice, clearly proves; and, as they have been hitherto undescribed, we have the following account given:—"When the animalcule" (the particular specimen examined was Bursaria heucas, *Ehr.*) "is examined under a sufficiently high power, minute fusiform bodies may be detected thickly imbedded in its walls. These bodies are perfectly colourless and transparent; they are about the 1-2500ths of an inch long, and may easily, even without any manipulation, be witnessed at the margin, where they are seen to be arranged perpendicularly to the outline of the animalcule, while, on the surface turned towards the observer, their extreme transparency and want of colour render them invisible against the opaque background, and it becomes necessary to crush the animalcule beneath the covering-

glass, so as to press out the green globules which it contains, in order to bring the fusiform bodies into view. To these bodies I propose to give the name of trichocysts. As long as the animalcule continues free from annoyance, the trichocysts undergo no change; but when subjected to external irritation, as occurs during the drying away of the surrounding water, they become suddenly transformed into long filaments, which are projected from all parts of the surface of the animalcule, and it is these filaments which, being mistaken for cilia by Cohn and Stein, gave rise to the erroneous views just mentioned." (J. Glaisher) Snow Crystals, in 1855; (J. H. Bennett, M.D.) An Investigation into the Structure of the Torbane-hill Mineral, and of various kinds of Coal. Translations—Observations on Noctiluca (Miliaris?), by Dr. W. Basch; Researches on the Development of the Microscopic Algæ and Fungi, by Dr. F. Cohn. Reviews—Principles of Comparative Physiology, by Dr. Carpenter; On the Microscope, by Dr. H. Schacht; Lettsomian Lectures on Pulmonary Consumption, by Dr. Thompson. Notes and Correspondence. Proceedings of Societies—Microscopical Society; Royal Society. Zoophytology.

The Zoologist. No. 150, April; No. 151, May; and No. 152, June, 1855. 8vo. London: J. Van Voorst. 1s. each number.

No. 150, April:—(Rev. W. H. Hawker, A.M.) On Local Lists. This paper has appended to it a list of the Lepidoptera—*e.g.*, the Rhopalocera and the Heterocera, as far as the end of the Sphinges—which were taken in the neighbourhood of Horndean, Hants. (W. A. Bromfield) Note on the Economy of Saturnia Pyri; (J. Scott) Are the Psychidæ to be considered Bombyces or Tineina? This small group of moths is, doubtless, in a miserable state at not being legitimately disposed of by entomologists, and should be everlastingly obliged to Mr. Scott for taking so much trouble to find it a quiet resting-place among the Tineina. (H. Evans) Occurrence of Spælotis valesiaca, S. cataleuca, and Botys terrealis, near Beddgelert; (H. T. Stainton) Habit of the Larva of Glyphipteryx Haworthana; (T. V. Wollaston) Occurrence of a Water-beetle new to the British Fauna. This insect was taken on Midgeley Moor, near Halifax, during July, 1852, and is the Hydroporus elongatulus, *Sturm.* Note on the Orchesia minor of British Cabinets; Note on the Tachyporus nitidicollis of Stephens; (J. M. Jones) White Ant in India; (Rev. J. C. Atkinson) Memorandum of the Habits of the Jack-snipe; (A Roberts) Occurrence of Wild Fowl at Scarborough; (H. Stevenson) Winter Visitors to the Norfolk Coast during the late severe weather; (G. S. Frederick) Occurrence of the Polish Swan at Hornsey Mere; (S. Gurney, jun.,) Black Swans Breeding in Confinement; (T. A. Preston) Curious act of Auto-surgery in a Teal. This is a *very* "curious" piece of nonsense. A little shot, from the fowling-piece of some bad marksman, drilled a few small holes in the leg of a teal, through which it drew some feathers, in the place of the very best silk, and covered all with some patent adhesive plaster, made of its own clotted blood! Electric Property in the Feathers of a Wood Pigeon; (R. Knox, M.D.) Some Observations on the Estuary Trout (Salmo estuarius); (E. Newman) Memorandum of the Tadpole Fish. Mr. Newman says that the first dorsal of this fish is a slender, flexible spine, unaccompanied by any membrane, which is a very different account from what Dr. Parnell gives in his account of the fish, and which account has been universally followed. We could have wished Mr. Newman had mentioned if there had been any trace of

the other two rays. Of the fin-ray formulæ given, not one of them tally with Dr. Parnell's number; but this, with the one exception, is easily accounted for. Proceedings of Societies—Entomological Society, March 5, 1855, J. Curtis, President, in the Chair.

No. 151, May:—(H. T. Stainton) Entomological Botany, with more especial reference to the Plants frequented by the Tineina—continued from page 4,457. Notices of New Books—The Annals and Magazine of Natural History, Nos. 85 to 88; A List of the British Geodephaga; The Entomologists' Annual, 1855; The Aquarium, by P. H. Gosse. It would appear that in this pleasant little sea-side book by Mr. Gosse, the author has now and then given discourses worthy of the Archbishop of Canterbury, and that these are of such a nature as to excite the idea of "drastic curatives," the *unpleasant* flavour of which is ill concealed by the saccharine vehicle of natural history. A Memoir of W. Baker; (R. Warington) Observations on the Natural History and Habits of the Common Prawn—another of the Results attending the "Aquaria." This paper is nicely written, and gives some interesting details about the exuviation of these little creatures. (J. Couch) A Record of some of the Effects of the late severe Weather on Animals; (J. Y. Akerman) The Birds of London; (H. Stevenson) Note on the Hawfinch and Wild Fowl on the Norfolk Coast; (O. Pickard-Cambridge) Extraordinary Hen's Egg; (C. H. Rodd) Supposed new Snipe; (E. Newman) Supposed act of Auto-surgery in a Teal; (George Beresford) Occurrences of the Smew, near London; (J. Gatcombe) Occurrence of the Iceland Gull in the neighbourhood of Plymouth; (G. Guyon) Insensibility of Reptiles to Poison. It is, we believe, generally known that several animals are quite insensible to the effects of Prussic acid (H. Cy.). We have found it a very difficult matter to kill rats with this acid. (W. Thompson) An Unnoticed Character in the structure of the Fishing Frog, and notice of a Curious Habit of the Fringed-lipped Lamprey; (E. Newman) Gonepteryx Rhamni, double-brooded. Proceedings of Societies—Entomological Society, April 2, J. Curtis, President, in the Chair. Appendix to the "Zoologist" for 1855, Art. xxx., Description of two Coleopterous Insects new to the British Fauna, by T. V. Wollaston, Esq.; Art. xxxi., Revision of the Characters of Deretaphrus and Descriptions of two New Species, by T. V. Wollaston, and E. Newman; Art. xxxii., Characters and some account of the Economy of a supposed new Species of Australian Bombyx, by E. Newman.

No. 152, June:—(R. Knox, M.D., F.R.S.E.) On the Food of certain Gregarious Fishes; (Cuthbert Collingwood, M.B.) Calendar of Natural Phenomena observed at Purley Park, Berkshire. These remarks were made during the months of January, February, and March, in the present year (1855), and are very interesting; but we think, for a periodical like the "Zoologist," they ought to have been a little shorter, as in the present number this paper and the preceding one take up twenty-nine and a half pages out of the thirty-two of which the number consists. (F. Smith) Toads long known to be Enemies of the Hive-Bee; (E. Newman) A Word on the use of Initial Capitals to Specific Names. This "Word" we quote to give our readers the benefit of Mr. Edward Newman's opinion—"We are agreed on using initial capitals for genera, but we have no law as to initial capitals for species; for we cannot certainly reckon as a law that draft of a bill which was sent down to us from the Upper House—*videlicet*, the British Association—and which we, the representatives of the people, threw out, *nemine contradicente*. Now, having no law, every one does exactly as he pleases; and not only are no *two* entomologists

consistent with each other, but no *one*, as far as my knowledge extends, is consistent with himself. It is difficult to believe or understand the trouble which this diversity of practice gives to an editor, more especially should it so fall out that his contributor, having steadfast faith in his own critical sagacity, demands to see a proof; for then the said contributor, being in absolute command of a ship that has no rudder, and purring complacently over the unwonted authority he is enjoying, is sure to assume the printer to be in error, and incontinently to alter every small letter to a capital, and every capital letter to a small one. It is with a view to relieve entomologists of this critical labour that I suggest this simple rule—As all specific names must be substantives or adjectives, let every substantive (nominative or genitive), and no adjective, have an initial capital. One exception only occurs to me, but *exceptio constat regulam;* it is when a man's name is converted into an adjective, as Mitterbacheriana or Abildgaardana—I don't much envy these insects or their godfathers—then the capitals must, of course, be preserved as signboards to testify to future generations that it is mortal men have been thus immortalized; otherwise, the *cui bono* of these ponderous monuments of genius, like that of their fellows on Salisbury Plain, must greviously puzzle philosophers yet unborn." (W. T. Bree) Gonepteryx Rhamni, double-brooded; (H. G. Atkinson) Capture of Gastropacha ilicifolia on Cannoch Chase; (W. Machin) Occurrence of Notodonta carmelita in Kent.

Hooker's Journal of Botany, and Kew Garden Miscellany. No. 75, April; No. 76, May; No. 77, June, 1855. 8vo. London: Lovell Reeve. Price 2s. each, with a Plate.

No. 75, April:—(Sir W. J. Hooker, &c., &c.) Kew Garden Museum, or an Account of the Origin, and some of the Contents, of the Museum of Economic Botany attached to the Royal Gardens at Kew—continued from vol. vi., p. 26. This account of the contents of the Economic Museum, Kew, is most interesting. We hope to see it, when complete, reprinted in a separate form. Besides the mere names of the specimens in the Museum, we have short accounts of their properties, habitats, and the manner that is adopted in procuring the various products which render the plant valuable in an economic point of view. This adds very much to the interest, as well as the value, of the catalogue. Under the head of Ord. Cistaceæ, Cistus Family, we find the following account of how the resin called Labdanum is procured:—"Seven or eight country-fellows, in the heat of the day, when not a breath of wind is stirring, in their shirts and drawers, brush the plants with whips, the straps whereof, by rubbing against the leaves, lick off a sort of odoriferous glue, sticking to the foliage; this is part of the nutritious juice of the plant, which exudes in shining drops, clear as turpentine. When the whips are sufficiently laden with this grease, they take a knife and scrape the straps clean, making it up into a mass, or cakes of different size. A man who is diligent will gather 3 lbs. per day, or more, which sells for a crown on the spot. The work is rather unpleasant than laborious; because it must be done in the sultry heat of the day, and during the most dead calm. About 50 cwt. of it are annually collected in Crete, and sent exclusively to Constantinople." We would suggest that a MS. catalogue, on this principle, should be kept at the Museum of Economic Botany attached to the Botanical Gardens of the Royal Dublin Society. (C. F. Meisner) New Proteaceæ of Australia—continued from page 78; (Drs. Hooker and

Thomson) On Enkyanthus Himalaicus and Cassiope selaginoides, two new species of Himalayan Ericeæ—with two plates. Botanical Information—Note on the Vegetation of Rangoon, in a letter from Dr. M'Clelland, dated May 31, 1854. Notices of Books—Bryologia Javanica; List of British Mosses.

No. 76, May:—Kew Garden Museum, or an Account of the Origin, and some of the Contents, of the Museum of Economic Botany attached to the Royal Gardens of Kew, by Sir W. J. Hooker—continued from page 114; Biographical Account of M. Andrien de Jussieu, by M. J. Decaisne, extracted from the "Memoirs of the Imperial Agricultural Society of France" for the year 1854. This celebrated botanist was born, at the Museum, on the 23rd December, 1797. He completed his medical studies in 1824; and his thesis on this occasion was on the "Euphorbiaceæ." In 1826 his father retired from the Professorship of Botany, and the assembled professors of the Museum nominated his son to the Professorship of Rural Botany, in this year. In 1843 he gave to the world his crowning performance as an author—viz., "The Monograph of the Malpighiaceæ"—on which he laboured for fourteen successive years, and this work alone would have been sufficient to have established its author's reputation. Report of a Journey of Discovery into the Interior of Western Australia, between 8th September, 1848, and 3rd February, 1849, by J. S. Roe—continued from vol. vi., p. 380. Botanical Information—The Voyage of H.M.S. *Herald*, being an extract of a letter from Mr. Milne, dated Island of Janna, New Hebrides, December 4, 1854. Notices of Books—(William Wilson) Bryologia Britannica; (Dr. Asa Gray) Plantæ novæ Thuberianæ.

No. 77, June:—(James Motley) Notes on Sumatra; (M. J. Decaisne) Biographical Account of M. Andrien de Jussieu, extracted from the "Memoirs of the Imperial Agricultural Society of France" for the year 1854. Of this lamented botanist, M. Decaisne says—"Nature had endowed him with those qualities which give grace to superior talents, and deprive them of the tendency to excite envy; his disposition was benevolent and gentle, yet firm; his heart was warm, and his affections susceptible. In general appearance he was far from striking, and his rather peculiar countenance was less engaging than might have been expected, owing to the smallness of his eyes; while his own timidity prevented others from feeling, at first, quite at ease in his society; but he no sooner began to speak than this impression vanished; his animated, witty, full, and kindly conversation, graced with striking and amusing anecdotes, quickly did the speaker justice, and conveyed such an impression as was never erased from the hearer's mind; he was singularly devoid of ambition; he cultivated botany with great success, and to his own unfading honour—true; but he did so for its own sake, because he loved the science, and because his fathers had loved it before him. Fame and high office came to him unsought. The desire for notoriety, which rarely repays the anxiety it occasions, never agitated him; he belonged to that body of learned men who confine their activity and their desires to the promotion of useful labours." M. Jussieu died on the 29th of June, 1853. (George Bentham) Additional Note on Arachis hypogæa; The Government Botanist's Report of his journey from Melbourne to Omeo in the Australian Alps, dated Omeo, 16th December, 1854. The highest portion of the mountain range descended by Fred Mueller appears to be about 7,000 feet above sea level. Botanical Information—Charles Andreas Geyer; On Beech Oil, by W. E. G. Seeman; The Ferns of Wales, by Edward Young. Notices of New Books.

THE ANNALS AND MAGAZINE OF NATURAL HISTORY. No. 91, July; No. 92, August; No. 93, September, 1855. 8vo. With Plates. London: Taylor and Francis. Price 2s. 6d. each.

No. 91, July:—(H. J. Carter, Assistant-Surgeon H.C.S. Bombay) Observations on the Development of Gonidia (?) from the cell-contents of the Characeæ, and on the circulation of the mucus-substance of the cell; (S. P. Woodward, F.G.S.) Descriptions of the Animals of certain Genera of Conchifera; (P. H. Gosse, F.L.S.) Notes on some New or Little-known Marine Animals, with two Plates. We have, in this paper, descriptions of nine new animals, two of which belong to the class Arachnida, order Acarina, and are a great addition to our British marine mites. One belongs to the class Crustacea, two to the Annelidæ, two more to the genus Othonia of Johnston, and one to the Polyzoa, family Vesiculariadæ, for which a new genus is made—Nolella, from nola, a little bell. (C. Spence Bate, F.L.S.) On the Homologies of the Carapace, and on the structure and function of the Antennæ in Crustacea. After describing the anterior or internal antennæ and the inferior or external antennæ, the author continues:—"The next question which we have to consider is, to which sense either of these two sets of organs belongs; whether the upper belongs to the auditory and the lower to the olfactory, as I shall endeavour to prove, or *vice versa*, as maintained by Prof. Milne-Edwards. We shall divide the evidences on either side under two heads—the first, that which is derived from an external observation; and the second, that which is derived from its internal organization. First, then, from external circumstances:—An auditory apparatus is an organ furnished to an animal for one or both of two objects—first, for protection from danger; second, for the pleasure derivable from sounds. To animals so low in the scale of beings as the Crustacea, placed, as they are, in a medium which must considerably modify its character, sound can convey little to the consciousness of the animal beyond a sense of security or danger. To enable this to be of the most extensive value, the auditory organ must be, and always is, so placed as to be most exposed to external impressions at all periods; particularly when the animal is at rest or pre-occupied. Now, if we look at the organ the present state of science attributes to the sense of hearing, we find that in the most perfectly-formed animals, the *Brachyura*, it is enclosed within a bony case, and secured by a calcareous operculum; that it is always so in a state of rest, and only exposed when especially required. Not only is this the case throughout the order, but in some genera—as *Corystes*, *Cancer*, &c.; it is again covered by the supplying organs of the mouth. If we take into consideration that the inferior antenna is frequently developed into organs assimilating to feet, and frequently used for the purpose of assisting to climb, &c., it seems difficult to admit that it is an organ capable of protecting the animal by its quick detection of the sound of approaching danger. If we turn our attention to the superior antenna, we find that in the living animal it is always elevated in the water, and never at rest—always playing with a constant vibration, and a jerking motion peculiar to itself in the higher orders. Among the Amphipoda, though constantly erect, the motion is more regular and graceful; this, probably, is consequent upon the greater relative length of the organ. This organ is one that appears as if always on the watch—let the animal be at rest, let it be feeding, no

matter, the superior antenna is ever elevated, and on constant guard. Again, if we turn our attention to the land crustacea, we find the organ, as an antenna, disappear; and in *Ligia* and the amphibious *Orchestidæ* they are rudimentary, as if the organ, passing from water into a less dense medium, required modification in order to adapt it to the change of circumstances. If we take into consideration the nature of sound, and its difference of character when conveyed under water from that of passing through air, the obtuse character of the former, which can scarcely be more than a vibratory action of particles of water, which conveys to us a very modified and imperfect idea of sound, we find it difficult to understand that the organ situated at the base of the under antenna is capable of receiving impressions of sound, enclosed as it is within and covered by a stout calcareous operculum. But if we view it as an organ of smell, every objection previously becomes evidence in favour of the idea. The small door, when it is raised, exposes the orifice in a direction pointing to the mouth; this, also, is the direction of the same organ in all the higher orders. In Amphipoda it is directed inwards and forwards. In every animal it is so situated that it is impossible for any food to be conveyed into the mouth without passing under this organ, and of this the animal has the power to judge its suitability for food by raising the operculum at will, and exposing to it the hidden organ—the olfactory. If we turn to the upper antenna, we find that its position, form, and power, are as capable of fulfilling the office of conducting the sensation of sound, as the lower is that of smell. As I before observed, it is always placed erect, and continually feeling in the water for the first approximation of sensation. The filamentary appendages are always two or more, one of which is supplied with singularly-delicate membraneous cilia, being apparently prolongations of a similar membrane to that which covers the larger orifice of the olfactory organ. These lengthened and delicate cilia are peculiarly adapted to receive and convey the most minute vibratory sensation of the medium in which they are suspended. These organs, when spoken of, may conveniently be designated as auditory cilia, and have been found in every species of Crustacea that has been searched for them. If we turn our attention to the internal structure of this antenna, we shall find that it supports the idea of its being an auditory organ more forcibly than its external analysis. In the *Brachyura*, as before observed, the first, or basal articulation is largely developed; if it be removed from its connection with the animal and broken open, the basal articulation will be found occupied by a still smaller chamber, having calcareous walls of a much more delicate character than the integumentary structure. This internal chamber or cell is that which, in this paper, is supposed to be a cochlea, from its analogy, both in its structure and supposed use, to that organ in higher animals. It is situated in the cavity of the basal articulation of the antenna, and attached to the walls furthest from the median line of the crab. It presents a tendency to a spiral form, but passes not beyond the limits of a single convolution. The calcareous walls extend across the axis of the ideal spire, and the internal cavity is one continuous irregular chamber, the walls of which, at the centre of the axis, closely approximate, so as almost to meet. This internal cell represents, we think, the cochlea of higher animals, to which it bears some resemblance both in form and structure. If so, then, beyond dispute, it identifies the superior antenna as an organ of hearing. The internal structure of the inferior antenna differs very materially

from the appearances we have just described. In the *Brachyura*, where the organs are most fully developed, there is attached to the operculum a long, osseous tendon or lever, by which the attached muscles raise or close the entire organ, but there is no internal structure of any kind which could identify it as being an organ of sound. The aqueous sac mentioned by Edwards, I have entirely failed to discover. Viewing the two antennæ each as a whole, in their relative positions and connection with the rest of the animal, we are forcibly led to the conviction that the upper antenna is an organ of hearing, and the lower antenna is an organ of smell." The author's views are illustrated by plates. (M. de Quatrefages) On Double Monstrosity in Fishes. Proceedings of Learned Societies—Linnean Society, December 5, 1854, W. Yarrell, Esq., V.P., in the Chair; December 19, T. Bell, President, in the Chair. Zoological Society, February 14, 1854, Dr. Gray, Vice-President, in the Chair; read, notes on the habits of Indian Birds, by Lieutenant Burgess; February 28, 1854, Dr. Gray, Vice-President, in the Chair. Royal Institution of Great Britain, April 20, 1855., W. R. Grove, M.A., Q.C., F.R.S., Vice-President, in the Chair. Botanical Society of Edinburgh, April 12, 1855, Professor Balfour, President, in the Chair. Miscellaneous—Nereis bilineata, by W. Thompson; On a New Species of Thallasidroma, by G. R. Gray, F.L.S., and F.Z.S.; On the Eggs of Otogyps and Prosthemadera, by H. F. Walter. Meteorological Observations and Table for May, 1855.

No. 92, August:—(T. R. Jones, F.G.S.) Notes on Palæozoic Bivalved Entomostraea—No. 1, Some Species of Beyrichia from the Upper Silurian Limestones of Scandinavia—with a Plate; (J. W. Griffith, M.D., F.L.S.) On the Conjugation of the Diatomaceæ—with a Plate; (Thomas Wright, M.D., F.R.S.E.) On a New Genus of Fossil Cidaridæ, with a synopsis of the species included therein; (T. Horsfield, M.D.) Brief Notices of several New or Little-known Species of Mammalia lately discovered and collected in Nepaul, by Brian Houghton Hodgson; (William Clarke) On the Assiminia Grayana and Rissoa anatina; (T. Blackwall, F.L.S.) Descriptions of two newly-discovered species of Araneidea; (J. Gwyn Jeffreys, F.R.S.) Note on the Descent of Glaciers. No less than five various theories have been proposed to account for the descent of glaciers—1st, by De Saussure, who supposed that glaciers descended solely by their own weight; 2nd, by De Charpentier, and adopted by Agassiz, who supposed that the phenomenon was caused by the surface of the glacier being thawed during the day, that the water thus produced percolated the porous material, and that upon congelation taking place at night, the whole structure expanded in every direction, naturally occasioning or accelerating a downward movement in the direction of the slope; 3rd, that of Professor James Forbes, which attributed it to the viscous or plastic nature of the glaciers, causing the descent *suis viribus;* 4th, that of Mr. Hopkins, who referred the motion of a glacier to the dissolution of the ice in contact with the rock; and, 5th, that of Rev. H. Mosley, who supposed that it was caused by the heat of the sun, and, consequently, to an alternate expansion and contraction of the material. Without either patronizing one or any of these various and seemingly conflicting theories, or attempting to make up "the half dozen," Mr. Jeffreys is of opinion that each and all of the forces above mentioned may have their own part in producing this curious phenomenon; by this means he reconciles the various theorists, and good-naturedly sets at rest this difficult and vexed question.

Bibliographical Notices—Catalogue of British Bees, by F. Smith; Proceedings of the Yorkshire Philosophical Society, vol. i., York, 1855. Proceedings of Learned Societies—Zoological Society, February 28, 1854, Dr. Gray, V.P., in the Chair; March 14, Dr. Gray, V.P., in the Chair; March 28, Dr. Gray, V.P., in the Chair. Botanical Society of Edinburgh, June 14, 1855, Professor Balfour, President, in the Chair. Miscellaneous—On the Organization of the Pedicellate Glands of the Leaf of Drosera rotundifolia, by M. A. Trécul; On a New Organ observed in Callitriche, by M. A. Chatin; Description of a new Tanager, of the genus Calliste, by P. Lutley Sclater, M.A.; On the Spermatophora of the Crickets, by C. Lespés. Meteorological Observations and Table for June, 1855.

No. 93, September:—(Professor Steenstrup) Observations on the Genera Pachybdella (*Deising*) and Peltogaster (*Rathke*), two animal forms parasitic upon the abdomen of Crabs; (T. Rupert Jones, F.G.S.) Notes on Palæozoic Bivalved Entomostraea, No. 11; Some British and Foreign Species of Berychia—with a plate; (Dr. A. Krohn) On the Heart and Circulation in the Pycnogonidæ—with a plate; (M. Valenciennes) Abstract of a Monograph of the Family Gorgonidæ; (Dr. J. E. Gray, F.R.S., V.P.Z.S.) On the Genus Assiminia; (Alfred R. Wallace, F.R.G.S.) On the Law which has regulated the introduction of New Species; (Thomas Wright, M.D., F.R.S.E.) On some new species of Hemipedina from the Oolites; A short Biographical Notice of the late Dr. Johnston, of Berwick-upon-Tweed. Bibliographical Notices—The British Flora, comprising the Flowering Plants and the Ferns—Seventh Edition. Proceedings of Learned Societies—Royal Society, April 26, 1855, Sir B. Brodie, Bart., V.P., in the Chair; June 14, the Lord Wrottesley, President, in the Chair; June 21, the Lord Wrottesley, President, in the Chair. Linnean Society, January 16, 1855, Thomas Bell, President, in the Chair. Botanical Society of Edinburgh, July 12, 1855, Professor Balfour, President, in the Chair. Zoological Society, April 11, 1854, Dr. Gray, Vice-President, in the Chair; April 25, Dr. Gray, Vice-President, in the Chair. Miscellaneous—Monstrosity of Antirrhinum majus; Notice of the Horns and Skull of the Arnee; Meteorological Observations and Table for July, 1855.

Quarterly Journal of Microscopical Science. No. 12, April, 1855. Price 4s. With Woodcuts and Lithographic Illustrations. London: S. Highley, 32, Fleet-street.

No. 12, July:—(Wm. Herbert Thomas) Observations on Cosmarium Margaritiferum and other Desmidiæ; Address of the President at the annual meeting of the Microscopical Society, February 28, 1855; (R. J. Farrants, F.R.C.S.) An Account of Mr. Peter's Machine for microscopic writing; (John Frazer) On the Illumination of Objects by polarized light on a dark field; Report of the fifteenth annual meeting of the Microscopical Society. Original Communications—(George Rainey, M.R.C.S., &c., &c.) On the Structure of the Cutaneous Follicles of the Toad, with some experiments and observations upon the nature and alleged venomous properties of their secretion; (F. Currey, M.A.) On the Reproductive Organs of certain Fungi; (Ferguson Branson, M.D.) On Ciliary Action as the cause of the circulation in the Cells of Plants; (F. H. Wenham) Observations on the circulation of the Sap in Leaf Cells of Anacharis alsinastrum. Translations—On the Cellulose (in animals) question, by R. Verchow; On the Action of Concen-

trated Solution of Urea upon the wood cells, by A. Kölliker; Notice respecting the occurrence of Lymph-corpuscles in the commencement of the Lymphatic vessels, by A. Kölliker; On the influence of Caustic Alkalies upon the Motions of the Spermatic Filaments, by A Kölliker; On the Restoration of the Motions of the Sphermatozoids of the Mammalia, by MM. Moleschott and J. C. Recchetti; On the Vitality and Development of the Spermatic Filaments, by A Kölliker. Notes and Correspondence—Reply to some Remarks, by E. H. Wenham; Aperture of Object-glasses in relation to objects in Canada Balsum; Microscopical Conversaziones; Cheap Microscopes; On Species of Diatomaceæ; On a New Locality for Microscopic Test Objects; Memoranda on Flies' feet; On Finders; Memoranda on the Employment of Artificial Sea-water in Marine Aquaria. Proceedings of Societies—Royal Society; Stowe Newington Natural History and Scientific Society, April 24, 1855; Zoophytology. Title-page and Index to the Volume for 1855.

The Zoologist. No. 153, July; No. 154, August; No. 155, September, 1855. 8vo. London: J. Van Voorst. 1s. each number.

No. 153, July:—(George Guyon) Singular State of a Living Helops; (Job Johnson) Egg and Larva of Crymodes Templi. Proceedings of Societies—Society of British Entomologists, April 18, 1855, Mr. Harding, President, in the Chair; May 1, Mr. Harding, President, in the Chair. Entomological Society, May 7, 1855, J. Curtis, President, in the Chair; June 4, J. Curtis, President, in the Chair. Notices of New Books—The Annals and Magazine of Natural History, Nos. 89 and 90; The Natural History Review, No. 6; A History of the British Marine Testaceous Mollusca, by W. Clark. Remarkable Act in an Aged Cat; (A. Roberts) Occurrence of the Honey Buzzard near Scarborough; (Edward Newman) Occurrence of the Snowy Owl in Aberdeenshire; (H. Spurr) An Owl laying an Egg after twenty years' confinement; (F. Woodroffe) Ornithology of the Diggings; (E. V. Harcourt) Hen's Egg with Double Shell; (H. Stevenson) Extraordinary Hen's Egg; (G. Grantham) Occurrence of the Little-winged Plover and Smew near Brighton; (T. L. Powys) Occurrence of the Bittern and Goosander in Northamptonshire, of the Red-throated Diver in Plymouth Sound, and of Buonaparte's Gull in Dublin Bay; (E. W. H. Holdsworth) Supposed insensibility of Reptiles to Poison, and on a supposed unnoticed Character in the Fishing Frog; (James Wilson) Salmon and Salmon-fry; (R. H. Meade) Note regarding the Name of the Australian Trap-door Spiders; (W. H. Hawker) Gonepteryx Rhamni, double-brooded. This note is an answer to Mr. Newman's doubt as to whether the Brimstone butterfly is double-brooded or not, and answers all his objections in an off-hand way. (T. J. Bold) Capture of Nomada borealis at Gosforth, Northumberland; (George Guyon) Tenacity of Life in a Bembidium; (W. Thompson) Marine Vivaria; (Rev. H. Clark,) Notes on Certain British Hydrocantharidæ. We may here mention that it is the intention of the Rev. H. Clark to publish a Monograph of the British species of "Hydradephaga and Philhydrida," and that he will be most happy to receive for examination specimens of any doubtful species, more particularly specimens of Octhebius, Hydræna, Limnebius, and Elmis; his address being Rev. H. Clark, Northampton. (H. T. Stainton) Entomological Botany, with more especial reference to the plants frequented by the Tineina.

No. 154, August:—(R. Knox, M.D.) Inquiries into the Philosophy of the Salmon, and on the Growth of the Salmon from the Egg to the Adult. Proceedings of Societies—Entomological Society, July 2, 1855, John Curtis, President, in the Chair. Proceedings of Natural History Collectors in Foreign Countries—Letter from W. A. R. Wallace, dated Borneo, 8th April, 1855. Mr. Wallace, in writing about the capabilities of St. Munjon coal works as an entomological collecting ground, says—"I here met with the beautiful longicornis of the genera Astathes, Glenea, and Clytus, the elegant Anthribidæ; the Buprestidæ are very fine; one of the most beautiful is, I think, the Belionota sumptuosa, about one inch long, and of the richest golden copper colour; it flies with the greatest rapidity, making a loud, bee-like hum, and settles on timber only in the hottest sunshine." How exciting must be the pursuit of entomology in these tropical climes after the, in this respect, less favoured lands of Britain!

No. 155, September:—(E. H. Rodd) Occurrence of the Honey Buzzard; (H. Stevenson) Occurrence of the Roller; (T. J. Bold) Occurrence of the Pectoral Sandpiper; (G. Norman) Occurrence of large flocks of Crossbills, near Hull; (J. J. Briggs) Note on the Destruction of Swallows by the severity of the Weather; (T. L. Powys) Occurrence of Buonaparte's Gull, on the Irish Coast; Child and Snakes; Gonepteryx Rhamni double-brooded? remarks on this subject by H. Doubleday, J. W. Douglas, and H. T. Stainton. This query is here made the subject of several interesting communications from some of the best entomologists in Britain. Mr. Doubleday says the insect is not double-brooded. Messrs. Hawker and Bree say that it is. Mr. Stainton wonders that no one has yet made out such an apparently easy problem; and Mr. Douglas, in our opinion, is the only one who sets about settling the question in a fair and legitimate manner. (S. Price) Occurrence of Vanessa antiopa in Wales; (J. S. Ashworth) List of a few rare Lepidoptera in Wales; (G. Guyon) Occurrence, at Richmond, Surrey, of a Coleopterous Insect, new to Britain; (T. J. Bold) Great abundance of "Clegs" in Cumberland and Northumberland; (E. Newman) Duplicates of the Genus Colymbetes; (H. Newman) Enormous Flight of Ephemeræ; (W. Thompson) Short Directions for the Management of Marine Vivaria. Proceedings of Societies—Entomological Society, August 6, 1855, John Curtis, President, in the Chair. Society of British Entomologists, June 5, and July 3, 1855, Mr. Harding, President, in the Chair. Tyneside Naturalists' Field Club Meeting at Bothal. Notices of New Books—Annals and Magazine of Natural History; Artificial Rearing of Salmon, and some of its results; (E. Newman) Memorandum on Dr. Knox's Papers in the last "Zoologist," and on the occurrence of the Spined Loach, near Dorking; The Snake and Child Exhibition; Transactions of Entomological Society of London.

Hooker's Journal of Botany, and Kew Garden Miscellany. No. 78, July; No. 79, August; No. 80, September, 1855. 8vo. London: Lovell Reeve. Price 2s. each. With a Plate.

No. 78, July:—(R. Spruce) Note on the India-rubber of the Amazon. The mode of obtaining the caouchouc from the various species of Siphonia, is almost universally by tapping. Some used to cut down the trees, but found that, in this way, they obtained much less milk than by successive tappings of the same tree, the work, besides, being harder, and causing them to shift their sphere of operations continually. It is dried by smoke, the milk being applied in successive coatings to a mould. In the year 1849, the caouchouc fetched, in the Pará market, only £1 3s. 4d. per 32 lbs. (an arroba), but when the demand began to exceed the supply it reached the very high price of £4 8s. 8d. the arroba; it now sells from £1 15s. to £2. (G. H. K. Thwaites) Description of some new genera and species of Ceylon Pangiaceæ; (J. D. Hooker, M.D., F.R.S.) On Chortodes, a sub-genus of Flagellaria; Extract of a letter from Mr. Wallace, dated Singapore, Oct. 10, 1854. A most interesting letter, giving an account of his ascent of Mount Ophir. (R. Spruce) Botanical Objects sent to the Kew Museum from the Amazon; (G. H. K. Thwaites) On Urandra, a new genus of Olacaceæ. Botanical Information—Note on Piassaba, by T. C. Archer; On Sarsaparilla, by W. Spruce. Notices of Books—Carl Müller's Recensio Generis Grami-

nearum Zoysia, in Mohl, and Schlechtendal's "Botanische Zeitung;" The Phytologist; Loudon's Encyclopedia of Plants; Dr. Cock's Algarum Fasciculi; H. Schott, Arordiæ Fasc., I and II.

No. 79, August:—Botany of Van Dieman's Land—Extract of a letter from Dr. Harvey, dated Launceston, Van Dieman's Land, March 31, 1855. Among other interesting particulars given by Dr. Harvey in this letter, he mentions the naturalization of common English weeds in Van Dieman's Land to such an extent as to become perfect pests—horehound is found everywhere, and chamomile covers the fields, in many places to the exclusion of grass. Thistles are fast going a-head, hundreds of acres being given over to them; and they grow so rank in some places that one may walk over the beds of thistle-down, blown from the withered stems, ankle deep. Sweet-briar forms, in some places, impenetrable thickets, and annually produces millions of hips. The furze is, also, spreading, but not so rapidly. Hawthorn and oak trees appear heavily laden with berries and acorns. Botany of Victoria—Extracts of letters from Dr. Mueller. (G. H. K. Thwaites) Note on Bursinopetalum; (Dr. Asa Gray) Note on the Development and Structure of the Integuments of the Seed of Magnolia; (R. Spruce) Botanical Objects sent to the Kew Museum from the Amazon; (H. H. Calvert) Notes on Vegetable Products sent by him from Erzeroom. Notices of Books—Dr. Hooker and T. Thomson's Flora Indica.

No. 80, September:—Notes written on a Voyage from Singapore to Banjermassing, in the southern extremity of Borneo, in a Letter from James Motley to Sir W. J. Hooker; (G. H. K. Thwaites, F.L.S.) On Sphragidia and Eccremanthus, two new genera of Ceylon Plants, together with Observations on the Genus Hernicyclia—with two plates; On Botanical Objects communicated to the Kew Museum from the Amazon and its tributaries in 1853, by Richard Spruce; (G. H. K. Thwaites) Notes on the Botany of Ceylon. Botanical Information—Rice Paper Plant; Plants of Greece; Mr. Spruce's Voyage up the Amazon, and its Tributaries; Cordia Fungi. Notices of Books—(J. D. Hooker, M.D., F.R.S.) Illustrations of Himalayan Plants; (Thomas Moore, F.L.S.) The Ferns of Great Britain and Ireland, edited by Dr. J. Lindley, nature printed by H. Bradbury; Chloris Andina, par Dr. H. A. Wendell.

THE NATURALIST: a Popular Monthly Magazine, with numerous Engravings; conducted by B. R. Morris, Esq., M.D. No. 50, April; No. 51, May; No. 52, June; No. 53, July; No. 54, August; No. 55, September, 1855. 8vo. Price 6d. each. London: Groombridge and Sons.

No. 50, April:—(W.) Notes on the Star-fishes found in the Moray Frith, near Banff; (Edward Parfitt) A List of and Notes on the Fungi found in the Neighbourhood of Exeter; (George Donaldson) The Swamps of the Missisippi; (O. S. Round) The Myrtle Bee. Under this curious title Mr. Round tells us that a Captain Brown, while snipe-shooting, about the year 1830, in some bogs near Egham, met with some birds (?), that by him and his brother sportsmen were called bees. In size these birds (?) were about half as large as a wren; tail, long in proportion to the body, square; plumage(?), sooty gray black; tongue, which *protruded*, was long and horny. This statement of Captain Brown has led to a long discussion in "Notes and Queries;" but for our part we fancy the Captain showed himself a very fair naturalist in calling them bees; for his description comes much nearer a thing belonging to the *insect* tribe than to the *bird* tribe—believing the account to be true. Could the "bee" in question have been the humming-bird sphinx? Flying into the earth, hiding themselves in the moss, buzzing from bush to bush, and concealing in the grass at their roots—such things never were birds. (A. S. Moffat) The Water Ouzel; (C. W. Rothery) Winter Notes at the Lakes. Review—The Entomologists' Annual, 1855; The late Professor Edward Forbes. Proceedings of Societies—Entomological Society of London, January 1, 1855. The Querist; The Wood Pigeon; Increase in Insects.

No. 51, May:—(T. Southwell) A Spring Ramble; (Stephen Stowe) A Glance at the Feathered Residents in, and Visitors to, the Grounds of Terrick House, with

a few remarks from personal observation upon their habits and peculiarities—continued from page 58; (E. M. A.) Notes on the Habits of the Ring Ouzel—Merula torquata; (George Donaldson) The Swamps of the Missisippi—concluded from page 85; (H. R. Bolton) On the Expansion and Contraction of British Land Shells. It would appear from Mr. Bolton's observations that a specimen of Helix aspersa being taken by him in good condition, and the circumference round the largest whorl measured, the snail then being placed, for twenty days, in a dry situation, that this circumference *decreased* 3-10ths of an inch. This is an interesting subject, and worth the trouble of following up further. Miscellaneous Notices—Occurrence of the Little Auk at Barnsley—Achillea tormentosa.

No. 52, June:—(J. G. Baker) Two Days in Wensleydale; (Thomas Edward) The Fishes of Banffshire; (J. M'Intosh) The Redbreast—Erythaca rubecula; (J. H. Davies) A List of Land and Fresh-water Mollusca found in the vicinity of Thirsk; (Edward Parfitt) A List of and Notes on the Fungi found in the Neighbourhood of Exeter; (J. M'Intosh) Injurious Insects, No. IV., the Common Wasp—Vespa vulgaris; (G. R. Twinn) A Memento from the Tare. Miscellaneous Notices—On the Instinct and Communicative Powers of the Horse; Late Appearance of the Martin; Notes on the Swift Arrival of the Hirundines; Egyptian Goose; Occurrence of the Iceland Gull; Rare Birds near Winchester, and at Redcar; The Wolf-fish.

No. 53, July:—(O. A. Moore) Some Account of William Dawson, late of Leeds, Surgeon; Mollusca in the Neighbourhood of Nice, names from Draparnaud—Mollusques terrestres; (J. S. Walker) The Myrtle Bee. These few lines do not help to get rid of the "mystery," as we can hardly expect to find New South Wales wrens in Britain. (C. H. Dashwood) Short Notes from my Note-book; (John Rose, M.D.) Nucleus of a Flora of Gosport and adjacent parts of Hampshire; (W. Kidd) The Good Time Coming Come at Last, being notes on recent rambles amidst clouds and sunshine; (Rev. R. Pye Alington) Ornithological Notes. Reviews—Natural History Review; Synopsis of Edible Fishes at the Cape of Good Hope; The Entomologists' Annual; A Classified List of British Mosses; List of British Geodephaga. Miscellaneous—Note on the Rufous Warbler; Ornithological Occurrences in Norfolk; Papilio machaon; The Querist; Increase in Insects.

No. 54, August:—(Richard Hobson, M.D.) On the Occurrence of the American Mottled Owl (Strix asio) near Leeds. This owl was shot in the spring of 1852, near Kirkstall Abbey, about four miles from Leeds; the species is decided by Mr. Gresham, of York, and Mr. Denny, the Curator of the Leeds Museum, and a figure drawn by the latter individual is attached to this paper. (W.) Stalked-eyed Crustacea of Banffshire; (J. E. Daniel) On the Fauna of Wool, near Wareham, Dorset. We have, in this paper, no less than thirty species of mammalia enumerated as inhabiting part of the forests of Wool. (J. Morley) A Letter to the Editor of the "Naturalist," showing how, in Nottingham, a few operatives have clubbed together into an Entomological Society, and are able to boast of a very fair library, which is yearly increasing. Would we had more of such societies in these countries. (Thomas Edward) An Ornithological Rarity in the North; (J. O. Harper) An Afternoon's Ramble, or a leisure hour. A list of mollusca is appended to these notes, and after every specific name is appended the word "male;" thus (Cyclas cornea), male. What can it mean? (George Dixon) New Station for Lecanora rubra, *Ach.* (Lichen ulmi, *Swarts.*). Review—Kidd on the Canary. Miscellaneous Notices. The Querist.

No. 55, September:—(Richard Hobson, M.D.) Description of a Hawk shot in 1851, on the Chevet Part Estate, by William Bevers, Keeper to the late Sir Thomas Pilkington; (G. B. Clarke) Effects of the severe weather on the Hirundinidæ at Woburn, Bedfordshire, and the neighbourhood; Notes on the Leech, by J. M'Intosh; (J. D.) Land and Fresh-water Shells found in the vicinity of Oxford; (S. Stowe) Ornithological and other Notes; (W.) Contributions to the Icthyology of Banffshire; (J. J. Briggs) Letter to the Editor of the "Naturalist;" Miscellaneous Notices.

THE

NATURAL HISTORY REVIEW.

PROCEEDINGS

OF

THE ARMAGH NATURAL HISTORY SOCIETY, THE BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY, THE CORK CUVIERIAN SOCIETY, THE DUBLIN NATURAL HISTORY SOCIETY, THE DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION, AND THE LITERARY AND SCIENTIFIC INSTITUTION OF KILKENNY,

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INDEX TO PROCEEDINGS.

Errata.

REVIEWS—

Page 25, 8 line from head, *for* Chrenberg, *read* Ehrenberg.
,, 29, 23 ,, ,, indistinct ,, distinct.
,, 39, 12 ,, ,, medical ,, Vegetable.
,, 55, 6 ,, ,, is ,, in.
,, 59, 3 line from foot ,, 21 ,, 51.
,, 76, 13 ,, head ,, Trinchomenus *read* Anchomenus.

PROCEEDINGS OF SOCIETIES—

Page 53, Foot note, the references are inverted.
,, 54, 17 line from head, *for* bicolor *read* bicolon.
,, 57, 16 ,, ,, Aphidæ *read* Apidæ.
,, ,, 34 ,, ,, muxologicorum *read* mycologicum.
,, ,, 6 ,, foot ,, Cryptogammarum *read* Cryptogammicarum.
,, 58, 13 ,, head ,, Hepnum *read* Hypnum.
,, 60, 8 ,, ,, ,, bicolor ,, bicolon.
,, 62, 26 ,, ,, ,, mouth ,, front.
,, 118, 4 ,, foot ,, definitely ,, definitively.
,, 119, 20 ,, head ,, arenosus ,, arenarius.
,, 124, 23 ,, ,, ,, bicolor ,, bicolon.

Proceedings of Societies.

ARMAGH NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

OCTOBER 18, 1854.

Rev. Dr. Romney Robinson, in the Chair.

The Secretary read the following Report for the year 1854:—

A stranger to our Society might ask regarding it such questions as these—What is the Society? what does it attempt? what is it doing?

It is considered that an annual report furnishes a proper opportunity for replying to such inquiries, affording to the members occasion to review the past, and to the Society a means of exhibiting anew its character, advantages, and claims.

Union is strength, and men act the more cheerfully from acting in concert. Many objects may be accomplished by conjoined effort which baffle individual exertion. Proceeding on these principles, the members of this Society have united themselves together for common purposes, casting their respective acquirements into a common store—a store which possesses this peculiar property, that the more largely it is drawn from, the larger it becomes; and the Committee cannot too strongly impress upon the members what, indeed, reason would suggest, and the experience of this and every similar institute proves, that in order to healthy, vigorous, and sustained action, there must be general exertion towards individual improvement and common progress.

But are the objects in view worthy of such union? What is to be done? Hitherto natural history and philosophy have been the fields over which this Society has sought to expatiate. In the one department the classification and arrangements, the uses and the beauty of the material creation come under notice; in the other, the human mind turns inward upon itself, investigates its own character, and analyzes its own phenomena. In the one, the sphere of observation is so wide and so easily accessible that every one may occupy a place; in the other, each inquirer has the subject of examination within himself. In the one, there is a variety like that of England's Great Exhibition, where the mind was at first bewildered by the multitude of objects; in the other, there is variety like that of the clouds, where the scene is ever shifting, yet this very variety restrained by specific laws. In the one, there is a rich universe without, and physical science bids us look upon it, to understand, admire, and adore its Great Author; in the other, there is an universe of thought within, and the metaphysical inquirer needs no costly apparatus, and has no tedious waiting for seasons of observation. Each is a gold field where all may search and all find treasure—where no quarrel need exist as to division of territory, and in which, as elsewhere, patience is sometimes rewarded with the richest discoveries in ground that has been already explored.

The Society has this year extended the sphere of its exertion. At the annual meeting, held 4th October, archæology was added to its objects; notice of the proposal having been duly given by Dr. Riggs. There are, doubtless, minds between which and this branch of interesting investigation there is a strong affinity, and by their enlistment, an accession to our resources may be expected with confidence.

And what, it is asked, has been done? To this the Committee are in a position to reply with unmingled satisfaction, that the progress of the Society during the past year, if not rapid, has been uniform and steady—an addition of literary and

scientific works has been made to the library, and a considerable increase to the membership can now be reported. Numerical power does not, indeed, constitute our real strength, unless, as it is hoped and believed in this case, our new associates bring to the pursuits of the Society earnestness of mind, and habits of vigorous and continued application.

In the latter part of 1853, monthly conversaziones were proposed as likely to stimulate and improve the members. The new year was commenced with these meetings, and the plan has been carried out with great spirit and advantage. The attention of the members has been successively turned to such objects as "The Armagh Marble," "The Atmosphere," "Gold, and what effects are likely to result from its increased supplies," "Coal, what is it?" "The Geology of Armagh and its neighbourhood." Much information has been conveyed, and deep interest awakened, as may be inferred from the fact that the last-named topic formed the subject of three conversaziones. The advantages of such meetings are obvious. Those who might shrink from the elaborate preparation of a paper, can thus convey the results of their reading and observation, and either remove difficulties or give explanations with all the freedom of ordinary intercourse. Familiarity with the vocabulary of science is acquired, and the power of conveying thought by speech is cultivated and improved. He who estimates aright the proportion of his ideas derived from conversation will fully appreciate the excellence of this arrangement.

The energies of the Society have not been flowing in this direction only, several papers having been read by its members. A subject of deep interest to us as Irishmen was vigorously and clearly treated by Mr. Kay, in an essay on "Self-reliance, in relation to the Improvement of Ireland." Attention was gracefully and ably called by the Rev. Wm. Anderson to "the advantages to be derived by non-professional men, from an acquaintance with the principles of Mental Science." With his accustomed practical interest in the Society's operations, the Rev. George Robinson delivered a deeply-interesting lecture on "Botany;" followed by the Rev. Mr. M'Alister, in a valuable paper on the subject of "Light." An essay by the Rev. Wm. Henderson, on "First Truths, their character and importance," formed the last of these important contributions—the only thing to be regretted about any of them being the limited attendance of the members and their friends.

It will be seen that among these, two lecturers entered upon the Society's *philosophical* department. It is hoped that others will follow in the same direction. Right views of the science of mind are of the last importance to the successful cultivation of any other science. As foolish it would be to suppose that a man can be a good astronomer who does not understand the nature and construction of his telescopes, as to expect any branch of physics to be pursued with accuracy and success without a due acquaintance with the mental instrument by which the objects of all the sciences alike are defined, arranged, and measured.

The expectation of a course of lectures on "Geology," during the year, was confidently entertained, application having been duly made to the Royal Dublin Society From peculiar circumstances, however, in connection with the election of the Committee for provincial lectures, the result of that application has not yet been officially notified. Your Committee do not, however, abandon the hope of such a course, the advantages of which, if duly appreciated, must be obvious.

The necessity of affording to the country members increased facilities for procuring books from the library, and the propriety of opening the reading-room every evening in the week, having been brought under the consideration of the Committee, these subjects were referred to the opinion of the members specially convened for that purpose. The Committee recommended that a paid officer should be appointed for the purpose of taking charge of the library and reading-room, that the reading-room should be open to the members from seven to ten o'clock every evening, and that on Tuesdays, for the more especial convenience of country members, the library and reading-room should be accessible during the hours of one and four o'clock. The Committee feel great pleasure in stating that these suggestions were unanimously approved of by the members; and since the appointment of such officer, and the introduction of these arrangements, the advantages connected with the reading-room have been, and are more highly appreciated, and the books in the library more sought after

than hitherto. With reference to the more regular and convenient supply of books from the library, the Committee contemplate making some further improvement, so that every facility of obtaining them may be afforded to the members. Among subjects, such as the "Flax-plant," "the Linen Manufacture," and others of direct practical bearing on daily life around us, there is a wide field of profitable inquiry yet, so far as we are concerned, unexplored; and fully sensible of the important aid the friends and members from the country can render, everything that can be done has been thus attempted to engage their co-operation, and the Committee anticipate the result with hope and confidence.

There is still cause of regret in the Society's limited accommodation, owing to which the extension of the museum is seriously impeded. This is to be deplored from the importance of this appendage to an Institute like ours, but especially from the fact, that many members are prepared to present to the Society interesting specimens in geology, natural history, and antiquities; and from the want of proper accommodation, the Society is not in a position to avail itself of the kind offer. However, during the past year, some difficulties that threatened the well-being of the Society have been overcome, and a very large amount of prosperity has been enjoyed; and with a cheerful and hopeful spirit would we anticipate the removal of this and every other obstacle that lies in the way of future usefulness and efficiency. The museum is specially desirable as a means of interesting those who, from many circumstances, might not be able to watch the progress of the Society for any length of time, but to whom a collection, such as is easily attainable by us, would present tangible and distinct evidence of progress and position.

Having thus given a view of what is being done, the Committee would bespeak not only an increased but extended interest in behalf of this Society. It is true that the defence of the liberties of Europe has imperatively demanded the best and bravest of Britain's sons; and it is true that all men look with thrilling interest to the issues of the strife; but, if knowledge be power—and we know it is—there is all the more reason why we should seek the peaceful triumphs of knowledge. Who knows not that extending science has diminished to an amazing extent the loss of human life in actual war? Enlightenment at home must ever strengthen our power abroad. And who can tell what impulses may be communicated to minds even by efforts such as ours? Edward Gibbon beguiled the hours of his sickly youth with such books of history as came in his way, till the foundation was laid on which rested his great work, "The Decline and Fall of the Roman Empire." Clarkson wrote a prize essay in Cambridge on the subject of Slavery. His energetic mind was aroused in the process of preparation, and he asked himself, at last, "must not some one begin the attempt? Might not I?" And the answer to the question was seen in the mighty movement at the close of which Britain laid twenty millions of money on the altar of freedom! And who can tell what intellects among us, yet to be powerful for good, may be now receiving into their virgin soil the seed of actions of which history shall, in future days, take charge? And if not—if no future Arago, or Owen, should be among us—yet the aggregate of human happiness shall not be unincreased. In pursuits like ours there is a present reward. As the coral insect continues to build, without knowing the beautiful isle of which it is laying the foundation, so let us labour, and One there is who will evolve the proper issues.

Extraordinary activity now marks the human mind in the pursuit of the true, the beautiful, and the useful. Though the caloric ship has not crossed the Atlantic, the north-west passage has been discovered. This very activity, however, needs to be guided, directed aright, and controlled. The circumstance of being in an association where the mature experience of some may temper and direct the ardour of others, is favourable to useful exertion; and with motives to effort so powerful, and encouragements so abounding, the fault must be our own if we reap not both pleasure and profit.

T. R. ROBINSON, CHAIRMAN.
B. P. DAVIDSON, SECRETARY.

The Librarian, also, read the following report:—

LIBRARY.

MR. PRESIDENT AND GENTLEMEN—In presenting you with a report of the library and reading department of our Society, I regret I cannot lay before you a

regular statistical statement of the actual number of times that the lending volumes in the library have been lent out, because the figures would give you no adequate idea of the state of matters in this respect. During the past year there has been much irregularity, in consequence of members detaining some of our very best books longer than the time allowed by the Society, and continuing to detain them after having been noticed to return them. Although this state of things has caused many complaints, I am happy to be able to inform you that a decided improvement has taken place during the last two or three months, and the books are now being circulated more regularly among the members.

At the close of the year 1853, the number of persons taking out books from the library was 62; at the close of the present year, the number is 98, showing an increase of 36.

Several volumes have been added to the library during the past year. In the year ending October, 1853, there were 273 volumes in the library; in the year just ended, there are 325 volumes—being an increase of 52 volumes.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 1, 1854.

Dr. Andrews, President, in the Chair.

Dr. Dickie read a notice on specimens of the axolotl, from the Lake of Mexico, where it is abundant, and is highly prized as an article of food. It belongs to the perenni-branchiate reptiles, so called from the persistence of gills which co-exist with the usual pulmonary or air-breathing apparatus. The axolotl in general appearance resembles the tadpole of the common water salamander, but is much larger—being, when fully grown, eight or nine inches long. Cuvier examined two young individuals procured by Humboldt, and came to the conclusion that it might be the immature or tadpole state of a gigantic salamander. This idea he subsequently abandoned; the view in question is still, however, held by some zoologists. Dr. Dickie entered into details regarding the organization of the axolotl, and of the perenni-branchiates generally.

Mr. MacAdam exhibited specimens of sandstone from Scrabo, having upon them ripple marks similar to what may be observed at the present time on sandy beaches, and which were evidently produced by the action of sea water many thousand years ago.

Dr. Dickie stated that he had observed in the east of Scotland similar markings on recent dry sand at some distance from the sea, and which had been caused by the action of the wind.

NOVEMBER 15, 1854.

Dr. Stevelly, V.P., in the Chair.

The President of the Society, Dr. Andrews, read a paper on the Art of Photography. After alluding to the early attempts of Wedgwood and Davy to copy the fleeting picture of the camera, by receiving it on a sensitive chemical surface, which, although attended with partial success, led to no practical result, from the impossibility of subsequently fixing the picture, the author gave a short historical account of the more recent discoveries of St. Victor, Daguerre, and Talbot—the two latter of whom especially may be considered as the founders of the present art of photography. The processes now chiefly in use for obtaining light pictures were then briefly described, and the chemical actions which accompany them explained. The causes of the imperfections in photographic representations of natural objects were fully considered—one of the most important of which arises from the circumstance

that certain visible portions of the solar spectrum produce scarcely any effect upon the sensitive surfaces usually employed, while other portions of the spectrum, which produce no impression upon the organs of vision, act with great energy upon the same surfaces. In conclusion, the many interesting applications which this art has already received were shortly alluded to.

An interesting discussion followed the reading of this paper, in which Doctor Dickie, Professor Stevelly, Mr. MacAdam, and other members took part.

DECEMBER 6, 1854.

Dr. Dickie, V.P., in the Chair.

Mr. Stephen Archer read a paper on the Geography of the Ancient Greeks. It commenced by noticing the inferiority of the ancient Greeks to the Phenicians in the art of navigation, and in a knowledge of the earth's surface—the prevalent opinion being that round the dry land there existed a circumfluent ocean, from which the principal rivers flowed into the Mediterranean, and that, on the outer boundaries of the ocean, there was a chaos or mixture of the elements. Allusion was then made to the opinions of Homer, Hesiod, Thales, and Anaximander—the last of whom may be considered as the founder of geographical science. He was the first to form a map or chart, which he had engraved on a tablet of brass. The rivalry of the Greek and Phenician navigators was then noticed. A short abstract was given of the chapter of Herodotus on Scythia; and a comparison was made of the tribes mentioned by him—viz., the Scythians, Cimmerians, Sarmatians, Anthropophagi, Argasippi, Tauri, &c., with the present inhabitants of the Russian empire. The Ural and Altai mountains, so celebrated for their produce of gold, were mentioned by Herodotus, but he did not give their names. The Tauric Chersonesus, or modern Crimea, with its Greek settlements and interesting legends, was then adverted to; also Sinope, and the warlike nation of Amazons. The paper concluded with an inquiry into the origin and language of the Turks, and allusion was made to the Mantchous, Tungusians, and other inhabitants of Northern Asia.

DECEMBER 20, 1854.

Robert MacAdam, Esq., V.P., in the Chair.

Before commencing the business, resolutions were adopted, expressing the deep sorrow felt by the Society for the lamented death of one of their most distinguished Honorary Members, Professor Edward Forbes, of the University of Edinburgh; and the Secretary was directed to transmit a copy of the resolutions to the bereaved family of the Professor. A paper was then read by Dr. Dickie on the "Relations of Position, Number, Form, and Colour in the Flower." Proofs were, in the first place, adduced that all the parts of the flower are homotypes with the leaf; the transition from leaf to bract, from the bract to the calyx, and from the latter to the corolla, being often sufficiently obvious. The ovarium or seed-vessel, in general aspect, frequently presents a nearer approach to the leaf-type than some other parts of the flower; in the stamen the relation to the leaf is frequently not so evident; in the water-lily and allied plants the stamens, however, have an obvious resemblance to the petals, and in double flowers all are alike. The law of the spiral regulates the position of leaves, their alternation being thus explained—The opposite and whorled positions of leaves in some plants are modifications of the alternate, owing to shortening of the axis. The flower and its parts consist of a series of whorls upon a short axis, and, as in whorls of leaves, those of each series stand opposite to the spaces between those in the next, so that the pieces of the calyx alternate with those of the corolla, and so throughout, and no plant is known in which all are opposite to each other. Relations of number are not less evident; the two great types of flowering plants called exogens or dicotyledons, and endogens or monocotyledons, have the parts of their flowers regulated principally by the numbers, five and three, respectively—presenting thus an interesting relation between the structure of the flower and that of the stem, of the leaf, and of the seed. When the pieces of the calyx and of the corolla are of the same size and form,

these parts are called regular, when not so, they are irregular; some forms of the latter are peculiar to certain natural families, and we observe fixed conditions of form and colour. The colours of plants are regulated by generally understood principles—viz., that a certain primary colour is associated with a certain secondary, which is its complement—that is to say, the two together contain all the elements of white or compound light. Relations of structure of position, and of number, have long been familiar to botanists; such betweeen colour and form are not less obvious and interesting. In regular corollæ there is not only uniformity in the size and shape of the different pieces, but also in the distribution of the colour or colours, when, as is often the case, two are present, and these two a primary and its complement. When the corolla is irregular, so also is the distribution of the colours; and in flowers whose parts are arranged on the quinary type, the piece, called by botanists the odd lobe, may be usually distinguished by its colour, which differs from that of the others.

CORK CUVIERIAN SOCIETY.

DECEMBER 6, 1854.

PROFESSOR BOOLE, LL.D., in the Chair.

Professor Murphy read the following paper

ON THE ANACHARIS ALSINASTRUM,

And produced some specimens taken from the Bishop's brook. The plant is a native of Canada and other parts of North America, in which five or six species are found. This weed has attracted a good deal of public attention in England during the past few years, from its tendency to choke up drains and obstruct the navigation of canals and rivers. The species (alsinastrum) is said to have been first observed in Britain, in 1842, by Dr. George Johnston, of Berwick, who found it growing in the lake at Dunse Castle, in Berwickshire. It was also discovered in the Junction Canal, at Market Harborough, in Leicestershire. Attention was drawn to it by Mr. Babington, in a paper read before the Botanical Society of Edinburgh, in December, 1847. It was next observed by Mr. Marshall, of Cambridgeshire, in August, 1852, at which time it was also noticed by many persons in different parts of England. He thinks it was introduced by a seed, or a portion of the living plant attached to timber floating down some of the rivers of Canada. Mr. Babington thinks it may have been introduced with aquatic plants from America. The Anacharis, when once introduced, would, in a few years, spread into any connected water system from one end to the other, and is thus supposed to have been disseminated through the midland districts of England. A bit of it was planted in Cambridge Botanical Gardens, whence it got into the Cam, and it needs no longer be sought for; it may be found everywhere, in more or less quantity, from Cambridgeshire downwards, choking up the mouths of docks, sluices, and narrow watercourses, and in the upper portions of the river, impeding both navigation and drainage. If it should continue in anything like the same ratio as it has done, the upper parts of the river will no longer be able to pass their waters to the sea, and the navigation interest may surrender to the railways what little remains to them of the carrying trade. That it is already a source of annoyance to our watermen is evident by the universal complaints which have been made of the obstructed state of the River Cam. Sluice-keepers complain that masses of it get into the pen, and when the slackers are drawn, the openings are choked, and the operation of letting boats through is greatly impeded. The railway dock at Ely became so choked with the weed that the boats could not enter until several tons of it had been lifted out. Rowers, too, found it interfere with their amusements; and swimmers remarked

that it clung to them like "scratchweed," and that if they were overtaken by a lump of it, they were likely to be entangled and dragged by it into deep water. Even the fishermen complained that they could no longer ply their nets so freely as they were wont, and discontinued setting their hook-lines—*i.e.*, lines laid across the river with a series of hooks attached—because the "new weed" either carried them away bodily or stripped them of their baits and fish. Lastly, the drainage was seriously impeded. So much for the "behaviour," to adopt the expression of Mr. Marshall's, "of the Anacharis alsinastrum in England." As respected the origin of the specimen exhibited, Mr. Murphy said his son had brought a small piece of it, with other aquatic plants, in 1850, from Trinity College Botanic Gardens. These he planted in a small pond, fed by a spring which issued from the lands of Ballygaggin, and which pond was intended to contain the aquatic plants of the proposed botanical collection of the School Farm. The Anacharis was forgotten, but in the following summer it appeared, forming a dense tuft, a beautiful object, at the bottom of the pond. It extended itself rapidly, and by the autumn had nearly occupied the whole of the little reservoir, which was then cleared of it; but it soon recovered possession, and, at length, overpowered and destroyed all the other aquatics. The overflow of the pond falls into the Bishopstown stream, and there, especially in the still parts of it, as in the bathhouse beneath Mr. Haycroft's nursery, it has established itself. In the more rapidly-flowing parts it has insinuated itself amongst the stones at the bottom, but does not appear able to master the current. It is not found higher up the stream than the point where the water discharges itself from the pond; and, fortunately, as this is so near the sea, it cannot, from the locality, extend itself injuriously, as it has done in England. Its introduction into Ireland is also attended with mystery. The Anacharis belongs to the monocotyledonous class, and is dicœcious—in other words, staminiferous and seed-bearing blossoms are produced on separate plants. The English plants are all female; but not having seen it in flower in Ireland, he was unable to say whether it is male or female, or both. Every bit of it is capable of throwing out roots and forming a distinct plant. Anacharis belongs to the natural family Hydrocharidacea, which includes, amongst numerous others, the interesting Vallisneria spiralis, which, like Anacharis, bears seed and staminiferous flowers on different plants, and concerning which the beautiful fiction has been invented of the stamina-bearing flowers ascending to the surface of the water, being separated from their stalks, and floating with the current amongst the style-producing flowers. Being anxious to ascertain its value as manure, he had asked Dr. Blyth to determine the amount of its contained nitrogen and phosphoric acid, and the result, which was much more favourable to it as a manure than he anticipated, was, that in its wet state, as taken from the water, it contained 0.24 per cent. of nitrogen, and, when dried, rather more than 3 per cent. It contained a considerable amount of lime, and a very little phosphoric acid, in the shape of phosphate of iron. The per centage of nitrogen would lead us to expect very beneficial results from its application as manure. Farm-yard manure, as determined by Boussingault, contained, when dried, only 2 per cent. of nitrogen —in the wet state, 0.40. The Anacharis, as taken from the water, and merely shaken, contains 90 per cent. of water; but the farm-yard manure examined by Boussingault contained as much as 80 per cent. of water. The Anacharis, in its moist state, contains, weight for weight, nearly as much nitrogen as the straw of corn in its ordinary dry state; and a very valuable application of this plant would, therefore, be, should it ever become sufficiently abundant, to use it as a bedding for cattle—for which purpose it would become sufficiently dry in a very short time in fine weather.

Dr. Porter exhibited a curious growth in the branch of a laburnum tree—the lower part of the tree being thin, while the upper part was thick, and threw out several branches. This the learned doctor attributed to damage done to the surface of the branch, and the juice thus obstructed caused the unnatural thickness observable.

DUBLIN NATURAL HISTORY SOCIETY.

NOVEMBER 17, 1854.

Doctor Croker, M.R.I.A., in the Chair.

The preliminary business having been disposed of, the donations sent to the Society during the recess were laid on the table.

Thanks having been returned to the donors, Mr. Andrews, Honorary Secretary, read the Annual Report of the Council.

The sixteenth Annual Report of the Society is now submitted; and, taking into consideration the circumstances of the last twelve months, your Council have every reason to be satisfied with the position the Society maintains. The steady support given by the members is most gratifying, and the interest and usefulness of the subjects brought forward during the past session, the following general outline of the proceedings will convey:—The first ordinary meeting of the session was held in the month of December, 1853, at which Dr. Kinahan gave a paper "On the occurrence of the Reddish-grey Bat (Vespertilio Nattereri)." In that paper Dr. Kinahan remarked on the very limited knowledge we possess of the bats of this country—animals whose habits were but little known and but little studied. At the time, Dr. Kinahan considered this to be the second record of its occurrence in this country—the first being brought to the notice of the Society by F. M'Coy, Esq., in 1845, who presented it from G. Mangan Esq., and as the first record of its capture in Ireland, having been killed at the Scalp, county of Dublin, near Enniskerry. The specimens obtained by Dr. Kinahan were from Levitstown, county of Kildare, where he, at the same time, captured the Pipistrelle bat (Scotophilus murinus). It adds much to the interest of a collection, when the habits and peculiarities of objects brought to notice are accurately noted, as in the instance of the paper communicated by Dr. Kinahan. The habits of the Pipistrelle bat, he observes, differ much from that of Nattereri; its flight and turns are more rapid and sudden—its cry shriller—much more wary and dodging in avoiding capture, and still more remarkable from that of Nattereri by its fœtid odour. The Pipistrelle appeared of less common occurrence—impatient, squealing, and vindictive when captured; while Natterer's bat was gentle, submitting to be handled without biting, and merely gaping with its mouth, uttering a low chirp. At a former meeting Dr. Kinahan had submitted a specimen of a bat, of which he had some doubts as to the species; and now, on comparing the characteristics of Nattereri, he was inclined to consider its characters to partake both of Vespertilio Daubentonii, and V. mystacinus, *Bell*. In conclusion, he submitted a local list of the animals of a part of Carlow, Kildare, and the Queen's County, from the observations of F. Haughton, Esq. Mr. Andrews, one of the Honorary Secretaries, then gave a paper "On an Addition to the Ornithology of Great Britain." In the introductory part of the statement, he alluded to the climate, geological features, and peculiarities of seasons, as affecting much the geographical distribution of animals and plants. The south-west of Ireland, from its extreme western position and temperature, possessed many of the characteristics of the western shores of Portugal and Spain; hence, many instances of local peculiarities had been noticed in the botany, ichthyology, and marine animals of the coasts, identical with those of the Pyrenees, and of the shores of Portugal and the Mediterranean. The present notice, however, was one of far greater interest than any that had hitherto been recorded as a visitor to this country. It was that of the membranaceous duck (Malacorynchus membranaceus), a native of Australia, and of rather local occurrence in that country. Six of these singular birds were observed, during very severe weather in the month of February, feeding on the soft slob in Castlemaine Bay, county of Kerry; and the beautiful specimen which Mr. Andrews submitted was the only one shot out of the flock. The continued severity of the weather prevented further approach to them during the time the birds were observed in that bay. Until this most singular occurrence of this bird on the shores of Kerry, it was not known but in Australia.

Mr. Andrews described the characteristics of this handsome duck, deriving its name from the loose, angular skin attached to the upper mandibles. It is termed "Wrongi" in New South Wales, and known as the pink-eyed duck by the colonists of Swan River. At the same time was also noticed the capture of the dusky petrel (Puffinus obscurus), in the month of May of the same year, off the Island of Valencia; and also the obtaining, in Dingle Bay, the young of the greater shearwater (Puffinus major), but termed Puffinus fuliginosus of Strickland, and, at the time, considered to be distinct from the great shearwater (Puffinus cinereus). Mr. R. J. Montgomery exhibited a specimen of the great cinereous shrike (Lanius excubitor), and the black-cap warbler (Motacilla atricapilla), both shot by him in Beaulieu Wood, county of Louth. The shrike, or butcher-bird, was the fifteenth of its record in Ireland. Mr. Andrews noticed that it had been communicated to him by Mr. Blackburn, of Valencia, that the turnstone (Strepsilas interpres), with four young ones, unable to fly, were taken, in the month of June, near the old revenue station, in that Island, being confirmatory of the breeding of that bird in Ireland. At the meeting, in the month of January, of this year, Professor Allman stated some observations that he had made on a remarkable peculiarity of the adventitious roots of "Jussiæa Grandiflora." The remarkable condition he observed, was in a specimen of this plant which grew in the College Botanical Gardens. Some of the roots which proceed from the nodes of the stem, instead of growing downwards, so as to fasten themselves in the mud in the bottom of the water in which the plant grows, assume an ascending direction, and grow into the air, where they present a very remarkable appearance, looking like portions of rush-pith attached to the stem of the plant. A microscopical examination of these roots exhibited peculiar structures of exceedingly delicate stellate cells—the intercellular spaces constituting air chambers of a very remarkable character in the vegetable kingdom. In the woody fibres of the same plant, Professor Allman discovered the remarkable peculiarity of their being filled with starch granules—a state of prosenchymatous tissue almost unique in the vegetable kingdom. This was followed by a paper from Mr. Andrews "On the Harbour Fish of the south-west coast of Ireland," principally relating to those fish that were permanent residents in harbours and estuaries, and those that visited such localities for the purposes of spawning. He alluded to the great attraction and interest afforded in the Zoological Gardens of London, by the arrangement of those extensive tanks in the vivaria, where the habits, modes of progression, and the seeking of food, which influence marine animals, form a pleasing study to the accurate observer, who is thus enabled to detect important facts in their economy and habits, which the silent depths of their haunts veil from inquiry, and render observation of, conjectural. In the enumeration of the several genera and species, Mr. Andrews described the habits, characters, and localities of some rare and beautiful species he had obtained on the south-west coast, and concluded by noticing positions where extensive store-ponds could be formed, and in which the habits, and spawning states of our deep-water marine fish could be traced, and where not alone important physiological facts could be arrived at, but the accumulation of stores of fish, which would be available at seasons as a valuable traffic. Mr. Callwell said, the subject brought forward was one of great interest and value, both to the scientific and to the practical. He could confirm, with regard to the fisheries, how useful the formation of such store-ponds would be. At the Island of Innistrahull, about six miles from Malin Head, off the coast of Donegal, the islanders supplied vessels with fish on passing the island. They had fine whale boats; and during the fishing seasons brought the fish alive, which they placed in a store-pond, naturally formed in the island; and they were thus prepared to put turbot and other prime fish on board the steamers on the passage from Sligo to Glasgow, or to Liverpool. Mr. Ffennell, Commissioner of Fisheries, commented on the importance of the concluding part of Mr. Andrews's statements; and as bearing on the artificial propagation of fish, he noticed the operations carrying on in the salmon fisheries of this country. He read a report communicated by Mr. Buist, of Perth, and stated the system of the propagation of the ova of the salmon, by Mr. Ramsbottom and by the Messrs. Ashworth, in Lough Corrib, the experiments in progress at St.

Wolstans, and those of Mr. Doherty, at Bushmills. He also alluded to his own experiments at the Custom-house, and described the progressive growth and development of the young salmon fry, which had been of such attraction in the Exhibition, and which were still thriving well. At the meeting in February, Mr. Andrews again brought forward some notices with regard to the membranaceous duck, as he had received reliable statements fully confirmatory of the fortunate circumstance of its capture in Castlemaine Harbour. He entered more fully into its character and affinities; and, through the kindness of Mr. and Mrs. Blackburne, of Valencia, he had the opportunity of exhibiting the specimen of the dusky petrel (Puffinus obscurus) which had been caught off Valencia; also the Manx petrel, and the egg taken with the nest in the cliffs of the same island. Mr. Andrews also exhibited the egg of a petrel, which had been brought to him from the smaller Skellig Island, and which, on being compared with specimens of petrels' eggs in the British Museum, bore strong resemblance to the egg of Bulwer's petrel (Thalassidroma Bulweri). Dr. Kinahan, in observing on the interest of the facts of birds breeding in parts of the country where they were only considered as occasional visitants, mentioned his belief that siskins breed in Rathgar and Donnybrook, in the county Dublin. In Powerscourt woods and in Tipperary, he had met those birds as late as the end of July. He had no doubt but that the red-wing sometimes bred here, and likewise the black-cap warbler. The next paper, on the same evening, was by Dr. Kinahan, "On the Reproduction and Distribution of the Smooth Newt, and notices of the popular superstitions relating to it." Doctor Kinahan's attention being directed to the examination of a great number of these animals in the neighbourhood of Dublin, he had the opportunity of watching the earlier stages of development of the only species met there, the smooth Newt (Lissotriton punctatus). These remarks were with reference to the habits of the smooth Newt, its mode of depositing its eggs, and development of the ova, and which, closely watching through the different stages, led him to dissent in many points with the conclusions arrived at by Mr. Higginbotham (whose statements appeared in the "Annals of Natural History" for the month of December, 1853), and in the belief of Rusconi and others; but that his observations could corroborate most fully the views of Professor Bell. Dr. Kinahan then entered into details of the several parts of Ireland and peculiar localities the smooth Newt most commonly occurred in, mentioning the provincial terms and superstitions relating to it in different districts. In the month of March, Mr. Gilbert Sanders gave the result of a series of microscopical examinations of the genus Desmarestia (the species ligulata), being a marine alga, of common occurrence on our coasts, but in which no trace of fructification had hitherto been detected. Mr. Sanders's observations led him to believe that he had detected the spores, indicative of fructification, in the species ligulata, and he demonstrated the forms of the tubercles on the pinnæ, which he regarded as conceptacles and superficial. If further investigations enabled him to maintain the views he had formed, there could be no hesitation in removing that genus from the order Sporachnaceæ to Dictyotaceæ, or probably the constitution of a new genus. He had not been able to detect any appearance of fruit in either of the other species—D. aculeata or D. viridis. Mr. Sanders exhibited and made some remarks on D. pinnitinervia, which had been added to the marine botany of the country by his friend, Mr. Sawers, of Londonderry. Dr. Kinahan followed, by a paper "On the Injury done to fry in fish-ponds and vivaria, by the smooth-tailed sticklebaek (Gasterosteus leiurus)." In this paper, Dr. Kinahan noticed the extreme voracity of the sticklebaek, or pinkeen, and gave the observations of C. Brunetti on its destructive habits in destroying the fry or young of the goldfish, by greedily attacking and biting away the pectoral and tail-fins of the young fish, and eventually causing their death. In the review of the habits of the sticklebaeks and their distribution, Doctor Kinahan exhibited much power of observation, so essential to a naturalist, and an untiring energy in following out the most minute details of interest on the subject. Common as its distribution would appear to be, there was a district in the north of Clare, around Feakle, where it was utterly unknown, even by name, its place being taken by the smooth loach (Cobitis barbatula); and the gudgeon, which, in general, is a local fish, swarmed there in abundance. The minnow was also unknown there. In the

neighbouring counties the smooth-tailed stickleback is plentiful. In addition to the list of fish which he had given with reference to the Dodder, he could now add the introduction of the dace (Lenciscus vulgaris). Mr. Andrews exhibited some recent specimens of fish, with reference to his paper on the harbour fish of the south-west coast; among them were fine specimens of Crenilabrus tinca, C. cornubicus, and C. gibbus, which were all referable to one species—that of C. tinca. These were taken in Dingle and Ventry harbours, county of Kerry, and also specimens of Crenilabrus microstoma. A plant of Scolependrium vulgare (var. marginatum) was exhibited by Dr. Kinahan, found by him at Tinnehinch, county of Wicklow—being its first record as Irish. The peculiarities of the forms discovered in England by Sir W. C. Trevelyan and Mr. Wollaston were mentioned, and a series of specimens, illustrative of the remarks, exhibited. In the month of April, Mr. Ffennell, Commissioner of Fisheries, submitted very full details with regard to the salmon fisheries of this country, and dwelt very forcibly on the great importance of scientific inquiry in the promotion of practical knowledge. He mentioned the interest taken in the experiments he was carrying out in the growth of the young salmon fry, and which induced a Dr. Merron, Professor of Anatomy in one of the London colleges, to visit Dublin, for the purpose of understanding the system of those operations. Dr. Merron was interested in the formation of a company for the object of transporting the ova, and propagating the salmon in the rivers of New Zealand. In commenting on the failures last season of the experiments of the Messrs. Ashworth, he alluded to some peculiarities in the habits of the male and female salmon in the spawning season. Under the aid of the Board of Public Works, he had projected a salt-water enclosure at Kingstown, and he doubted not but that the young fry would there thrive, and reach mature growth when transported at the proper season. He was satisfied that enclosures of inlets and estuaries on our coasts, might be converted into valuable fish parks. Mr. Andrews made some observations on the restocking of our rivers by artificial means, and alluded to the causes affecting lakes and rivers, which might influence the seasons of the early and late breeding fish, and of the periods of their condition. Mr. Andrews then made some slight allusions to the Syngnathidæ, or Pipe-fish family, and mentioned that several that he had obtained on the south-west coast were identical with the species occurring on the shores of Finland and in the Baltic, particularly the two varieties of S typhle. Dr. Kinahan then read a paper "On the Abnormal Forms of Ferns." In this statement he elaborately entered into the characteristics of aberrant forms of variety and subvariety, of permanent and non-permanent continuities, and of the peculiarities of venation, division of frond and fertility, submitting a very extensive list of these forms of the several species of British ferns. At the meeting in May, Mr. Williams, in presenting to the museum specimens of game fowl from Ceylon, made remarks on the peculiarities of the breed, which differed in the carriage of the tail from all the known varieties of domesticated poultry. He noticed the distinctive characters of the Cingalese fowl; and, if disposed to speculate on that question, might be inclined to refer the Ceylon fowl to the Gallus furcatus, which is wild in Ceylon. Mr. R. J. Montgomery made some remarks on the peculiarity of locality of the nest of the cole-titmouse (Parus ater), and upon that of the little grebe (Podiceps minor). Dr. Kinahan called the attention of the Society to two bats presented by him, and upon which he had formerly made remarks, referring one obtained by him in the county of Clare, in 1852, to Vespertilio Daubentonii; the other, obtained in the county of Kildare, in 1853, to V. Nattereri; though, at the same time, he pointed out differences from the description of that bat. He now, through the kind assistance of Professor Bell, could refer the one captured in Clare to the Vespertilio mystacinus, a species new to Ireland, and the other bats to V. Daubentonii. Thus the Society's collection included V. Nattereri, V. mystacinus, and V. Daubentonii—the two first being as yet unique as Irish. Doctor Farran followed, with a paper "On Helix pisana, and its localities." In presenting a beautiful series of the shells of this local mollusca (designated *cingenda*) to the Society, he was anxious to clear up the vagueness of its hitherto-named localities, by reducing to a certainty the extent of its distribution as an Irish species. He gave some details with regard to this beautiful shell, and observed that it may be obtained at Laytown, Bettystown, and up to Drogheda—these places being

continuous with Knockangin. On the strand of Knockangin, near Balbriggan, Scalaria Turtoni had been found, and named in honour of Dr. Turton. Dr. Kinahan had obtained Helix pisana rather abundantly near Baltrae, on the north side of the Boyne, and also very fine specimens on the south side of the Boyne. Dr. Kinahan, on the same evening, gave a continuation of his paper "On the Abnormal Forms of Ferns," bearing out his former observations, and adducing many views in support of a systematic arrangement of all those varied departures from the original type which their several gradations might justify. Mr. Williams then made some remarks on the opinions advanced by Mr. Ffennell at the last meeting, with reference to the habits and periods of spawning of the salmon, and read a communication that had been forwarded to him by a gentleman experienced in the river fisheries of the south, more especially those of the Bandon river. The next month, June, Mr. Andrews gave a paper, "Observations on the Salmon, the Parr, and the Gravelling." This paper was a review of the several opinions that had been given upon the subject at the two previous meetings, and of the observations that Mr. Andrews had made on the habits of the salmon and on the peculiarities of the western rivers, noted by him from his inquiries in connection with the fisheries. Some confusion prevailed with reference to the young fry, in classing all the young states of the salmonidæ as the parr or gravelling, and such to be the young of the salmon. Sufficient distinction had not been understood as to the characters of the young salmon fry, nor as to the periods of their several changes of growth. Most of the salmonidæ and species of trout presented very strikingly in the young state the peculiarity of the transverse bars; and Mr. Andrews was satisfied, that in many of the clear, gravelly, and swift-running trout streams of this country, a species similar to the description of the parr, figured in Yarrell, having the dark spots on the gill-covers and the transverse bars, were to be met at all seasons, and that they were distinct from the young of the salmon, at the same time; in those rivers frequented by salmon, the salmon fry, at different stages of growth throughout the year, exhibit the transverse bars, and dark spots on the gill-covers. The practised eye of the scientific ichthyologist can at once detect the symmetry of form, and peculiarity of the pectoral and caudal fins, that distinguish the young of the salmon before assuming the smolt state. These views, however, have fully appeared in the proceedings of the Society, and which Mr. Andrews at the meeting illustrated by a complete series of the specimens of the young of the salmon in its early stage and in its migratory dress, and also the parr; the young of the white trout and of the brown trout, brought from the Bandon river, county Cork; the Laune and Caragh rivers, Kerry; and the Greece, in Carlow. Dr. Kinahan, in connection with the subject (the spawning of fish), exhibited recent specimens of the nidus and ova of the smooth-tailed stickleback, taken the previous day in the Dodder. He gave an account of the habits of this little fish on the spawning ground, and its extreme pugnacity in defending the nest. Further observations made by Dr. Kinahan on ferns and their varieties, and his examination of the extensive collections of Dr. Allchin and G. B. Wollaston, Esq., had cleared his doubts as to how far varieties combine *inter se*. Dr. Farran expressed a hope that a greater number of ornithological facts would be in store for the ensuing session, and mentioned the occurrence of a flock of male wheatears he had noticed at Knockangin, in April last, feeding in the manner of flycatchers, and the singular fact of the total disappearance of the Brent goose (Anser Brenta) from the Dublin market. These proceedings and remarks terminated the session; and your Council trust that the Society has maintained throughout the transactions its course in a scientific as well as in a popular style, and that the subjects on the natural history of this country, brought before the meetings, have proved original, useful, and instructive.

On being moved by R. Callwell, Esq., and seconded by Doctor Farran, the Report was unanimously adopted.

The donations made to the Society during the last session were detailed under their several heads by Dr. Kinahan.

The Treasurer then submitted his statement, and observed that he had only to reiterate the views expressed by him at the last annual meeting, as to the continued prosperity of the Society. The expenses had been heavy, but he was gratified to announce that he had a balance in hands of £88 10s. 1d.—£45 of which had been carried to the credit of the sinking fund account.

The Chairman then read the result of the ballots, that the following gentlemen were unanimously elected to serve for the ensuing year:—

Council—Professor Allman, F.R.S., M.R.I.A.; Joseph Anderson, Sir Edward Borough, Bart., M.R.I.A.; Thomas F. Bergin, M.R.I.A.; F. W. Brady, Chas. Croker, M.D., M.R.I.A.; J. R. Dombrain, Charles Farran, M.D.; Samuel Gordon, M.D., M.R.I.A.; W. H. Harvey, M.D., M.R.I.A.; John Hart, M.D., M.R.I.A.; Robert John Montgomery, James Edward Stopford, LL.D.; R. P. Williams, M.R.I.A.; Gilbert Sanders, M.R.I.A.

Treasurer—Robert Callwell, Esq., M.R.I.A.

Secretaries—William Andrews, M.R.I.A.; J. R. Kinahan, M.B.

And that Lord Talbot de Malahide, the Ven. Archdeacon West, Charles Domville, James M. O'Reilly, and Henry M. Barton, Esqrs., were elected members of the Society.

The meeting was then adjourned to the second Friday in December.

DECEMBER, 8, 1854.

GILBERT SANDERS, Esq., M.R.I.A., in the Chair.

The minutes being confirmed, letters were read from Professor Bell, J. O. Westwood, and E. Newman, Esqrs., expressive of their gratification and thanks at being nominated honorary members of the Society.

Dr. Kinahan mentioned that Mr. E. Newman, author of the "British Ferns," had sent a package of his "complete list of British Ferns" for distribution among the botanical members of the Society.

Dr. Kinahan presented to the Society some specimens of crustacea—Portunus holsatus (Stenorhynchus phalangium), Crangon vulgaris, Pandalus annulicornis—and stated, it had been his intention to have completed the collection, as far as practicable, but that circumstances had arisen within the last few days which would prevent his doing so; he hoped at some future day, however, to give the Society a paper on "The Shore or Drift Crustacea of the South Coast of Dublin," as from this source he had obtained nearly three-fourths of the species recorded as Irish, including, amongst others, Atelecyclus heterodon, Portunus holsatus, P. pusillus, P. variegatus, Corystes cassivelaunus, Hyas coarcatus, Cancer pagurus, Carcinus mænas, Pagurus Bernhardus, P. Prideauxii.

Thanks having been given for the donations,

Mr. Andrews, on being called on for his paper

ON AN ADDITION TO THE FAUNA OF IRELAND,

Said, it was with much regret he heard this evening that the Society was about to lose the services of Dr. Kinahan, who had informed him that he was shortly to embark for Australia; and as it would be some time before he would again be present at the meetings of the Society, Mr. Andrews would waive the priority of his paper, in order that Dr. Kinahan might have time to record his views with regard to the paper he had in the list for this evening. Mr. Andrews said he would make a few remarks on some fine specimens of crustacea, which he presented to the Society, being the first of a series he intended to give towards forming a complete set of the Irish crustacea. These were fine specimens of Stenorynchus phalangium and tennirostris, taken in Dingle and Ventry harbours, coast of Kerry, and also large specimens taken in deep water, in the trawl, in Dingle Bay, with Inachus dorsettensis and Corystes cassivelaunus. He also presented several species of Paguri, or hermit crabs, taken in the shells of Pleurotoma and Natica, at the depth of 84 fathoms, off the Blasket Islands. Mr. Andrews mentioned that he met with many minute species of crustacea in that depth of water, taken up in a small dredge with the pebbly and shelly soundings, as Pandalus annulicornis, and the common prawn. Palœmon serratus was also taken at that depth, and the latter was found in quantities in the stomachs of the cod fish, taken on the long lines. Mr. Andrews presented specimens of Palœmon serratus thus taken. Although the specimens of crustacea in the collection of the Society were at present by no means perfect, yet he would mention that very complete lists of the Irish crustacea had

been noticed and recorded in the proceedings of the Society. So far back as the 3rd of January, 1845, Dr. Farran read a paper, the result of an extensive series of observations of the late Mr. William M'Calla, enumerating a very full list of the collections made by him on the west coast of Ireland. Those lists contained the record of the discovery of Thia polita—the original specimen being in the museum of the Society. A notice of it was also made by Dr. Scouler in the "Annals of Natural History" for March, 1846. Yet, in a very recent publication of the British crustacea, by Professor Bell, the entire credit of adding this interesting Mediterranean crustacean to the Fauna of Britain is given to Dr. Melville, of the Queen's College, Galway. Mr. Andrews did not impute the slightest desire or intention on the part of either of those gentlemen to deprive of credit where it was due, but he blamed them for the absence of reference to what had already been accomplished in the natural history of this country. Mr. Andrews intended to bring forward a general recapitulation of the proceedings of the Society, in which many facts of interest would be noticed with regard to the late Wm. M'Calla, whose zeal and intelligence had been great, and whose ardour in the pursuits of natural history had not been surpassed in this country.

Doctor Gordon begged to move a vote of thanks to Mr. Andrews for his donations, as one who had always been indefatigable in promoting and forwarding the interests of the Society.

This being seconded by Dr. Farran,

Mr. James Haughton, jun., read a paper

ON THE COLEOPTERA INFESTING GRANARIES.

He said—Mr. Chairman and gentlemen—Having, for some time past, had frequent opportunities of observing the habits, &c., of many of the coleoptera which infest the granaries in this city, I beg to bring before you a few observations which I have recorded about them, in the belief that any facts concerning even the most insignificant insect, cannot fail to be of some interest to those to whom their habits are not generally known. In the summer season many of our corn stores are visited, in vast numbers, by the weevil tribe, which commences depredations on a scale which, I think, classes them amongst the most destructive of all insects. To give an idea of the mischief they are capable of committing, I may mention, that previous to the repeal of the corn laws, when the duty upon grain was very high, wheat, which had remained in bond for a length of time, frequently became so infested with them, that it might actually be seen shifting its place on the lofts from the movements of the living mass contained in the heap, and, in some instances, the portion left, not being worth the duty, had to be thrown out; also, an instance of a loft of wheat, containing 1,000 barrels, having, in a few months, become deficient upwards of fifty barrels, in addition to a depreciation in the value of the remainder of about ten per cent.—almost all of which loss was caused by the common corn weevil (Calandra granaria). From the foregoing statements, it is obvious that it is of great importance to find out some way by which these mischievous insects can be destroyed without injury to the grain. The wheat to which I have last alluded was Egyptian, which, from its excessive dryness, is peculiarly suited to the multiplication of the species. A curious fact connected with them is, their propensity for gathering into masses in one place. The amount of heat they generate when thus collected is quite surprising, and is even more observable when the wheat in which they are stored is in sacks, instead of being thrown loosely on a loft. On applying the ear to the outside of a sack in which there are many weevils, one can quite distinctly hear the buzzing and crackling noise caused by the incessant boring going on inside. When the grain is stored in bulk on a loft, and removed from its contact with the walls, the weevils creep out in immense numbers, and are then easily swept up and destroyed. I myself have seen many malt shovelsfull taken away in a single day. I have brought with me some of the weevils, of which it will be easily perceived there are several kinds, and also some wheat bored by them, which will give a good idea of the ravages they commit, as, in many instances, nothing is left of the grain but the outside shell or bran. Most workmen about corn stores assert that they bite wickedly; but, although I have constantly been on

lofts on which they abounded, I can say, that as regards myself, I have never been bitten. They are very susceptible of cold; and on the approach of winter, if the day be chilly, I have seen them falling in great numbers off the walls, &c., on which they may have crept. If it was not that the cold kills them, the mischief they would do would be incalculable, as they multiply exceedingly fast, and are very active during the continuance of the hot weather. Another fact in connection with them is, the partiality they have for collecting in or on places where water has been dropped. I have seen small spots covered with them to the depth of about half an inch. This may, perhaps, be accounted for by their crawling on blindly, and so becoming entangled in the wet. I do not, however, think this likely, as they must have gone out of their usual course to get to the damp portion of the flooring. This is a curious fact in opposition to their usual custom of selecting the driest and warmest places they can find. By their borings in wheat they cause a large quantity of dust to accumulate, which, mixed with the Nile mud, which is always more or less through Egyptian wheat, makes, as I am credibly informed, an exceedingly fertilizing manure, almost equal in its forcing effects to guano. I regret that my information as to species, &c., is too limited; but, as I have not studied them scientifically, I hope I shall be excused on that head. Their appearance under a microscope, exposed to a moderate magnifying power, is exceedingly beautiful, and agreeably disappointing to one who has only seen them with the naked eye. They are covered with brilliant spots, bearing some resemblance to those on the elytra of the diamond beetle. I tried several modes of killing them, and found hot water the speediest. Chloroform (which will destroy without injury almost any insect) also kills them; but if put into cold water, and left for a considerable period, when taken out and placed in a moderately-warm situation, they, in many instances, recover, although to all appearance quite dead. With respect to chloroform, it may not be out of place to say that I have found it the most humane, and, at the same time, the quickest, way of killing, without injury, butterflies, moths, beetles, and, in fact, most insects; and even if it is dropped on the most delicate insect, the evaporation is so rapid that it does not injure it in the slightest degree; whilst a few drops, put into a box with the most refractory butterfly or moth, kills it in a few seconds.

The Chairman said, he heard with much pleasure Mr. Haughton's statements, and they were such that characterized the proceedings of the Society, and which rendered its transactions of practical utility. He wished that gentlemen similarly circumstanced as Mr. Haughton would turn their attention to noting such observations, which might tend to result in much useful information.

Dr. Kinahan said he could, from his own observation, corroborate Mr. Haughton's statements as to the number and destructiveness of these insects. On examination, he found there were evidently six coleopterous and one dipterous species present among the corn. These he submitted to his friend, A. R. Hogan, Esq, who kindly examined them, as well as the packages of insects taken from the wheat—in which latter, Mr. Hogan detected another species of coleopterous insect. From Mr. Hogan's list it appeared that the most numerous species present were Calandra oryzæ and granaria, as well immature as full grown. These two species made up the great bulk of the heaps. Next in point of numbers came Corticaria ferruginea and Cor. pubescens, in about equal quantities. The other species present were Stene ferruginea and Silvanus surinamensis—this latter detected by Mr. Hogan. Beside these there was a single species of a beetle as yet unindentified. These, with a single specimen of Tenebrio molitor, make out no less than eight species of granivorous beetles infesting the parcel of corn.

Dr. Kinahan then gave his paper

ON A DIGITATE VARIETY OF BOTRYCHUM LUNARIA, AND A NEW IRISH LOCALITY FOR LOPHODIUM SPINOSUM.

As far as I can learn, this interesting form of the common moonwort has been hitherto undescribed, differing so obviously as it does from the forms described as rutaceum and matricarioides. Its chief interest is, I take it, twofold—first, as showing the relation between forms of venation, which appear distinct; and, secondly, as throwing not a little light on the true

homologies and relations of the fruitful "branch," as it is called, in this plant. Strikingly it differs from the linear outline of the ordinary form, with its simple pinnæ and flabelliform venation, whilst this form has a deltoid outline, and the lower pinnæ decompounded, with pinnatified pinnules, and a distinct mid-rib, and secondary venation springing therefrom, being exactly the converse of the variety of Blechnum spicant, which I exhibited before you, under the name of dissectum (Kin.), and which Francis first described as strictum, in which we found the ordinary linear pinnules of that fern reduced to simple pinnate lobes, and the venation, instead of being made up of secondary veins, springing from a median axis, reduced to the flabelliform arrangement, which is the normal arrangement in Botrychium. But it is in the second point I think its chief interest consists; for taking this form in connection with two other abnormal forms—viz., that in which we find the pinnæ deeply incised at their edges, and that in which we find many of the pinnæ soriferous at their edges—we are led to believe that these two portions of the ordinary plant of Botrychium, generally called branches, really represent the two surfaces of an ordinary dorsiferous fern, only that in one the venations take on the flabelliform, and in the other the branched form; for, examine those fronds whose pinnæ are soriferous at their edges, and we see the nerves coalescing, and forming a sort of a mid-rib to the division of the pinnæ, on whose termination the sorus is placed; nearly the same arrangement as we find in the deltoid form just described, where we find the nerves uniting and forming a common mid-rib, on whose sides the secondary divisions of the pinnæ are placed. Going a little farther—this may lead us to believe that the form of Ophioglossum vulgatum, where we find two leafy fronds developed instead of one leafy and one fertile frond, are really only plants whose fertile element, from some reason or another, is not fully developed, but remains as a barren frond. That this is the correct explanation of the change is shown in one specimen, in which one half of the frond is normal, the other of the deltoid type; and also in the Blechnum spicant, where, even in the same frond, we see parts in which the usual linear pinnæ are preserved, and others in which this, if I may call it so, flabelliform type is well shown; while by comparing the common form with this variety the interchange of the two types is well seen. In conclusion, I have the pleasure of recording a new Irish habitat for Withering's fern (Lophodium spinosum, Newm.), which I met with, in some quantity, on the edges of the bog drains in Annagh Inch, parish of Dorrha, county Tipperary. Its occurrence as Irish has been previously made known by Lovat Darby, Esq., in the county Monaghan.

Mr. Wakeman begged to present to the Society two heads of cows, with the horns, which were obtained at Dunshaughlin, in digging turf. They were found in a bog, where a lake once existed, but is now dried up, and in the centre of which was traced a Crannog, or fortified island. There appeared to have existed there a fortified encampment, and where, among animal remains, the bones of horses, cows, and an extinct species of pig were discovered; also other animals, besides weapons of war and ornaments. The heads of these animals before the meeting appeared of some antiquity, belonging to the tenth century, and illustrated the kind of animals in Ireland at that period. He thought that such a notice came within the province of inquiries of the Society, and he would be happy, on a future occasion, to give more full details of the subject.

The thanks of the Society having been unanimously given to Mr. Wakeman,

Mr. Andrews said, that in concluding the business of the evening, he would again allude to the intended departure, from this country, of his brother Secretary, Dr. Kinahan, but that his absence, however, would not be for more than a year. He was sure the members would respond to his sincere and best wishes that he would be successful in his enterprise, which was most cordially concurred in.

The meeting then adjourned to the month of January.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

NOVEMBER 4, 1854.

R. Ball, LL.D., President, in the Chair.

Mr. Wright having announced the following donations to the Library, viz.:—

"The Twenty-second Annual Report of the Royal Zoological Society for Ireland," from Dr. Ball;

"The Naturalists' Repository," by E. Donovan, F.L.S., five vols., from a Lady;

"The Commissioners' Report of the Fisheries of Ireland," from J. W. Ffennell, Esq., Commissioner of Fisheries;

"The Natural History Review," Vol. I., from the Editors; and

"Insecta Maderensia," by T. V. Wollaston, Esq., from the Author;

The best thanks of the Association were ordered to be given to the several donors.

Dr. Ball mentioned that the special thanks of the members were due to Mr. Wollaston, for his donation of his "History of the Coleoptera of Madeira;" it had been published in a very costly manner; and he hoped this splendid gift would induce some of our other members to add to the formation of our Library.

The President demonstrated the method he had adopted for the æration of the aquatic vivaria in the gardens of the Royal Zoological Society. He stated that a house had been constructed, round which twelve tanks had been erected, so that the sides of the tanks, being inserted in apertures of the wall, and being framed, present, from the interior of the house, the appearance of so many animated pictures. Above the tanks so placed, is carried a leaden tube, from which proceed twelve small gutta-percha tubes, the ends of which are perforated with small holes, and lie along the bottoms of the tanks, concealed in the rockery; the leaden tube is connected with a simple blowing-machine, worked by a handle, which may be used by a visitor. On pumping, air is forced up from the bottom of each tube in small bubbles, and presents a highly ornamental appearance; whilst its value has been proved by the improved condition of the many fishes and other animals contained in the several tanks. It is intended to apply this process to the breeding of salmon ova; and, with some modifications, it appears to promise success.

Mr. A. R. Hogan read the following paper from J. Walter Lea, Esq., Corresponding Member:—

NOTES ON THE DIURNAL LEPIDOPTERA OF SOME PORTION OF WORCESTERSHIRE.—PART I.

Fruitful as several of the midland counties of England are in Lepidoptera—as, for example, Warwickshire, which is famous—none that I have in any degree explored surpass, if, indeed, they equal, the productiveness of Worcestershire. Judging from the success which I have met with in but a comparatively small portion of the county, I should think that a careful search throughout the whole might be rewarded with the capture of a considerable portion of our valuable butterflies. The district—which I have explored more or less accurately at various times between the years 1840 and 1850—is not very large, including the neighbourhood of Bewdley, bordering on Shropshire, and the right bank of the Severn, from that town nearly to Worcester, taking in part of the Malvern, and the Abberley Hills; also, the neighbourhood of Kidderminster. It is a favourable district, even at first sight, as it includes woods, commons, marshy places, hills, valleys, and river sides—in a word, most varieties of country. Various circumstances have prevented me from doing anything like as much as I ought otherwise to have done in the time; and I dare say that good work during two summers would be a perfect equivalent for my long-interrupted and rather desultory investigations, extending over a period of nearly ten years. The arrangement and nomenclature which I have made use of, are those adopted by Mr. Westwood in his beautiful work, undertaken in conjunction with Mr. Humphreys. I insert the names of all the allowed species, in hopes that the experience of others may be able to fill up some of the vacancies.

Papilio machaon. Not observed.
,, podalirius. Do.
Goniapteryx rhamni. Common.
Colias edusa. Not found.
,, hyale. Do.
Pieris brassicæ. ,, chariclea. ,, rapæ. ,, metia. ,, napi. ,, sabellicæ. } All in abundance. P. sabellicæ not so common as the others.
,, daplidice. One specimen, not far from Bewdley.
Euchloe cardamines. Abundant.
Leptoria caudida. Pretty freely taken near Astley, and in Bewdley Forest.
Aporia cratægi. Found several times near the Astley and Shrawley Woods.
Melitæa artemis. Found, but very rarely, near the Valley of the Teme.
,, cinxia. Not found.
,, athalia. Do.
,, selene. Very common, especially on the west side of the Severn.
,, euphrosyne. Common in same localities as the rest.
,, dia. Not found.
Argymnis lathonia. Only one specimen, near Woodbury Hill.
,, adippe. Only one specimen, at Astley; but I should expect that, both in this and the following case, the solitary instance of capture must have been accidental, as neither insect is generally accounted rare; and several of the other Fritillaries usually found in similar localities, are sufficiently abundant in the district in question. The fact is, however, rather singular, or else I have been very unfortunate with these species.
,, aglaia. One specimen, at Astley.
,, paphia. Not uncommon about Abberley and Shrawley Wood.
Vanessa C. album. Very abundant, west of the Severn; comparatively rare, however, on the east side of the river; and about Kidderminster and Wolverley I have scarcely ever found it. Probably this may be owing to the fact, that in this portion of the district the hop is not cultivated, as it is on the other side of the Severn; and though the caterpillar of the C. album feeds on many plants besides hop, particularly the nettle, I have always found it much more abundant wherever the hop is cultivated. The difference in proportion for the two sides of the Severn would be, at least, 60 to 1 in favour of the right bank. I have frequently observed very great variations, not only in the colour but the form of the wings of this insect; one of the most curious of which is, that the projections which form the extremities of the scallops in the posterior wings are divided, so as to present the appearance, in some cases, of a furcated cauda, where the projections exceed the ordinary length; and this peculiarity I have occasionally noticed in every similar projection, on both the anterior and posterior wings, though very rarely in the former. When the scallops chance to be less deep than ordinarily is the case (and I have found them almost obliterated), this formation has a very peculiar effect. There are numerous variations in the markings of the wings, the bars traversing the discoidal cells being represented (particularly the inner one) by separated and well-defined spots of black or, more properly, velvety brown; and the ordinary spots, also, vary exceedingly in number and depth of colour, as well as in arrangement. The earlier evolved specimens are generally darker than the later ones; and I have noticed that the darker specimens are less liable than the others to the singular variation in the form of the wings which I have noticed above, and also have the scallops commonly deeper. As there are two broods in the year, it is possible that these peculiarities of structure may be found principally in the later

one, which is generally paler in colour than the brood appearing in the end of June. I have met, however, with more variations of all kinds in this species than in almost any other butterfly; and I should think that, in any ordinary season, I could have collected an almost complete series of gradations from the type to the greatest deviation from it, within the limits of the district which I have mentioned.

Vanessa polychloros. This insect I have taken several times, particularly in the neighbourhood of Astley; but have never found it in any great abundance. One or two specimens may be obtained in ordinary seasons from the above-named locality, and very probably more than that number if carefully hunted for; I never looked particularly for them.

,, urticæ. Very common.

,, io. Ditto.

,, antiopa. Not found; but I strongly suspect it might be met with, as these are places very favourable to it.

,, atalanta. Very common.

Cynthia cardui. Far from uncommon, particularly about Astley, and on the right side of the Severn generally.

Apatura iris. I have not taken this insect myself in this district, and am rather surprised at it, excepting for the reason that I have not made *express* search for it. I have very little doubt that it is to be found, and should be glad if any one could inform me that it has been caught there. The locality is, at the least, as favourable as those in the neighbouring county of Warwickshire, about Coleshill, and Merivale Abbey, and Coventry; and in Leicestershire, about Bardon Hill, on the confines of Charnwood Forest; in which places it is to be found, or, at least, was, between 1840 and 1843, when I was hunting in those neighbourhoods. The only other locality which I personally know as producing it, is near Warminster, in Wiltshire; but none of these places are more favourable than this district in Worcestershire, where there are oaks and sallows in abundance. It is chiefly to be met with in the southern counties of England, but by no means exclusively. I am acquainted with one or two other districts towards the middle of the country, where I expect it may be found, though I have not seen it there myself; but being, unfortunately, very short-sighted—which is a bad failing for a Lepidopterist—my failure, especially in such a case as that of the A. iris, is not of any great consequence, nor can it weigh much against the districts in question.

Limenitis camilla. Unquestionably very rare; but to be found about Bewdley Forest occasionally, and scattered over the wooded district between the valleys of the Severn and the Teme. It seems, however, to be somewhat fitful and uncertain in its appearance.

Also, the following note, from the same gentleman, in reference to a cholera-like disease which he had found to attack Lepidopterous larvæ:—

"On June 21, I took eleven fine and apparently healthy caterpillars of the Lasiocampa roboris, not far from Dover, within a distance of about two miles. The next day I gave two of them to a friend, and kept the rest. They have been constantly supplied with abundance of fresh food, and have eaten well; and one or two of them have moulted since I had them, and seemed healthy and lively afterwards. About a fortnight ago one of them seemed sluggish and ill—the finest of the whole number—and, in a day or two, died—its skin tearing, and the inside running out. Since that time four others have died in the same way, as well as the two which I gave my friend. The four remaining ones seeming very languid and weak, I examined them carefully, and found them infested by numbers of minute white mites, semi-transparent, with smooth, globular bodies, six legs—the posterior pairs considerably longer than the others, and two rather long antennæ. They concealed themselves principally at the roots of the hairs, and in the folds of the skin, between the segments of the body, and ran very quickly if disturbed. I found many of them on the body of the caterpillar which moulted a few days ago, and died this morning; and numbers on the remaining four which yet survive. I cannot, as yet, determine whether they live entirely on the surface of the body,

or penetrate also beneath the skin. In one or two cases the caterpillar has been attacked by a violent diarrhœa for one or two days before death; in one case the anal segment of its body rotted away. I expect to lose the remaining four specimens, as all are ailing, and the hairs are coming off, as was the case, more or less, with the others.

"Is this a common occurrence, or an accidental one? The complaint seems epidemic about here now; a caterpillar of Odonestis potatoria in my keeping has just died of a similar disease, and one or two of other species, some of my own, some in the possession of a friend. Is there any way of removing the disease, or guarding against it? I shall be glad of any information on the subject, as I never before had any caterpillars attacked in a similar manner."

The Rev. Joseph Greene mentioned that he had lost a fine specimen of the larva of the rare Notodonta trepida by a disease similar to that mentioned by Mr. Lea. In *his* case he observed a number of mites in the folds of the skin, and these he suspected were eventually the cause of the death of the individual. He had also noticed, that in one compartment of his breeding-cage, three inches square, containing two larvæ, one of them was attacked, while the other remained perfectly free from the parasites which caused the other's destruction.

Mr. Wright read the following note from Robert Warren, jun., Esq., dated Moy View, Enniscrone, Co. Sligo:—

"My Dear Sir—I have the pleasure of informing you that I have ascertained the locality of a fresh-water breeding station of the common gull (Larus canus). It is at Lough Talt, in the centre of the range of Ox mountains, in this county. Lough Talt is completely surrounded by heath-covered mountains, and is situated about ten miles from the sea-coast. It is about one mile in length, and half a mile in breadth, with one or two small, rocky islets on which the gulls build. When I visited it, although so late as the middle of July, I found the nests containing eggs (upon which the old birds were sitting), and saw several young birds flying about, and between four and five pairs of adults. As the lake is strictly preserved, and no one is allowed to molest the gulls, it is to be hoped that their numbers will increase rapidly."

Also the following from Robert Davis, Esq., of Clonmel:—

"My Dear Friend—About the middle of this month (July), 1852, I had sent me, from a part of the Bog of Allen, near Killemaule, an egg of some unknown bird, which I have since been unable to get named until a few days ago, when having transmitted it to a good judge, he, on careful comparison, pronounced it to be that of the Eared Grebe (Podiceps auritus, Selby). As I am not aware of any instance of this bird being found *breeding* in this country before, I lose no time in communicating it, through you, to the Association. This bird itself is very rarely met with here, and only in the immature plumage."

The President stated, that out of a large collection of shells, &c., which had been collected by Professor Harvey, in Ceylon, and forwarded to him, he had selected those which were exhibited on the table; among them were some beautiful Helices, which he thought interesting, representing, as they did, the same variations of colour as had been observed in our Helix nemoralis.

The General Secretary announced that, through the kindness of Mr. Callwell, he had been enabled to visit the light-ship, which had just returned from the Conabeg station, in hopes of obtaining any marine shells or animals that might have adhered to her during her sojourn at that place; however, owing to the vessel being copper-sheathed, he found nothing save a few mussels (Mytilus edulis), which hung by their byssus from the bolt heads attached to the rudder; he trusted he might be more successful in future examinations, particularly on vessels returning from a long sea-voyage, which he would be able to inspect, through the kindness of the Commissioners of the Ballast Office, who expressed the greatest willingness to co-operate with the Association.

NOVEMBER 25, 1854.

R. Ball, LL.D., President, in the Chair.

Professor Robert Smith, of Trinity College, being proposed and seconded, was elected an honorary member; the Rev. Dr. Romney Robinson and Richard

Dowden (Richard), Esq., were elected corresponding members; and Robert Barton, Joseph Greene, and George Norris, Esqrs., were elected ordinary members of the Association.

The President then stated that the following resolution had been agreed to:—

"Resolved—That the members of the Dublin University Zoological Association have received, with extreme sorrow, the President's announcement of the premature death of their excellent corresponding member, the late Professor Edward Forbes; they deeply sympathize with his many friends at the loss which, as individuals, they have sustained, and with naturalists, generally, at the death of one whose well-ordered mind and high talents had so much contributed to raise to its present philosophical character zoological study, and from whom, in the eminent position he had obtained, much was expected for the future. They call to mind, with melancholy gratification, the interest he evinced for the progress of the Association, the valuable advice he gave at its formation, and the lucid information he afforded when he attended its meeting."

Dr. Ball stated, that the collection of Artic Zoology would not be exhibited until he could secure the presence of Captain M'Clintock, who would then give much useful information about them.

Mr. Lamprey read the following letter, from his brother, Dr. Lamprey, of the 15th Regiment, Ceylon, Corresponding Member:—

"Kandy, October 9, 1854.

"My Dear Brother,

"My boy brought me the insects and the wool-like substance which I enclose in this letter—the history and description of which I will endeavour to give; and, perhaps, some of your entomological friends will be able to recognise them. I was struck, some time ago, by observing a white, wool-like substance, of a beautifully fine texture, and very strong, on a leaf of a white-blossoming plant (*Datura*, I think); and on opening it at the time I found a quantity of small eggs, which I fancied were the eggs of a spider; but I mislaid the specimen, and thought nothing more of it till my servant-boy brought me another specimen, which he found on a leaf of a mulberry (*morus*) plant. Unfortunately he tore it nearly off, but I think you will be able to understand what it was like when you refer to the diagram and examine the enclosed. I observed a number of larvæ crawling about the leaf, and thought that they were those of the common horse-fly. On examining them a few days after, I found them very torpid. When I first got them, I put some on a piece of raw beef, and others on a piece of plantain, to ascertain whether they subsist on animal or vegetable substances; but they touched neither; on the contrary, they died soon after.

"Unfortunately I was sent to an out-station to do duty, and was not able to observe them further; but on looking into the box in which I left them during my absence (about three weeks) I found that, instead of torpid larvæ, there were a number of flies scattered all around, and all dead. I was much disappointed, in every sense of the word, and am puzzled to find out whether one fly, as small as the enclosed, could manufacture such a large quantity of silk. That the silk is not the product of a caterpillar, I have every reason to believe; and you can ascertain this point by opening the mass, and you will not find a chrysalis, or anything indicative of such a fact; and my finding eggs in an earlier stage, sufficiently satisfies me on *that* score. The larva, before changing to the fly, formed a chrysalis of its own in the substance of the wool, which you can see; perhaps you may also find a matured fly unescaped.

"It would be a valuable discovery if it could be ascertained how to rear the insect which produces this substance, as its texture is so beautiful—of extraordinary fineness, strength, and purity of colour (white).

"I will endeavour to send you a variety of the same, which I found attached to the walls of a garden well; but the animal producing it is aquatic, and the substance, though four times the size, is slimy, and, I fear, too bulky to send by post. I found masses on the leaves and stems of the trees overhanging the water, as well as on the wall of the well. I have sent my boy out for a specimen. The variety I first described is not very common, and but occasionally met with."

Mr. Hogan exhibited the following Coleoptera, which had been taken near Dublin, since he read his list:—Bembidium flavipes and Xantholinus tricolor, by Mr. Haliday; Elaphrus riparius, Stomis pumicatus, Patrobus rufipes, Dytiscus punctulatus, and Olophrum piceum, by Dr. Kinahan; and Leistus fulvibarbis, Geotrupes vernalis, and Salpingus planirostris, by himself.

Dr. Kinahan then read the first part of a

LOCAL LIST OF BIRDS FOUND IN THE COUNTY DUBLIN.

This list does not pretend to include all the birds that have been found in the County Dublin, but merely those species which have fallen under my own observation. The great majority of them are natives of Donnybrook. The nomenclature adopted is that of Mr. Thompson's work. I have, in a few instances, made observations in reference to habits which I found either contradictory or explanatory of the statement in this work.

RAPTORES.

Falco æsalon. Occasionally all the year round. In the winter it may be seen chasing the larks; I have also, on two occasions, witnessed these birds chasing dunlins—once off Clontarf Island, in 1848, and also at the Pigeonhouse; I have seen either this or the next chasing the common godwit (Limosa rufa). Breeds at Howth.

,, tinnunculus. Common. Breeds in Mount-merrion demesne. This bird preys extensively on birds as well as mice. I have witnessed several instances of its daring and pertinacity. In the year 1849, near Crumlin, I saw it chase a skylark. The poor lark doubled and doubled, the hawk closely following, and keeping above it, and every now and then striking at it with outstretched talons; but the lark was too quick for the hawk, and always dropped, as if shot, whenever the hawk struck. At last the lark took refuge under the flank of a cow, which was lying down near, and the hawk, after soaring round and round for some minutes, flew away. I then, with great difficulty, succeeded in rousing the lark from its strange refuge. The whole time the birds were never more than ten yards above my head, and often not five Another time, in Tipperary, when out shooting, with a companion, we came across some golden plover. Out of these my comrade succeeded in bringing down a brace—one of which fell at his feet, the other at some distance. While my comrade was reloading, I went to pick up the bird which had fallen at some distance, when a kestrel, sweeping past me, stooped and clutched the bird which was lying at my comrade's feet, with which he succeeded in getting off. This was in September, 1849. I might mention many other instances of the same kind. This bird also chases the dunlins on the strand.

Accipiter nisus. Our commonest hawk. A pair may be constantly seen about Merrion-square, and the south side of the city; it is equally daring with its congeners just mentioned.

Buteo vulgaris. A fine specimen killed in Killiney last year; now in the Royal Dublin Society's Museum.

Circus cyaneus. About Donnybrook. A winter visitant only, and then but occasionally; it preys on the larks, which flock at that season, and I have seen it capture them on the wing in the Bishop's Field. I have, at Rathgar, seen it dash at, and clutch a redwing out of a thick thorn hedge. It does not confine itself to such small game always, as I find a note of one carrying off a wounded grouse from me, when shooting in the county Tipperary, in 1848; this feature in its history has been alluded to by Thompson. I have seen the bird constantly on the Three-rock Mountain and the ridges in its neighbourhood.

Otus vulgaris. I have seen specimens from Clondalkin and Stillorgan.

Strix flammea. Common.*

Other raptorial birds are found in the county Dublin, but these are all I have met myself.

* Strix nyctea.—It may be of interest to mention, that on the 28th December, 1853, I saw a pair of these birds at Annagh Inch, county Tipperary.

INSESSORES.

Muscicapa grisola. Not uncommon; breeds in Donnybrook. I have met it at Clondalkin and Roebuck.

Cinclus aquaticus. In our mountain glens common. I can, from personal observation, testify to this bird's powers of walking under the water, as I have seen it several times; the bird possesses the power not merely of walking but also of remaining stationary under the water; and, during the period of its submergence, it appears like a ball of quicksilver, arising, as I take it, from the oiliness and texture of its feathers. The study of its habits will well repay any observer. I have seen the bird as low down the Dodder as Milltown.

Turdus viscivorus. Scarce about Donnybrook, but breeds with us. In the mountain glens it is more frequent. Dr. Drummond, in his translation of the "Chase of Glenismole," has fallen into an error in giving this bird, with its harsh, inharmonious song, credit for being the species from whence the thrush valley got its name. All the species of Turdus are found here, this being the rarest. I have seen this bird, and the two next following, on several occasions, in the College Park, in this city.

,, pilaris. A winter visitant; remains sometimes through the summer. Some years ago, when crossing the south side of Howth, I found several dozens of these birds lying dead in the furze, with the upper part of their skulls stove in, and the brain gone—the rest of the bird perfect, even to the eyes. It is the felt, or field-fare of the country folk.

,, iliacus. A winter visitant; sometimes breeds here. I had a young bird which I believe to be this species, I think, in 1850; it was brought to me as a young thrush; its underwing coverts, red; over the eye, a broad white stripe; the remainder of its plumage resembling that of the missel-thrush; the bird pined away and died.

,, musicus. Common. This bird paired here in June, with the next. The nest was robbed. The thrush was the hen, the cock the blackbird.

,, merula. Common.

,, torquatus. Local. The Three-rock Mountain and Kilmathogue Hills are tenanted by a few pair. I once, many years ago, saw a specimen of this bird killed, in December, at Roebuck.

Accentor modularis. Common.

Erythaca rubecula. In 1849, a pair of these birds built their nest, hatched, and reared their young, in a small watering pot, which was lying in the centre of a grass plot, beside a frequented walk, at Moorefield, Roebuck. I saw the nest myself when it had three eggs in it, one having been broken by the pot having been shifted. The nest and pot were presented to the Trinity College, Dublin, Museum by my friend, Dr. Wm. Haughton.

Saxicola rubicola. Common.

,, œnanthe. Common in the mountain glens.

,, rubetra. Scarce. I have shot this bird several times in the winter—on the 12th December, 1847, and, again, on the 25th of January, 1850, at Salthill.

Salicaria phragmitis. Donnybrook; general.

Curruca hortensis. This bird I introduce in doubt; but, I think, it has occurred once, at least, at Donnybrook.

,, cinerea. Common; breeds.

Sylvia rufa. Common. The earliest date I have seen this bird was March 10, 1849; the latest, September 26, in the present year.

,, trochilus. Common.

Regulus cristatus. Common; but rather local. I have found this bird's nest in the bank of a ditch, concealed under the leaves of the yarrow (Achillea millefolium).*

Parus major. Common; breeds.

* I believe I have met with the fire-crest (R. ignicapillus), as, in December, 1849, I shot, at Ranelagh, a bird answering to its description, especially in the markings on the cheeks.

Parus cæruleus. Common; breeds. I met an instance of this bird's building in the inside of a pump, which was in constant use.

,, palustris. The rarest of our tits. It has only come under my notice at Donnybrook in four instances. On one occasion I shot a hen and three young birds at one shot.

,, ater. Rather scarce at Donnybrook.

,, caudatus. A winter visitant only at Donnybrook. Breeds at Rathgar and in the Phœnix Park.

Motacilla Yarrellii. Common.

,, boarula. Do.; but rarer than last.

,, flava. Rare; local. I have met this bird on the Dodder and at Rathgar.

Anthus arboreus (?). I shot a bird in the winter of 1847, which I believe to be of this species.

,, pratensis. Common.

,, petrosus. Strands; common.

Bombycilla garrula. A specimen shot at Sandymount, in 1852.

Alauda arvensis. Common.

,, arborea. Occasional. Bred here in 1850. In the previous winter I had remarked the bird in "bunches" along with A. arvensis.

Plectrophanes nivalis. Pigeonhouse-wall.

Emberiza miliaria. Rather a rare bird in Donnybrook; a pair or two build every year there.

,, citrinella. Very common.

,, schœniclus. Rare; at Donnybrook; one pair generally build here yearly.

Fringilla cœlebs. Very common.

,, montifringilla. Rare. I shot a hen bird, in the winter of 1847, at Donnybrook, and a pair, in the same locality, February, 1848.

Passer domesticus. Very common.

Coccothraustes chloris. Common; flock in the autumn, and feed on the seeds of the grasses.

,, vulgaris. I met one of these birds in the neighbourhood of Rathgar, in the summer of 1851; I have also met them in the Phœnix Park.

Carduelis elegans. Rare at Donnybrook; in the Dodder glens frequent; breeds at Donnybrook; also found at Kingstown.

,, spinus. An occasional visitant and resident. I first met this bird, December, 1846, on Sandymount Marsh, on the alders; there were a pair, and one of these I shot the following February. I again met them, in large flocks, at Major Sirr's, Ranelagh, in company with the lesser redpole, feeding on the alders. These birds remained there from December, 1847, up to April, 1848. During 1847 there were a pair which, I believe, bred in the Bishop's Field. I found a male also, as noted, in Sandymount Marsh, January 25, 1849. I have seen them also in Rathgar.

Linaria cannabina. Common.

,, minor. Do.

,, flavirostris. A winter visitant during three years; these birds bred, in some low shrubs, in the Bishop's Field, in numbers. These shrubs are now pulled up, and last year I saw only one pair.

,, borealis (?). I have several times met individuals resembling this species; but it is very difficult to distinguish between it and L. minor.

Pyrrhula vulgaris. A very rare bird at this side of Dublin. I have only seen one in the Bishop's Field during the last eight or nine years; they sometimes, however, occur in large flocks in the neighbouring plantations.

Sturnus vulgaris. Very common.

Corvas corax. Killiney Hill and Dodder valley.

,, corone. A young bird of this species was shot by my brother, J. H. Kinahan, Esq., in the Bishop's Field, some years ago.

,, cornix. Too common.

Corvas frugilegus. Very common.
,, monedula. Too common.
Pica caudata. Common.
Garrulus glandarius. A single pair seen in Stillorgan Park.
Certhia familiaris. A few pair about Donnybrook.
Troglodytes Europæus. Common.
Cuculus canorus. Scarce about Donnybrook; common, however, in the County Dublin generally, especially about Mountpelier and Clondalkin, at which last locality, on the 17th June, 1848, I had, while in company with my friend, Dr. W. Haughton, the pleasure of having the truth of LeVaillant's theory, concerning the manner in which this bird deposits its egg in its future niches, entirely confirmed. My friend succeeded in winging a female cuckoo as she was rising; she fell into a ditch, owing to the depth of which several minutes elapsed before we could get her out. Having obtained the bird, I proceeded to kill her, by pressing on her breast, having my thumb on the cavity formed by the *os furcatum*, when I felt something slip from under my thumb, with a gurgling sound. Dr. Haughton, attracted by the sound, turned at the same moment, and we both saw an egg in the act of falling to the ground, from whence I picked it up, perfectly uninjured. This egg agrees with all descriptions I could obtain, and on being shown to Dr. Ball, he at once recognised it as a cuckcoo's. On dissection by Professor Allman, the bird proved to be a young female, and had in her ovary two full-grown eggs, one ready to pass into the oviduct. No remains of eggs could be detected in her stomach, even when examined with a powerful microscope. Full details may be found in the Appendix to "Thompson's Birds," page 442. The egg and the skin are in the collection of the Dublin Natural History Society.
Alcedo ispida. Occasionally met with on the Dodder, at Donnybrook; abundant higher up the river.
Hirundo rustica. Common; used to breed in Donnybrook Church.
,, urbica. Common.
,, riparia. Do.
Cypselus apus. Do.
Caprimulgus Europæus. I have seen a specimen from Howth.

This concludes the list of the Raptorial and Insessorial tribes. On a future occasion, I hope to give a list of the Rasorial, Grallatorial, and Natatorial families found here.

After some conversation, the meeting adjourned.

DECEMBER 16, 1854.

ROBERT BALL, LL.D., President, in the Chair.

H. T. Stainton, Esq., Mountfield, Lewisham, Kent, was elected a corresponding member.

The President gave a demonstration on the Coracidæ, being in continuation of a series illustrative of the collection in the University Museum, and exhibited various species remarkable for the brilliancy of their plumage, especially the Trogon resplendens.

Mr. A. R. Hogan exhibited a coloured drawing, by J. Walter Lea, Esq., corresponding member, of a remarkable variety of Pieris daplidice (?), taken by him in Worcestershire, and read the following extract from his letter:—

"The distinctions between the present insect and the Pieris daplidice are obvious; all the dark markings on the anterior wings, and the difference of the marks on the costal edge, which in the new Pieris rather follow those of the Vanessæ. Moreover (though this is scarcely perceptible in the figure), the small branch emitted from the third branch of the postcostal nerve, close to the apex of the fore wing, which Mr. Westwood mentions as typically characteristic of the Pierides, and as being wanting in P. daplidice, is found in this other species. The wings also are more transparent, the markings on the under side of the posterior wings being not only much more

perceptible on their upper surface, but are also apparent through the anterior wings where they overlie the posterior. The *form* of the posterior wings widely differs from that of Daplidice, as is clearly expressed in the figure. Another remarkable difference in which the unknown greatly surpasses the Daplidice in beauty is, that while in the latter the light parts of the posterior wings underneath are dull, irregular bands, in the former they take the form of glossy, well-defined spots and patches—some very minute. The gloss is rather satiny than silvery, but still, so far as apparent, approach to the succeeding genera of Fritillaries. The dark portions of the same wings are more dark in this species than in Daplidice, and more heavily irrorated with dark, powdery spots, which give it a green appearance, equal in strength and depth to that of the corresponding parts in Euchloe cardamines. In Daplidice it is much lighter and less bright in colouring. Of my two specimens the new species is distinctly larger than the Pieris daplidice; but my specimen of the latter *may* be rather small."

Mr. Haliday was of opinion that the variety described under the specific name *Bellidice* on the Continent was the nearest approximation to Mr. Lea's specimen; and translated the following description from the work of Ochsenheimer and Treitschke:—

"Daplidice, var. Bellidice, Brahm. Ins. K. 362.—Much smaller; upper side of wings, a strong, black cloud at base, which, in under wings, extends in a broad streak almost to the middle, and there is lost in the ground colour; on the upper wings forms a deep, black streak at the inner margin. The under side of the lower wings, as well as the tip of the upper wings, is dark green, without any yellow tinge, and thickly bestrewed with black specks. The white spots are present pretty much as in Daplidice; but they are smaller, more sharply defined, and form no bands. Occurs at Vienna and Leipzic."

The Rev. Joseph Greene said, that there were such endless varieties among the Lepidoptera, that he was not surprised at this example, which, however, was a very singular variety, at least.

Dr. Kinahan then read the second part of his paper on a

LOCAL LIST OF BIRDS FOUND IN THE COUNTY DUBLIN.

The species enumerated in the following list were all observed by myself; but the list is not so perfect as I could have wished; but, I trust, I may be excused when I inform the Association that I am preparing to leave Dublin early in the following week on a voyage to Australia and Peru. It is my intention to be absent about eleven months; and as I take with me all the articles needed by a naturalist for collecting, I hope on my return to be able to lay before you many interesting details in connection with zoology.

The Rasores are but scantily represented; they are—

Columba palumbus. Donnybrook, and generally. I saw a flock of these birds, containing some hundreds, at Donnybrook, in the winter of 1851. In some parts of the county, as at Portrane, they may be seen, at any season, in myriads.*

Tetrao scoticus. Mountain and common.

Perdix cinerea. Stubbles and common.

Coturnix vulgaris. Donnybrook. This bird remains here all the year round; at least some straggling pairs may be seen in the winter.

This ends the Rasorial Birds.

The Grallatores are as follows:—

Œdicnemus crepitans. A specimen was shot, in my presence, on Clontarf Island, in 1849, by R. W. Atkinson, Esq.

Charadrius pluvialis. Dublin mountains; common; breeds there; Donnybrook; hard weather.

,, hiaticula. Merrion Strand.

* I may here mention, that in the caves at Portrane the common house pigeon breeds annually, in company with Hirundo urbicus, H. rustica, and Cypselus apus. I saw them last year there.

Charadrius cantianus. Clontarf Strand; rare.
Squatarola cinerea. Donnybrook, 1849; Clontarf Strand; Malahide; Merrion Strand.
Vanellus cristatus. Mountain glens; common; Donnybrook; hard weather.
Strepsilas interpres. Merrion Strand; very rare.
Calidris arenaria. Merrion Strand; rare.
Hæmatopus ostralegus. Sea coasts; very common.
Ardea cinerea. Very common.
Numenius arquata. Strand; common; Donnybrook.
,, phæopus. Strand.
Totanus fuscus. Shot this bird at Bohernabreena, in the millrace, in the winter of 1851.
,, calidris. Merrion Strand; rare.
,, hypoleucos. Dodder river and mountain glens; common in summer.
,, glottis. Donnybrook; winter of 1851.
Limosa melanura. Merrion Strand and Clontarf Island; much rarer than the next.
,, rufa. Strand; very common.
Scolopax rusticola. Donnybrook; in hard weather.
,, Gallinago. Do., and Sandymount Marsh.*
,, gallinula. Donnybrook.
Tringa variabilis. Strand; common; occasionally seen on the rivers.
Crex pratensis. Common; some birds remain there the winter.
Rallus aquaticus. Portrane, Baldoyle, and River Dodder; rather rare in Dublin.
Gallininula chloropus. Abundant in the winter; frequents the dry ditches.
Fulica atra. A pair were resident at Sandymount Marsh previous to its being drained.
Anser segetum. Comes to Donnybrook occasionally in hard weather. Wild geese are seen flying over Dublin every winter.
,, albifrons. This species is common in the Dublin market, it sometimes occurs in Donnybrook. I saw a flock of them once pitched in a field near Firhouse. In the county of Tipperary I have counted 250 birds all feeding at one time in the callows.
,, bernicla. Dublin Bay every winter.
,, brenta. Very common on Merrion Strand.
Anas boschas. Donnybrook (used to breed near Ball's-bridge), Merrion Strand, and formerly, also, to be found at Sandymount Marsh, which, however, has been drained within the last few years, and, thereby, this and many other birds have ceased to be residents.
,, acuta. I have seen this bird at Malahide.
,, crecca. Donnybrook, in a quarry-hole in very hard winters; Sandymount Marsh, &c.
,, penelope. Merrion Strand; sometimes in hundreds.
Fuligula ferina. Merrion Strand; rather scarce.
,, marila. Merrion Strand.
,, cristata. Merrion Strand.
Clangula vulgaris. Merrion Strand.
Mergus serrator. Kingstown Harbour.
Podiceps cristatus. A pair of these birds came to Rochford's pond; after sojourning there a while, they were scared away. I had frequent opportunities of examining them, as when first they came they were quite tame.
,, minor. Dodder. A specimen was taken alone this month by a friend of mine, near Classon's-bridge, in this city; the bird easily escapes detection owing to its habit of diving, and only allowing the end of its bill being seen above water.
Colymbus glacialis. Dublin Bay.
,, septentrionalis. Do.

* As a rule, snipes are much scarcer in the County Dublin than in Tipperary, Carlow, or Galway.

Uria Troile. Howth.
,, grylle. Howth.
Fratercula arctica. Killiney and Dalkey Sound, and Dublin Bay generally.
Alca torda. Merrion Strand, occasionally; in the Bay, generally. I have taken this and the preceding alive several times, having been left by the receding tide in shallow waters.
Phalacrocorax carbo. Common in Dublin Bay. In the county Tipperary this bird is met far inland both on Lough Deargh and a little lake called the Pous Lake, near Lorrha.
,, graculus. Dublin Bay. I saw a young bird of this species, within the last fortnight, picking in Kingstown Harbour; the young are a great deal less wary than the old bird. Both these birds have great vital power. I saw one of the preceding species dive, and remain under water for about five minutes, during which time it swam about 40 yards under water; it afterwards swam nearly as far before we caught it; yet, upon dissection, it proved to have been shot through the heart.
Sula bassana. Common in Dublin Bay.
Sterna Dougallii. Dublin Bay.
,, hirundo. Dublin Bay, &c.
,, macrua. Do.
Larus minutus. I have seen this bird on two occasions in Dublin Bay.
,, ridibundus. Common both on shore and inland.
,, tridactylus. Common; in some years, at least, this bird remains all the year round at Ardrone, County Waterford. I have also been forwarded specimens of these birds, found dead in the winter, eighty miles from sea.
,, canus. Common on Merrion Strand and mountain glens.
,, argentatus. Merrion Strand and Donnybrook.
,, fuscus. Do.
,, marinus Do.
Of the Skuas I have seen many, but never succeeded in killing them; therefore, prefer to remain silent as to their species.
Puffinus major. I may here mention, that I have seen two live specimens of this bird, taken at Youghal, County Cork, hooked on gentlemen's lines.
,, anglorum. Howth.
Thalassidroma pelagica. Occasionally, though rarely, in Dublin Bay.

Thus, gentlemen, I have finished the task I had undertaken; I had hoped to have entered more fully into details concerning the species enumerated, but a hurried summons to a distant land has prevented my being able to do so. I must, therefore, apologize for laying this second portion of the list in such an unfinished state before you.

The President said, that he regretted Dr. Kinahan's absence for the sake of natural history in Dublin; but, with his indefatigable love for investigating natural history, his intended voyage would, doubtless, result with the greatest benefit to both himself and the Association; and he was sure he was joined by every one of its members in wishing him a safe and prosperous voyage, from which he, in common with them, would anticipate great scientific advantages.

Some interesting conversation then ensued relative to this paper.

Mr. T. W. Warren exhibited a specimen of the water ouzel, and wished to hear the opinions of the members, as to whether it really possessed the powers of walking beneath the water and diving, sometimes attributed to it.

Dr. Kinahan said, that he had most distinctly seen it walk down a shelving bank into the water beneath it, and that it walked under the surface of the water, without any seeming inconvenience.

Dr. Ball contrasted the form of this bird with that of the Greenland diver, and drew the attention of the Association to the fact, with a view of showing how often the theorizing of naturalists was at variance with observations. The Greenland diver is the perfection of mechanical form for diving; the ouzel wanted this peculiar form, yet it appeared to have equal power in this art.

CORK SCIENTIFIC AND LITERARY SOCIETY.

JANUARY 4, 1855.

WILLIAM DOWDEN, Esq., V.P., in the Chair.

Mr. R. Dowden read a paper, entitled

NOTES ON SOME FAMILIAR FACTS CONNECTED WITH SOUNDS AND HEARING.

Sounds are much affected in the impressions they make by comparison and by attention. It is known that sounds at night are heard much more distinctly than by day—that is, when the places where they are made are liable to the noise and bustle of day activity, and when these noises and bustle subsiding, leave the stillness of night to permit the conveyance of sounds undisturbedly.

That sounds can be drowned by noise we all know; Richard the Third cries out—"Strike up drums, let not the heavens hear these tell-tale women rail on the Lord's anointed." Sometimes, in the calm evening, we hear distant music, which, by day, we could not hear, or distinguish so clearly. Some conditions of the air are described as being more favourable than others for the transmission of sounds; but that subject I do not now enter upon; comparison is my principal topic. Let any person go from Fleet-street, in London, to Ludgate-hill, and he will, of course, observe an increase of uproar; but if he proceed from Lincoln's-Inn Fields, and compare its quietness with Holborn-hill, at mid-day, the contrast will be very remarkable. Taking a tour for another instance, let me come home, and tell you, that the reduction between the distances from the pitch of one noise to another, has here presented curious effects. In a masquerade-room, in Cork, there were some thousand or fifteen hundred masquers talking, shouting, singing; so that the very undertone or buzz of the room had a certain amount of general elevation. One gentleman, who perfigurated as Cornet Allopod, the sportsman and yeomanry apothecary in the play of "The Poor Gentleman," came in his cavalry dress, red, turned up with "rhubarb-coloured lappets;" and, intending to cause a sensation, he let fly one barrel of his fowling-piece; when what was his astonishment to find that, pooh, it made no more noise than a good popgun; this was too bad; he thought he had not rammed down his charge; and, being resolved on gaining distinction, he fired his other barrel; alas, he had the same result; he won no applause, no more than if he had clapped his hands together; but he thus learned, experimentally, the acoustical fact, that the nature of our sound-perceptions are much influenced by comparison.

Raising the pitch of sound has another effect worthy of a little notice; deafish persons can sometimes hear a little when they are addressed in a noise. There are probably two reasons for this fact—firstly, that the nerves of hearing may be somewhat stimulated out of their inertia by noise, and thus may be made susceptible. When hearing is promoted by beating a drum or braying a trumpet at a deafish ear, this may be one provocative to audition; but there is also another cause for this effect—in our common conversation with persons "hard of hearing," we scream some of our words, and then we drop into low cadences; in this way we disturb, but do not satisfy, the obtuse hearer. Now, if we travel in a carriage, whose roll demands of the converser a steady, equable elevation of pitch, we are more likely to be heard than when we are at liberty to make fitful changes, from shouting to whispering.

The next acoustic circumstance which has a marked result is, attention. We know that the ticking of a clock, and other habitually heard noises, cease to engage our notice, except we choose to attend; but sometimes the same sound seems much louder when intensely observed than when treated with indifference.

There is an echo which can be awaked within "Gleana Coppuil"—"The Horse's Glen"—in Mangerton Mountain; this is a reverberatory percussion of the sound made; and, of course, at every point whence it is reflected, some loss of the

original impulse of the air must be sustained; thus, the last echo of two or three (which are generally heard) ought to be the faintest, and physically it must be so; but the apparent effect is the contrary; the first echo returns a strong sound, and it diminishes by striking against a great rock at an angle in the deep ravine; the sound momentarily subsides, but every ear is now fixed in acutest attention, when suddenly rolls out the sound again, as it were of a small cannon, with the seeming power of thunder, startling the listeners, who believe, from their own sensations, that the noise is wonderfully increased by its travels. This, however, is only the result of sensitiveness, produced by the deepest attention which is given to it.

The next effect on hearing to which I shall request consideration, is the different states of susceptibility which the same person experiences in differing states of health. I do not here refer to such extreme perceptivity of sound as often afflicts fever patients, or other well-marked valetudinarians, sufferers from nervous diseases, &c.; but I allude to the different susceptibilities of persons in good, average strength, but in differing states of robustness and powers of resistancy. Cannoniers can stand the report of a six-pounder without a start; and some of their power to do so arises from mental pre-occupation in the duty which engages them; but it is probable that if these men were suddenly, and without an occupying duty, placed by a ship's seventy-four-pounder, the discharge would cause them to start, as most civilians do now, who come close to the firing of light artillery guns. Some ladies, perhaps, indulge in startings at sudden noises, and do it for effect; but sensitive nerves, at times, leave people no power to resist; so that what is uncontrollable is sometimes deemed unjustly to be affectation; still, a habit of effort in subduing the practice of starting, when only produced by usual noises, is a good, moral training of the physical powers. We know that reflection and preparation make horses steady in field-firing, and these methods applied to nobler creatures may be equally true. So much for our normal conditions with respect to sudden sounds; we now come to certain morbid states of the nerves, under similar influences. A gentleman who was capable of bearing, without inconvenience, the noise of gun and pistol firing (which was usually so much the old habit here at times of public rejoicing), was surprised and annoyed at finding himself, when walking the illuminated streets with some ladies, continually starting at the explosions all around; this was somewhat unlike the constitutional firmness proper to a man; the noises gave him real pain; but the ladies themselves being able to stand the firing without a bounce, their escort was not a little disconcerted at his irresistible susceptibility. The matter was capable of easy explanation; the gentleman was about a month recovered from a bilious fever; all the parts of his system which had been tested before had indicated perfect restoration; but the undue sensibility of the auditory nerves proved that these organs were still only convalescent. The sufferer had fears that his pristine firmness, under such trials, might never return to him; but he soon attained his resistancy and good endurance, as perfect as they ever had been. It is known that sudden noises make young children cry with painful alarm, when the pitch only reaches that which healthy adults could bear without inconvenience; this results, of course, from the greater sensibility of the hearing nerves of children.

It would not properly belong to this short memoir to describe the morbid sensibility to sounds which ignorant alarm inflicts on some people; how loud the cricket's chirp is to the superstitious listener, or how the shrinking of the timber of an old press or cupboard can seem, at times, to some terrified night-watcher, to be the tearing down of wainscots, and bursting open of doors. The exaggerations of acuteness in the perceptions of self-deluders are too numerous to record at present, but strange facts sometimes do try the courage and the judgment even of steady observers. A young gentleman was engaged in a manufactory, and it sometimes happened that processes had to be continued all night; on these occasions the workmen who had to sit up were permitted to go home for an hour or so, and, during their absence, our young manufacturer had charge of fires and furnaces, which called for all his attention. After the men went away—say, about eleven o'clock at night—he used to lock the gate of the factory inside, and, for some time, he had the whole lonely concern to himself. On one night the work to be done was in a hurry; consequently, the fires, under the boilers, had to be urged; and,

in one case, the iron-work of a fire-door was driven to a glow of heat which illuminated the darkness all around; there was danger here, and our young friend had to run down a ladder, and open the furnace-door; knowing his way, he ran up quickly to the boiler, when instantly he heard a series of sharp blows below, and under him, which astonished and somewhat alarmed him. The neighbourhood of the factory was one of very doubtful repute, and our young friend concluded, that thieves, from the next lane, had scaled some wall, and were terrifying him away, so as to give them a clear course for their robbery. However, he, firmly believing that misdoers are usually cowards, determined to see after the plotter or plotters; he lighted three or four candles, so as not to be benighted in his work, and placing them in succession on his way, he approached the locality of the noise, bearing a handy iron bar as his protection, and deeming his up-stairs condition as a good vantage ground. He progressed—he inspected—all was silent; but when he came near the furnace-fire, he was met by a loud shot, like as if from a pistol; it was the iron furnace-door, which, in cooling from its red heat, and, at the same time, shrinking, thus demonstratively taught him a lesson of acoustics and general physics at the same time.

The natural range of hearing, from grave to acute, is also a curious subject. Wollaston tells us, I think, that he could not hear a bat's scream, it was too treble for his auditorial powers. We must suppose that there are also sounds too grave for other ears; but the philosophy of acoustics is so wide a field that your ears must content them with this superficial sketch on the subject at present.

DUBLIN NATURAL HISTORY SOCIETY.

JANUARY 12, 1855.

GILBERT SANDERS, Esq., M.R.I.A., in the Chair.

The usual preliminary business being disposed of, Mr. Andrews laid on the table the 8th volume of the Proceedings of the Literary and Philosophical Society of Liverpool, presented by the society; and from himself, Notes on Irish Natural History.

Mr. James Haughton then presented, from Dr. Kinahan, specimens of Crustacea, from the Dublin coast; Daubenton's bat (Vespertilio Daubentonii), captured in Kildare, 1854, &c.

Thanks having been returned for the donations,

Dr. Farran read his paper

ON PECTUNCULUS GLYCYMERIS, AND ON THE LOCAL RANGE OF MOLLUSCOUS ANIMALS, TRACED WITH THE DREDGE.

It may be within the recollection of some members present that I laid before the Society the result of my examination, by the dredge, of Berterbie Bay, in the year 1844; and, although that communication extended to an unconscionable length, I felt that many most interesting circumstances had been, of necessity, omitted, which I then purposed, at a fitting opportunity, to bring under the notice of the Society, when I had satisfied myself of the correctness of my views by a re-examination of that interesting bay. In accordance with this determination, I have selected from many subjects of high interest the history of the beautiful shell, Pectunculus glycymeris, specimens of which are placed before you, purposing to touch but slightly on it as to its general distribution, but dwelling somewhat more particularly and at greater length on its relation with Berterbie Bay and the shells associated with it in that locality. Its history may be briefly given. It is laid down by the best authorities on the subject as being an inhabitant of the European seas, attaining the size generally of from two to two and a half inches in length, and nearly the same in breadth, increasing in intensity of colour as it approaches the south, and generally covered with a thick, villous coat, from which it had, for a length of time, derived its

specific name of "pilosus," but which has now been laid aside, and the Linnean name, glycymeris, substituted on the ground of priority. It is recorded as having been found in various localities and at different depths on the English coasts, and is of great beauty in the seas surrounding the Channel Isles, where it constitutes both genus and species. As a fossil, it is found generally diffused in the tertiary formations, preserving its colour, markings, and villous coat in a surprising manner. I will now proceed to what more immediately concerns the subject before us. Any gentleman who has the good fortune to possess a copy of Mr. Thompson's "Fauna of Ireland," a work which I cannot permit to pass without observing, that, although small in compass, it exhibits a depth of patient research seldom equalled, never surpassed, will see that he mentions that Pectunculus has been found on three sides of our island, but that it had not been discovered on the west when his work was published in 1843. I have a distinct recollection of having seen in my first visit to Roundstone, some years before 1844, obsolete valves of Pectunculi brought up by a very bad dredge, which Mr. M'Alla had then in his possession; and subsequently having mentioned the circumstance to Mr. Thompson, he was unwilling, on such evidence, to admit it as having been found in the west, although he candidly confessed it was more than likely it would be found there hereafter. When I made a more accurate examination in my visit of 1844, I found that at the entrance, or nearly so, of Berterbie Bay a large bank of obsolete shells had accumulated in the middle of the channel, and running parallel to the shore on each side; it is so formed, that by keeping close to the shore when sailing up the bay, and doing the same on returning on the opposite side, you will not find a trace of this large bank; but by crossing the bay you will at once come on it. When you examine the contents of the dredge after drawing it over this bank, you will find they consist of obsolete valves of Pecten maximus, Lutraria elliptica, Cardium norvegicum, and Pectunculus glycymeris.

In the occurrence of the three first-named shells I felt but little interest at that time, as I was tolerably conversant with their history; but as to the Pectunculus I certainly was very anxious to discover its whereabouts, as I would then be able to fill up the point indicated as wanting in Mr. Thompson's Fauna, as well as to satisfy myself as to its habits. But the question at once presented itself to my mind—from whence did this large mass of shells proceed—from what source did that supply flow? After much reflection I arrived at the conclusion, that situations suitable to the various molluscs within the bay, more particularly the banks of yellow sand from which the bay derives its name, and which are very numerous, must be the birthplaces of the various animals; and having remained there for their appointed time their empty shells were carried by the drift to the entrance of the bay, where, meeting with the incoming tide, they were prevented from proceeding further, and thus this accumulation had occurred. Impressed with this conviction (which I shall presently show was very fallacious) I devoted a considerable time to the examination of those banks, which were generally covered by ten or twelve fathoms of water, but without any success. I suggested to the boatmen that we should proceed to the bottom of the bay; and, having tried several banks there, we were fortunate in finding a single specimen of Pectunculus, and one also of Venus cassina. Encouraged, I remained on the bank for a length of time, sailing backwards and forwards, but without any further success. Although this was very discouraging, still I felt gratified that I had found Pectunculus *in situ*, thereby filling up the points wanting in Mr. Thompson's Fauna, and completing its circle round our island; but, on the contrary, I felt somewhat mortified on finding that my well-digested theory was not borne out by fact, as the supply and maintenance of the accumulation never could have been brought from that quarter; so, very philosophically (and as others do in similar cases), I cushioned the subject, and never reverted to it until this evening, when I trust to be able to give a satisfactory solution of the problem. I was enabled, last summer, to revisit the scenes of my former labours, and, of course, Berterbie Bay was the first object—stimulated in no slight degree by again seeking for Pectunculus; this I did, but without any success, neither did I obtain any specimens of the rarer shells, which I formerly got; so that I confess I was somewhat disappointed; I, therefore, willingly agreed with our steersman to try new ground, and, accordingly, proceeded to the ground called emphatically by

that functionary "clean ground," on which the fishermen shoot the spilliards lying between the Deer and Hard Islands, about five miles from land. When we got into twenty fathoms of water the dredges were thrown overboard, and soon I was gratified by obtaining Pectunculi associated with Venus cassina in considerable numbers, of large size, and finely coloured. However, we met with so many annoyances from the dredge becoming entangled in rocks, that we shifted more inshore, to ground lying between the Hards and Innislacken Islands, and was astonished to find, on hard and clean sand, Pectunculi in such numbers that it was only a matter of time as to obtaining any number. I present for your inspection specimens of rich colouring and marking, small and large—the latter measuring nearly three and a half inches, being three quarters of an inch larger than those recorded by Forbes and Hanley in their work on the British shells. Associated with Petunculus I found Venus cassina, Solecurtus candidus, and Cardium norvegicum. I can entertain no doubt that this is not only the natural habitat of the Pectunculus, but also of the other shells specified, particularly Cardium norvegicum; and this may be fairly inferred by comparing them with the same shell found within the bay, the first being smooth and clean, with a bright citron colour, those within the bay presenting an ochreous, worn, and dead appearance. I can only account for this fact by supposing, that from the vast accumulation of animal matter thrown together on this bank gases are extricated which act on the shell, and thus produce the decayed appearance presented in those specimens. The same may be observed in the specimens of Venus cassina and Pectunculus found at the top of the bay in 1844. Gratified as I felt by the discovery of this interesting locality, my pleasure was greatly heightened by its affording a clue in solving my problem; for I ascertained that the current or drift which passed over this spot set directly into Berterbie Bay; and the seamen told me that sometimes the power of the current is so great that it carries everything coming within its influence into the bay; or, as they graphically described it by saying, "that it sucked up everything that came to its mouth," from which it never returns; and from hence, I think, I may fairly conclude that I have obtained a correct solution of my problem; for the mollusc dying the shell is disengaged from the position it held during life, and is carried directly by the current or drift into the bay; and thus the bank increases daily in size, and ultimately will shallow the bay. Cardium norvegicum is subjected to the same process; for it is evident that its natural habitat is on this spot—those found within the bay, as I pointed out, not presenting the same appearance of health as those externally. It may be instructive to remark, that the same association of shells found in Berterbie Bay is also found in Bantry Bay, and I entertain no doubt that when other bays have been investigated some singular results will be elicited.

Having thus given an outline of the history of Pectunculus glycymeris, I beg to call the attention of the Society to an able paper, by the late Professor Edward Forbes, entitled "The Geological Relations of the existing Fauna and Flora of the British Isles," contained in the "Memoirs of the Geological Survey of Great Britain." In this paper he lays it down as an axiom, that all animals and plants have specific centres, from which the members of the family radiate by different processes. If it would not be considered very presumptuous in such an humble votary of science as myself, I might fairly conclude, from the great number, large size, and varied colouring, that if I have not reached the centre, I have, at least, come across a most flourishing colony of this interesting species. I shall take an early opportunity of again alluding to Professor Forbes's paper. I think I would be guilty of great injustice if I did not bring the merits of the dredge on the table prominently forward—invented and manufactured by our fellow-citizen, Mr. Rochford. It was my good fortune to be possessed of this admirable instrument in my late visit to Connemara, and it is owing to its capability that I have the satisfaction of placing those fine specimens before the Society. I can safely say, that no naturalist will be disappointed in having it as his companion when at sea, and I consider that it must supersede all others.

Doctor Farran then exhibited a splendid series of the Pectunculi in all stages of growth, and pointed out the several specimens, which, from different depths and positions in the bay, varied in size and in the beauty of their markings. He also exhibited fine specimens of Venus cassina, Cardium norvegicum, and Solecurtus candidus.

Doctor Carte observed, that Doctor Farran's specimens of Pectunculi were the finest that had been obtained in the British Isles. He brought the beautiful work of Forbes and Hanley "On British Mollusca," to show the great superiority of size and beauty of marking of the specimens obtained by Doctor Farran. Doctor Carte remarked, that the interior of the valves of the foreign specimens exhibited very rich colouring, and he would like to know whether any of Doctor Farran's specimens presented similar characters.

Doctor Farran said he would examine his collection, and notice the subject at the next meeting.

The Chairman observed upon the correctness of Doctor Farran's remarks as to the accumulation of the dead valves of the Pectunculi, which he attributed to the set of the currents from the grounds where the molluscs were abundant in the living state. On the south coast of England he had found the dead valves in quantities in Whitsund Bay, but the living animals were rare. In shoal water the shell appeared to be more covered with the villous coat; in deep water the shell was more free from it, and the markings were more vivid. Off Plymouth Sound the true habitat of the animal was, he considered, in sixteen fathoms. Strong currents set in among the shoals and formed a kind of delta, where quantities of the dead shells accumulated.

Mr. Andrews said, that being aware of the great interest that the display of such an unrivalled series of fine specimens of Pectunculus glycymeris would create, and the importance of the discovery on the west coast of the living animals in such profusion as recorded by Doctor Farran this evening, he had been led to offer a few remarks from his own notes of the south-west coast of Ireland. He fully concurred in the statement made by Dr. Farran, as to the value of the admirable report drawn up by the late William Thompson, Esq.—valuable for the scrupulous attention to details, and omission of all questionable or doubtful records of localities; hence, to the period of its publication, being a standard reference of the known distribution of the Invertebrata of Ireland. This report, however, can only be considered as a general review; for few at the time had obtained any very extensive local information of the zoology of the country, especially with reference to the west and south-west coasts, and this may account why Pectunculus glycymeris and Bulla hydatis, also recently recorded by Dr. Farran, should have escaped being marked in Mr. Thompson's report as western species. These molluscs, which Dr. Farran has established to occur in such abundance on our west coast, with Venerupis irus and Kellia suborbicularis, have most extensive distribution, being found on the shores of Spain and Portugal, and off the Canary Islands and Madeira. Robert M'Andrew, Esq., a most practical and scientific investigator of the distribution of marine mollusca, obtained Pectunculus glycymeris abundantly off the Canary Islands, in fifty fathoms, sandy soundings. Now that such investigations are assuming a philosophical aspect, local Faunas must become of great importance, as embracing a more perfect survey of distribution of animal life, interesting to zoology and to physical geography. Hitherto our investigations of the marine zoology of the western and southern coasts have been limited, especially in deep water, where the different soundings afford endless forms of animal organization; forms, he might say, innumerable in beauty, and in vividness of colouring, and many of them of the most delicate structure inhabiting the greatest depths of the ocean where animal life can exist. Before bringing to their notice one of these beautiful, yet fragile, animals, which he obtained in deep soundings off the coast of Kerry, and considered new to the fauna of the country. He would make some remarks on the soundings of the south-west coast. Along that coast, and off the entrances of the Shannon, Dingle, and Kenmare bays, the soundings run gradually out from forty to one hundred fathoms; and where, as also inside, around, and off the Blaskets and the Skellig Islands, the soundings vary, with bottoms of fine sand, sand and mud, shelly and pebbly, coarse-gravelly, and rocky and corally grounds, and these characterize the different feeding grounds of the cod, ling, haddock, turbot, and sole, as well as many of the more common kinds of our edible fish. Where the fish most frequent to seek the food suitable to their habits, there the marine animals most abound; and it is on the feeding grounds of the ling, the cod, and the haddock, that many of our more rare Pelagian mollusca and crustacea are met.

I have observed that the paucity of our information is attributable, on the

west coast, to the confined examination of the dredger, whose labours have principally been engaged in the exploration of the bays and estuaries, and not to any depth of soundings off the coast. Instances are recorded of many rare molluscs captured on the lines of the fishermen on the great bank of Newfoundland, and also on the inner banks, as well as frequently taken from the stomachs of the cod fish. I have taken fine specimens of Fusus islandicus on the lines in 81 fathoms; and Dr. Farran informs me that Buccinum Zetlandicum has only been taken on the fishermen's lines at a distance from the land sinking Urisbeg mountain. Animals enjoying life at great depths of the ocean are more extensively distributed in different latitudes from the uniformity of temperature; while warm or cold climates affect those animals that are peculiar to shoaler grounds. The western shores of Spain and Portugal abound in marine animals, and it has been remarked that the eastern shores of the American continent are barren in proportion to its western coasts, which are plentifully inhabited by testaceous animals. The west of England affords nearly two-thirds of all the marine animals yet discovered in Britain; and we may, therefore, conclude, that the rich shores of the west of Ireland may yet add largely to its fauna. Among recent labourers you witness this evening what has been accomplished by Dr. Farran, and I may add, that from this coast much is to be expected from the well-directed researches of Professor Melville, of Galway. In one of the experimental trials in which I was engaged, in connection with the fisheries, we had run out soundings nearly ten miles to the north-west of the Toraght Rock, one of the Blasket group, where we found bottoms of fine gravel and shells from fifty to eighty fathoms, and which we found, on trial, to be valuable fishing grounds. The soundings were taken up in a small dredge, to which a heavy iron bar had been attached. I shall pass, for the present, the several objects of interest captured, and submit to you the subject of the present paper. It belongs to that class of articulated animals, the Annelides. The Annelides and Nereids constitute a tribe of exceedingly interesting animals, apparently insignificant in their habits, yet beautiful in structure, and rich in brilliant tints. These invertebrate creatures form a peculiar class in the eyes of naturalists, verging on the confines of the sub-kingdom, yet exhibiting modifications of other higher groups. Their annulose character and nervous system range them in an intermediate link between the vertebrata and annulosa. They possess a vascular apparatus for circulation, with generally a long, slender body, soft, and divided by circular folds into a great number of rings. On each side of the body are a long series of fasciculi of bristles, supported on fleshy tubercles, which act as feet. The characters, however, vary in many species. In some the head is distinct, in others it is wanting; and the head is frequently ornamented with fascicles or plumes of cirri, acting as antennæ. These animals are distributed (the greater number marine) from the shoalest to the deepest water. Some, for protection, form a calcareous tube, almost like the shells of molluscs; others form a coating by agglutinating grains of sand or shells, and, likewise, some are in tubes, which are entirely membraneous or horny. Of this last number is the species that I shall bring before your notice, as being an addition to the fauna of Ireland. It belongs to the genus Eunice, *Cuv.*, characterized by having plumose branchiæ, proboscis, armed with horny jaws, each foot armed with two cirri, and a bundle of setæ, five tentacula surrounding the mouth and nape. The animal in the living state was almost colourless, inhabiting a horny tube, beautifully transparent, and of from $2\frac{1}{2}$ to 3 inches in length; the head of the animal plumose, the plumes of a delicate pink or violet tinge. I obtained three specimens from a depth of 81 fathoms, in soundings of fine gravel. It appears to be identical with the Nereis tubicola of Müller, which inhabits a horny tube, and is figured and described in the "Zoologica Danica." I may mention that I have also obtained on the same coast, in shoal soundings of soft sand, Pectinaria Belgica, the animal enclosed in a fragile tube of agglutinated grains of sand, the head of the animal ornamented with golden plumes. It is beautifully figured in Donovan, as the Sabella tubiformis.

Doctor Carte observed, that from the extreme interest of the proceedings of this evening, it must be seen that our knowledge of the extent of the marine zoology of the western coast was as yet but very imperfect. He much wished that a dredging association could be formed, whose labours would be directed to more extensive

investigations. He considered that the strongest spirits of wine was the best calculated to preserve perfectly the characters of the more delicate marine animals.

After some conversation on the subject of Dr. Farran's specimens, the meeting was adjourned to the second Friday in February.

FEBRUARY 9, 1855.

ROBERT CALLWELL, Esq., M.R.I.A., in the Chair.

The minutes and the usual business being confirmed and disposed of,

Mr. Williams requested permission to notice a fine specimen of the Iceland gull, (Larus islandicus), in immature plumage, which had been presented to the Society, through Joseph Todhunter, Esq., from Doctor Harvey, of Cork. Mr. Williams said, that he was in expectation of the particulars of the capture of this rare bird, which he would submit at the next meeting.

Mr. Andrews presented to the Society a well-preserved specimen of the Porbeagle shark (Lamna cornubica). This was the second specimen that Mr. Andrews had obtained in Dingle Bay. These sharks generally appear in the bay in the autumn months, during the time that the hake and herrings are plentiful in the bay. They are of less frequent occurrence than the blue shark (Carcharias glaucus), which appears at the same season, and is sometimes troublesome to the fishermen's lines. Mr. Andrews noticed, that the Fox shark, or Thresher (Carcharias vulpes), had been met with in Dingle Bay.

The Chairman mentioned, that in one of the tours of inspection in the Ballast Office steam vessel, he had visited Carlingford Lough, in the month of August. Herrings, at the time, were plentiful in the lough, and he had noticed a species of shark frequently springing several feet out of the water, which the crew pointed out to him as the Thresher shark, from the peculiarity of the action of its tail fin.

Mr. Hopkins presented to the Society very fine specimens of Ianthina communis, which he found abundantly thrown ashore at Kilkee, county of Clare, after a gale of westerly wind. He had noticed several other rare species, which he would submit a list of at the next meeting.

The thanks of the Society having been passed to the donors,

Mr. Andrews said, he would read a communication from Mr. Trouton, of Drogheda, with reference to the skull and very fine antlers of the red deer, which were before the meeting. "I beg to say, that they were discovered in August last by some fishermen, whilst drawing their salmon net across the river—the River Boyne; the net having become fast in one of the horns, it was with some difficulty they raised them from where they were embedded in the centre of the river; but using great care they were enabled to take them up in the very perfect state in which they appear. Although they have been taken from the now present bed of the river, I have to remark, that within the last few years, the river has been deepened by excavation, about four feet; so that, until lately, the horns were deposited in a stratum four or five feet below the water. This, I think, will fix a very early date for their original deposit. The dark colour of the skull and horns will, I think, bear out this idea."

The horns were those of the red deer, and were perfect and of full growth.

Several of the members said, that such specimens were by no means uncommon in the country, and that they were frequently met with in parts of the Boyne.

The Chairman also remarked, that he had seen and obtained very fine horns of the red deer, and in a perfect state, found between Moate and Athlone.

The thanks of the Society were given to Mr. Trouton, for his kindness in forwarding the horns to be exhibited at the meeting.

Mr. Andrews was then called on for his paper, entitled

REMARKS ON THE PERCIDÆ AND SERRANI, AND ON AN ADDITION TO THE ICHTHYOLOGY OF IRELAND. (WITH A PLATE.)

It is always a subject of extreme interest to the naturalist the record made of any addition to the zoology or to the botany of a country. On the one hand, it

confirms a more extended geographic range of animals or of plants; on the other, it rewards his researches, and affords to him new objects of inquiry. In many papers brought before this Society, analogy has been shown, bearing upon the characteristics of the western and southern coasts of this country with those of Spain, Portugal, and the Mediterranean, especially with reference to the botany and to the marine zoology; and also instances have been noticed of peculiarities of the south-west coast with the southern and western parts of Cornwall, which, to some extent, prove the physical agency of temperature, humidity, and soil, in the development of geographic botany. Before submitting to your notice the subject of the present paper, "An Addition to the Ichthyology of Ireland," I shall briefly make some remarks upon the Percoides, or perch tribe, to a division of which family it belongs. These fish (the perches) are extremely numerous both in genera and species, and in the lakes and rivers of Europe, and in the seas of warm climates, afford excellent and wholesome food. The far greater number of Percoides have the ventral fins inserted under the pectorals, and form the first division, or thoracic perches. These are further characterized by seven rays to the gills, two fins on the back, and all the teeth dense and even. To this division belongs the common perch of our fresh waters, the Perca fluvialis. Distinctions of the opercula and tongue characterize others, as the sea perch, or Bass (Labrax lupus), which is found of much finer quality on the English coasts than the coasts of Ireland, although I have seen them of good flavour taken in Wexford harbour. Very large specimens of the Bass are found on the coasts of the United States. An extensive series of the division might be enumerated, remarkable for their beauty, and for their usefulness as food, especially the Aspro vulgaris, the zingel of the Rhone, and the Perca zingle of the Danube, and the common pike-perch, the Lucioperca sandra of the Danube, the Elbe, and the Oder. These, as I have before remarked, might be transported with useful results to the barren waters of our inland lakes.

The second division of the Percoides are distinguished by the single dorsal fin, have seven rays in the gills, but the genera are placed according to the characters of the teeth. To these belong the Serrani, a very numerous marine species, frequent in the Mediterranean, but chiefly abounding in seas of warm latitudes, brilliant and beautiful in their colours, and excellent as food. They seldom range so far north as Britain. Two species, however, that inhabit the Mediterranean have been recorded as British, the smooth Serranus (Serranus cabrilla) and the dusky Serranus (S. gigas), both taken on the coast of Cornwall. The former is of common occurrence on the coast of Sicily. The denticulated or serrated preoperculum, and the bony operculum, terminated with one or two points, are characteristic of the genus. This leads me to the description of what now is established as an addition to the Ichthyology of this country, the "Polyprion cernium," *Cuv.* The genus is formed from a single species common in the Mediterranean, and having an extensive range to the western isles, Madeira, and known on the coast of America. It is fully described in the supplement to Yarrell's History of British fishes, as "Couch's polyprion," having been first recorded as British on the coast of Cornwall. It is also known as the stone Bass, and the wreck fish. The genus Polyprion is distinguished by being entirely covered with small rigid scales; all the opercular bones are denticulated, strong bony ridges and asperities covering the head, and over and behind the eyes; but the most remarkable character is a strong bony ridge on the operculum, in a line above the pectoral fin, and directed backwards, ending in a point. The discovery of the fish now submitted to the meeting (and which has been so well and carefully preserved by Mrs. Baker, of Grafton-street) is due to Mr. Eugene Moriarty, a most intelligent fisherman, of Dingle, who superintends the stores and management of the Dingle men in the employment of the Royal Irish Fisheries Company.

When forming my records of every incident connected with the sea fisheries of the coast of Kerry, Mr. Moriarty mentioned the circumstance of a singular fish which he recollected to have been taken some years since in Dingle Bay, following and feeding upon the barnacles attached to floating wreck timber; but he never knew an instance of the fish being taken by the hook. His accurate description satisfied me that it was a species unrecorded on the Irish coast. In the month of September last Mr. Moriarty was fortunate enough in obtaining this fine specimen under most

singular circumstances. One of the fishing boats off Ventry, in the Bay of Dingle, picked up what appeared to be an American meal barrel, that had been for some time floating. It was partly filled with water, and when taken into the boat the fish was floundering in the barrel, and supposed to have been washed in by the sea, as it is likely at the time that numbers of the fish were swimming around the barrel. It is a deep-water fish, frequenting and feeding on rocky and corally ground. Mr. Moriarty forwarded the fish to me, and I at once saw that it was the Polyprion cernium of Cuv. and Valenc. Its history and description is so well given in Yarrell's supplement to British fishes, and in Cuv. et Val. Hist. des Poiss., that I shall only here add an outline of the specimen before you. Its weight, when taken, 10½ lbs.; length from tip of lower jaw to the base of the caudal fin, 22 inches; entire length to termination of tail, 2 feet 1½ inches; caudal and ventral rays fasciated; nostrils double; irides dull, silvery white, upper part of circle tinged with a dusky shade; fin rays—

D. spinous 10. 11, soft 14, P. 16, V. 6, A. 10, C. 21;

back, dark ash colour, shaded with umber; belly, dirty white; lower jaw projected beyond the upper; teeth, numerous and blunt, and with numerous teeth covering the palate; a prominent ridge on the operculum, terminating in a short spine; preoperculum, toothed; upper part of orbits ridged, and with pectinated or denticulated elevations from each orbit, directed toward a short, prominent ridge on the nape; head covered with rough, strong scales; the spines of the first dorsal fin very strong. In the Mediterranean this fish attains a large size, and its flesh is esteemed, being white and tender and of excellent flavour. I trust that I have thus drawn attention to the interest that the Ichthyology of our coasts may present, for I am satisfied, that upon more careful investigation, other species that have been recorded, as occurring upon the coast of Cornwall, and also Mediterranean species, will yet be traced on the southern and western coasts of this country. In continuation of the arrangement in the British fishes of the Percidæ, are the great and the lesser Weevers, or sting-fish (Trachinus draco, and T. vipera), both of which I have before noticed, as frequenting Dingle and Ventry harbours; and I feel assured that that beautiful Mediterranean species, the radiated Weever (Trachinus radiata), and found on the southern shores of France, will on our south-west coast be recorded in the fauna.

A discussion arose with regard to some instances that had been noticed of vessels at sea having met these fish in numbers, following wreck timber, and of their having been taken by jigging, with a hook attached to a pole. They were found excellent food for the crew.

Mr. Sanders said that he had often considered that a knowledge of natural history was but little attended to by officers of the navy, as well as our mercantile navy, where they had such opportunities of forming valuable records, and of extending so much the sphere of scientific information.

The Chairman thought that the thanks of the Society were due to Mr. Andrews for his paper, and for the interesting addition he had described and recorded to the Ichthyology of the country. It must be gratifying to the Society to find, that at each meeting some new record to the fauna had been brought forward.

The ballot having taken place, Joseph Farran Darley, Esq., of Upper Leeson-street, was elected a member, and Thomas Chandlee, Esq., of Waterford, a corresponding member.

The meeting was then adjourned to the month of March.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

JANUARY 6, 1855.

R. Ball, LL.D., President, in the Chair.

A. H. Haliday, Esq., A.M., J.P., &c., was elected an honorary member.

The President gave a demonstration of the family Alcedinidæ, being in continuation of the series illustrative of the collection in the University Museum.

Mr. Hogan announced, that he had that morning received a letter from his friend, Mr. J. Walter Lea, which stated that the butterfly under consideration of the Association at a former meeting, and then supposed to be a variety of Pieris daplidice, had been identified by Mr. Stainton as Anthocaris belia, one of the three allied species to one of which Mr. Hogan had already thought it might be referred. An interesting addition had thus been made to the Fauna of the British Isles, if no difficulty should subsequently arise respecting it. He would furnish a more explicit statement by their next meeting.

The Rev. Joseph Greene then read the following paper:—

DIRECTIONS FOR CAPTURING LEPIDOPTERA.

Owing to the many obstacles (among which may be mentioned, in particular, the high cost of, and the difficulty of procuring standard works, together with the absence of precise information as to the best methods of capturing insects, and of preserving and arranging them, when captured)—owing, I repeat, to the many obstacles which present themselves to the student of Entomology at the very outset of his career, he frequently becomes disheartened, and is often led to abandon the pursuit altogether, in disgust at his want of success. In the hope of obviating, in some degree, the last of these obstacles, I have drawn up a few remarks (intended *only* for beginners) relative to the best methods of capturing and preserving Lepidoptera. These observations are based, in part, upon my own personal observation and experience, and, in part, upon the observation and experience of those whose long and assiduous pursuit of this branch of Entomology renders their opinion and judgment unexceptionable.

Modes of Capture.—Lepidopterous insects may be captured in each of the four stages of their existence—the Egg, the Larva, the Pupa, and the Imago.

Egg.—Those eggs which are deposited by the parent insect at the close of autumn, are, I believe, rarely found. They may, however, be occasionally discovered by a careful examination of the trunks and twigs of various trees. The three following rare species, amongst others, have been taken in this way—viz., "Notodonta trepida"(oak), "Notodonta cucullina" (maple), and "Ptilophora plumigera" (maple). Those eggs, however, which are deposited in the *spring*, may frequently be found on the various plants and leaves of the trees, upon which the larva feeds.

Larva.—There is no better, or more productive means of obtaining Lepidoptera, than by searching for larvæ. Many species, which are rarely seen in the perfect state, may thus be captured in abundance, as the common "Arctia caja," "Diloba cæruleocephala," &c. Others, which have never been captured at all, or very rarely, upon the wing, have been occasionally taken in this stage. The specimen of "Gluphisia crenata," exhibited at a former meeting of this Society, was bred from a larva beaten from a poplar. The methods of searching for larvæ are, by beating, and by carefully examining the leaves of the various trees and plants on which they feed, both by day and by night—many caterpillars lying hid during the day, and only coming out to feed at night. This last can, of course, only be done with the aid of a lamp; it is an admirable method, and innumerable larvæ, which would elude the most entomological eye during the daytime, may then be found. Amongst the Noctuæ and Geometræ there are entire genera which only feed at this time. In searching for larvæ, during the day, small shrubs and saplings will be found better than *trees*, which are to be examined by beating, of which hereafter. The plan I adopt is, to take a twig in my hand, turn it up, so as to get at the under side of the leaves, and then carefully examine it. Noctuæ and Bombyces are generally found on the *under* side of whatever leaf they may be feeding on. The "Cerurae"—*i.e.*, the puss moth and the kittens—are, however, always on the *upper* side, usually about the centre of the leaf. Poplar, willow, and sallow are the trees they feed on. Geometræ will, almost invariably, be found during the daytime, extended at full length *along* the stalks or twigs of the trees on which they feed, and as they are often of the same colour as that on which they lie, frequently escape observation—that is, *careless* observation. The best shrubs, according to my experience, are, willow, poplar, sallow, oak, aspen, and alder. In beating, the operation is simple, though laborious. Nothing is required but a stout

stick, about six feet long, with a hook at one end. With this, the tree is to be thrashed. The hook is useful to *shake* a branch, when too thick to be beaten. Some collectors take, I believe, a sheet, and spread it beneath the tree to catch the larvæ as they fall. This, I think, is unnecessary, as I have found, except when beating over thick brushwood, no difficulty in detecting a caterpillar nor have I ever seen such a number of larvæ on any tree, as to require a sheet to collect them. Many Geometræ suspend themselves by a thread, when shaken from their resting-place, and are easily observed. I carry with me thirteen or fourteen chip pill boxes (with the top knocked out, and a little gauze substituted) for the purpose of bringing the larvæ home. A leaf of the tree or plant, on which it has been found, should be placed in the box with the caterpillar, and several may be put together, except where they are carnivorous, as "Stauropus fagi," "Scopelosoma satellitia, "Euperia trapetzina," and some others. When, however, I find so good a larva as the first of these, I generally give him a box to himself.

Pupa.—Digging for pupæ is an excellent method of obtaining insects, and possesses the peculiar advantage of being the only way in which the study can be pursued during the winter months. As some remarks of mine upon this subject were read before the Entomological Society (Vide Trans., vol. ii., N. S., part v., and "Zoologist," vol. xi., p. 3,888), I will here recapitulate a few of the more useful hints—"The only instrument I use is a common garden trowel. The form is immaterial; perhaps a rounded blade is the best, as passing with greater ease between the roots. The trees, which I have found the most productive, are the following:—elm, oak, ash, poplar, beech, willow, and alder. With regard to localities, meadows and parks with scattered timber trees are decidedly the best localities; being near a wood seems no advantage. It is, however, a very curious fact, that the nearer these meadows or parks are to inhabited places, as towns, villages, or even a single farmhouse, the more abundant are the pupæ. Next to parks and meadows I place woods. Searching in woods, however, is a tedious and fatiguing affair, and to search successfully requires some experience. Perhaps the following hints may prove useful. It is in vain to examine the *dense* portions; it is equally vain to dig at the *roots* of trees in woods, with few exceptions; and you will rarely find anything except upon trees of considerable growth. The *thick moss which collects about the trunks and roots* is the part to be examined. Bombyces are generally (almost invariably) found under the moss which covers spreading *roots*, and not on the trunks. The best localities in woods are the borders and open places. It is curious that such places, when elevated or facing the north, are the most productive. There remains one other locality—*hedgerows*. These may be dismissed in a few words; it is perfectly useless to try them. I do not think I have found a dozen pupæ in such places; *why* it should be so, I cannot tell. There are, of course, other localities, but as I have never tried them, I am unable to give any opinion on them.

"The next point, which may be considered worthy of notice, is the mode of search. This, of course, varies according to locality. In digging, it must be borne in mind, that all pupæ lie close to the trunk of the tree; seldom more than two inches distant. Frequently the trunk of the tree forms one side of the cocoon, especially the cocoon of such insects as spin. Again, pupæ lie close to the surface of the earth (I have seen those of 'Smerinthus populi' and 'S. tiliæ' half out of the earth; the larva of 'Calocampa exoleta' is the only one I know of that goes to a considerable depth). Insert, then, the trowel about three inches from the trunk, to the depth of two inches or so; then push it to the tree, and turn it up. If the soil be dry and friable, without grass, knock it gently with the trowel, which will be sufficient. If, however, there be grass, you must proceed more cautiously; take up the sod in the left hand, knock it very gently with the trowel, and those pupæ which merely enter the ground, will drop out. To find those which spin, you must carefully examine the sod, tearing the roots of the grass asunder; these are, of course, much the most difficult to find, the cocoons being generally the colour of the earth. I may here remark, that it is useless to try sticky or clayey ground, the caterpillars being unable to penetrate it. In searching under moss, the best plan is to loosen the edge, then to tear it gently off, observing whether any pupæ fall. Look at the trunk to see if anything adheres to it, and

then carefully examine the moss itself. Experience alone will enable you to detect a spun cocoon.

"Searching under loose bark requires no comment. (I will here make an observation in reference to the Ceruræ. The cocoons are found in the bark of the trees on which the larvæ feed. This is done in such a manner as exactly to resemble the natural inequalities of the bark, and it requires the closest investigation to discover them. The plan I adopt is, having found a poplar of moderate size, to place my finger upon the trunk, about six feet from the ground, and slowly drawing it down, carefully examine the line thus made, including about half an inch on each side of it. It is a laborious, but I have also found it a successful, plan. The *empty* cocoons are very easily detected, and it is advisable to see whether there be any on the trunk of a tree, before examining it in the manner recommended above, as I have (almost invariably) found that individual trees appear to be selected year after year. I pretend not to account for this, but it is the fact.) "If I were asked, which are the most likely trees, I should say, those whose branches spread out towards the ground, since moths seldom fly to the high branches; those whose roots form an angle filled with loose, dry earth, especially when covered with grass; and, lastly, those which have a thick, loose moss upon them. Nothing, however, can be more uncertain than any rules upon this matter.

"No pupa-hunter can hope for success, unless he has a good stock of patience and perseverance. He must not mind cold hands, wet feet, or an aching back; for although these are drawbacks, yet is the pursuit quite exciting, when successful, and it will reward the seeker, not merely of Lepidoptera, but also of all other orders of insects."

For the purpose of carrying pupæ home, when found, any box will answer, with a little moss in it, to prevent their rolling about. They should, then, be placed in a good-sized box, with a little earth at the bottom. The pupæ are to be laid upon the earth, and covered with moss. Some collectors damp the moss occasionally; I think it a bad plan; I never do anything to them. The box should have ROUGH sides to enable the insect to crawl up, and should also be covered with gauze or wire. Care should be taken not to kill an insect until the wings are fully dried; but, if possible, it should be killed before its time of flight, which, in the case of Noctuæ and Geometræ, is the evening.

IMAGO.—As to the most likely places for finding, and the best methods of capturing insects on the wing, it may justly be said—"Tot entomologici, tot sententiæ." The following, however, are the most deserving of notice:—During the daytime many Geometræ and some Noctuæ may be found by beating the hedges (on road-sides and at the borders of woods), furze, underwood, trees, shrubs, &c., when the former fly out, and may easily be captured with a net, while the latter fall torpid to the ground. Trunks of trees should be carefully examined, as large numbers, both of Noctuæ and Geometræ, make them their resting-place during the day. In the same manner, palings, fences, stumps, and old walls should be searched, especially on the side sheltered from the sun and wind. So far, during the daytime. As regards the evening and night, there are three plans particularly deserving of notice—sugaring, examining the trees, shrubs, &c., attractive to Lepidoptera, and lamplight. The first of these I have often tried, but have met with little success. Not so, however, with other collectors. Mr. Douglas has, in the pages of the "Zoologist," given many valuable instructions on this, and other points connected with the study and pursuit of Entomology; and I cannot do better than quote some of his remarks—"The strongest brown sugar, known as 'Jamaica-foots,' is mixed with hot water to the consistence of treacle, or somewhat thinner, and a small portion of rum added and stirred in; the composition is then laid on the trunks of trees, in favourable situations, with a painter's brush. I have found that it is better to make long and narrow streaks than broad patches. Many species do not like to wet their feet, and sit and sip the nectar modestly, and at a distance; others are not so careful, but rush readily on their destruction. The sugar should be put on the trees at dusk, before the moths fly; for I have repeatedly observed that, if used afterwards, there will not be nearly so many come. With a lantern suspended from the neck, and thereby preserving an upright position during every movement, the collector may visit the trees several

times during an evening. The greater number of moths will be found during the first hour; but some species are only taken late at night. Most of them may be taken very easily, by holding a pill-box under them, into which they will fall, and remain quiet till the next day; but some are not so quiet. Some persons boil the sugar and water, and think it an advantage; but I have not yet tried it. Of the efficacy of the addition of the rum I am sure, having more than once seen one collector use it, and another, at the same time, sugar without it, when the former would obtain double the number of Noctuæ."—Zool., vol. ii., p. 400. According to the opinions of different entomologists the best places to sugar are—single trees in hedgerows, open places in and at the borders of woods, or scattered trees in parks, meadows, gardens, &c. Whilst on a visit to that eminent naturalist, Mr. H. Doubleday, of Epping, he showed me, in a corner of a field bordering his garden, a young tree, the stem of which was not more than five or six inches in diameter. For many seasons in succession, he informed me, that he had there captured many of our rarest insects, not to mention multitudes of the common species. The tree must have been two miles from the forest, and the trunk was quite abraded with constant sugaring. As I have already remarked, I have myself had no success in sugaring; but from the numerous records contained in the pages of the "Zoologist," of Lepidoptera captured in this manner, there seems to be no doubt that it is one of the most excellent methods that can be adopted. To enumerate all the species thus taken would be an endless task, but I cannot refrain from mentioning some of the more remarkable, as "Luperina abjecta," "Diphthera orion," "Nonagria arundinicola," "Hadena atriplicis," and "H. satura," "Triphæna subsequa," "Glæa erythrocephala" (still unique), the beautiful "Catocalæ," "Fraxini," "Promissa," "Sponsa," and many others.

We come next to trees, shrubs, &c., attractive to moths. The following may be mentioned:—Jasmine, *honeysuckle*, valerian, *bladder campion*, *reed*, French and African marigolds, *raspberry* (when in flower), sweet scabious, thistles, *arbutus*, privet, *yew*, gooseberry, &c.* To these may be added—nettles, when in flower, which, at that period, I have seen swarming with various species of "Agrotis," "Triphæna," and "Noctuæ." But these fade into insignificance when compared with the far-famed sallow blossoms and ivy bloom. The spring insects, of course, are found on the former; the autumnal, on the latter. The following scarce species have been taken on ivy:—"Dasycampa rubiginea" (one of our rarest insects), "Agrotis Saucia," "Xylina petrificata" and "X. semibrunnea," "Calocampa vetusta," "Euperia fulvago," &c.; and on sallows, amongst others, "Tæniocampa munda," "Populeti," "Miniosa," "Opima," "Gracilis," &c. By shaking the sallows over a white cloth, the moths may easily be captured, as they fall off, apparently quite intoxicated. The ivy bloom should be examined with a lantern, and the insect, when seen, will, if gently tapped, immediately fall into the box prepared to receive him, and remain quite quiet. The time to commence searching in this manner is, I think, about seven in the evening. I had nearly omitted to mention lime-blossoms and syringa. These are certainly, as far as my experience goes, the most attractive baits for moths. I have seen lime-trees, and large shrubs of syringa, when in blossom, actually alive with insects. I have taken upon them specimens of the rare "Spælotis pyrophila" and "S. ravida." The best way of attracting insects is, I think, by lamplight. The "Zoologist" records many rare species thus captured, and I may mention among those taken by myself in this way—"Xylophasia sublustris," "Cerigo cytherea," "Neuria saponariæ, "Miana arcuosa," "Agrotis corticea and cinerea," "Dianthæcia carpophaga," "Hadena adusta," "Eupithecia sobrinaria," "Centaurearia," "subfulvaria," "pusillaria," "pulchellaria," &c. Mr. Stainton describes (Zool., 2,030) a very elaborate apparatus he employs for this purpose. My method is very simple, being merely to have two candles close to the window, when, on favourable nights, if the window be open, the moths will fly in and immediately ascend to the ceiling (when they may easily be captured with a net); or, if the window be closed, will make known their anxiety to be admitted; some, by a mild and gentle, others, with a loud and indignant tap. During the still silence which prevails in a retired country-place,

* Those marked in italics have been found particularly attractive.

about one in the morning, the sudden rap of a large moth, such as "Arctia caja," is no joke to the nerves. Moths, attracted by light, are very fond of crawling up and down the panes, and when thus situated may easily be taken in a tin box, such as will hereafter be described. There seems to be little use in trying the light, till about half-past ten—that is, during the summer months; and I may here mention a curious circumstance, which, as far as I am aware, has not hitherto been recorded; it is, that there seems to be an interval—viz., from about nine to half-past ten—during which moths appear to cease flying. From half-past eight to half-past nine they may be seen flying over and about the flowers, shrubs, &c., attractive to them; but, at the end of that time, they almost entirely disappear. When this has been the case, I have returned home (and this over and over again) and tried the light, but in vain. I have repeatedly sat at the open window for an hour and a half, without seeing a single moth. A little before eleven, when almost in despair, a solitary specimen has appeared. This has then been followed by others in rapid succession, till about half-past one, at which time they begin to fall off again, and disappear entirely just before daybreak. On a sultry summer's evening the ceiling of the Entomologist's room presents a singular spectacle, from the numbers of insects swarming about it. I say *insects*, for the collector must be prepared for other things besides Lepidoptera, such as spiders, centipedes, earwigs, midges, &c. He will also be much annoyed by bats, which speedily discover that the moths are attracted by the light, and, accordingly, visit you regularly every evening. I have seen a moth, when almost in my clutches, suddenly disappear, while the snap of the jaws informed me that the *bat* was too quick for me. The bat is a sworn foe to the Entomologist, and the wings scattered about beneath the window testify to his voracious powers.

I see no way of accounting for this lull in the appearance of insects, except by supposing that the process of digestion is then going on, and that they are then taking their siesta. There is one remark which I must not omit; on nights when the moon shines, moths go to bed, and the best thing for the Entomologist, on such occasions, is to do the same, as he will not take a single insect. The irregularity in the appearance of insects is remarkable, and difficult to account for. Warm, sultry nights are, undoubtedly, the best, and when there is a little small rain falling at the same time, you may generally expect success; but this is not, by any means, invariably the case. The only period at which I have *always* found moths abundant, is just previous to a thunder-storm, when the air is much charged with electric fluid.

For the purpose of catching insects on the wing, a net is requisite. A hoop, fourteen inches in diameter, should be securely fastened to a rod about four feet long, and a green or white gauze attached to the hoop. The bag may be three feet in depth. In fact, the net is almost the same as that employed in landing a fish. When the insect is in the net, the question is, how to get it out, without injuring it. The plan I adopt is as follows:—I have one or more tin boxes, of which the subjoined is the best description I can give—depth, seven inches, of an oval shape, something like an egg divided lengthways; breadth, one way, three inches; the other, two inches. The same proportions are observed throughout the entire depth. At one end is a false bottom, one inch in depth (this is included in the seven inches). This is to hold bruised laurel-leaves; and to enable the fumes to penetrate into the other portion of the box, is a small tray pierced with ten or twelve holes. At the other extremity is a lid fastened at one end, with an easy hinge. A similar lid is at the extremity of the false bottom, in order that the laurel-leaves may be renewed when necessary. The moth then being in the net, insert the box, with the *top* lid raised about an inch and a half, and your fore-finger upon it. As soon as you have the insect inside the box (a little practice will enable you to do this with ease), clap down the lid with your fore-finger, and in a few seconds the moth will fall insensible to the bottom. If, upon examination, you find it to be one you do not want, throw it away, and it will soon recover, if not kept too long in the box. Should the insect, however, prove a desideratum, you can transfix it at once, and kill it by piercing it, just under the wing, with a quill dipped in a saturated solution of oxalic acid. For this purpose, I carry with me a little bottle with a close-fitting glass-stopper. This method, I

imagine, will not do for Microlepidoptera. Directions on that head I must leave to others. A box, such as I have described (or rather *attempted* to describe), is actually indispensable to the Entomologist, and should always accompany him in his rambles, as insects are thus captured, with the greatest ease, on trunks of trees, leaves, flowers, &c. This is the box to be used in examining ivy-bloom.

The next point to be considered is, the setting up an insect, when caught; and and I may here speak of the proper *pins*. Edelsten and Williams, Iron Works, Birmingham, make pins for this purpose; and, upon application, will forward a pattern paper, with the prices annexed. The following are, I think, the best sizes:—for Rhopalocera, Nos. 5 and 17; Sphingidæ, 16 and 15; Bombyces, 13 and 14; Noctuæ, 8; Pyrales, 15 and 18; and Geometræ, 8, 7, 10.

There are three methods of setting up insects—the flat, the rounded, and the sloping. The flat is the method adopted on the Continent, but it does not meet with much favour in England. Several distinguished Microlepidopterists, however, employ it. The rounded is the method generally adopted, I believe, by the Metropolitan collectors. I cannot give any directions on this head, as I have never tried it. The last, which I term sloping, is the one which, I think, generally prevails. For this purpose are required strips of cork, or soft deal, about a foot long, with a groove, proportioned to the size of the insect, running down the centre. The cork must be smoothly shaved away on each side, according to the amount of deflection, which each individual's fancy may suggest; great care, however, being taken that each side exactly corresponds. Insert the pin in the centre of the thorax, with the head bent a little forward. Above all things, avoid letting the pin bend to either side. It should be exactly perpendicular, when the insect is set. Having placed the moth or butterfly in the groove, so as to permit the wings nearly to touch the edge, push them gently up with some pointed instrument to the desired length (a good distance is, the apex of the wing being some degree higher than the head), and then fix them with a brace of card. Be sure that the wings exactly correspond. The antennæ and abdomen should be made to preserve the required position by means of pins. This is a point much neglected by many collectors. Insects will require, according to their size, the state of the atmosphere, &c., more or less time to dry (the females generally take twice as long as the males); but they should not be removed until *quite* dry, as otherwise the wings are apt to start back. The setting-boards should be carefully kept free from dirt, dust, &c.

To relax an insect, all that is required is, to pin it on a piece of cork; place the cork in a vessel of water, and cover it up, and in 6, 12, or 24 hours, as the case may be, the insect will be as flexible as when caught.

To remove grease, the best method is, to cut open the under side of the abdomen, with a pair of fine-pointed and sharp scissors; and, having picked out the contents, to soak it for six or eight hours, either in camphine or spirit of turpentine. Having dried the insect, as far as possible, with blotting-paper, cover it up with magnesia for 24 hours. A camel's hair brush will remove the magnesia, and the insect will be uninjured. *Green* insects, however, fade, when submitted to this process. A large piece of camphor should be placed in each drawer, or box, which may contain insects.

For the purpose of breeding, I use a number of boxes portioned off into divisions. Both boxes and divisions, of course, vary in size. For example's sake, however, suppose one 18 inches square, and 6½ inches in depth, portioned off into 12 equal divisions. In each division I place some fine mould to the depth of about 1½ inch, and upon that I put some moss. A lid covered with gauze (like the rim of a slate, with the slate knocked out) is made to accurately fit the box, and the apparatus is complete. In each division may be placed four or five caterpillars, if using the same food. At first they do not seem to like their new abode, but they soon become reconciled to it. The food may be renewed once a day, and the moss occasionally damped. Wire must be substituted for gauze where the gnawing powers are strongly developed, as in the case of "Cossus ligniperda," the "Ceruræ," "Acronycta alni," &c., and bits of decayed wood should be placed in the division. I may here mention an instance of the gnawing powers of the larva of the "puss

moth" ("Cerura vinula"). The first caterpillar of this species which I found was deemed a great prize, and, as such, had a division to itself. On going to look at it the next day, to my indescribable dismay, I found it was gone, having easily eaten through the gauze covering. In vain I searched for it, and had given it up as lost, when, about three weeks afterwards, while removing the table-cover, I found it firmly attached to one of the legs, and *there*, upon examination, I found my long-lost larva. It had bored a snug berth for itself in the solid mahogany leg, and finding the place cold, I suppose, had firmly glued the table-cover over its cocoon.

These few remarks may, perhaps, be of some use to *beginners*, and should they, in any degree whatever, promote the study and pursuit of this branch of Entomology in Ireland, I should most sincerely rejoice. I have only to add, that I shall be most willing, at all times, to afford, either in person, or by letter, or by means of my own collection, any information in my power to those who may desire it.

A letter addressed, Rev. J. Greene, 49, Stephen's-green, Dublin, will always find me.

Mr. Greene stated, that in the "Entomologist's Annual," just published, Hama furva, *W. V.*, was noted as occurring only in Scotland; whereas a reference to his list of Irish Lepidoptera, published in the "Natural History Review," would show that it had been previously recorded as Irish by more than one collector.

FEBRUARY 3, 1855.

R. Ball, LL.D., President, in the Chair.

The President gave a demonstration of the families Meropidæ and Upupidæ, being in continuation of a series illustrative of the collection in the University Museum.

Dr. Ball also laid before the Association the following facts relative to a specimen of Lepidopus argyreus, the head of which he exhibited:—

ON THE PROBABLE OCCURRENCE OF THE LEPIDOPUS ARGYREUS IN DUBLIN BAY.

About eighteen years since, Mr. Glennon, the well-known bird preserver of Suffolk-street, gave me the head of a fish, stating that it had been then recently taken by Mr. Massey, at the Pigeon-house. I submitted this head to my ever-lamented friend, William Thompson, who was then engaged on his list of the Fauna of Ireland; he appears to have been misled as to the species, and having failed to get any precise information on the subject from Mr. Massey, refused, with his characteristic caution, to give the fish a place in his list. A few days since, on turning over the first volume of the Wernerian Transactions, I found, at page 83, a very fair figure, as if drawn from my specimen, but representing the head of a fish described by Colonel Montague, under the name of Xipotheca tetradens, as having occurred on the coast of Devonshire; the Colonel was not aware that the fish had been already described as a Mediterranean species. In Yarrell's excellent history of British fishes, its occurrence is recorded in other places in the south of England, and in the MSS. of Mr. Thompson, there is a notice of its having probably been taken, if I recollect rightly, at Newcastle, in the county of Down. We have thus reason to believe, that it may be found on this coast. It would seem here unnecessary to recapitulate the history of the fish, as stated in Yarrell; but I may confirm what he remarks, that the proper number of large teeth in the front of the upper jaw is six, not four, as supposed by Montague, and hence his specific name. When I got possession of the head, it had six sharp, lancet-shaped teeth in advance of the regular row of smaller teeth, and singularly arranged—two teeth standing parallel to each other, at about one-sixteenth of an inch apart, close to the extremity of the upper jaw; two larger, at about the eighth of an inch behind these, also parallel, and about one-eighth of an inch apart; the two largest, one-eighth of an inch farther behind, and about a quarter of an inch apart. These six teeth are singularly sharp and lancet-like; but the most curious part of their structure is, that they fold inwards, like clasped knives, and are so adapted, that the fish apparently can use these powerful implements for scarification or not at its pleasure. The diagram exhibited will explain their position when folded back in the angular roof of the mouth.

I think, under the circumstances, that we are justified in adding this fish to the list of the Irish Fauna, and I regret that no further information can now be had, Mr. Massey, who was a keen and accurate observer, and had made many interesting additions to the Fauna, being, alas, no more.

CRICETUS PHÆUS.

Dr. Carte exhibited specimens of Cricetus phæus (?) captured in the trenches of the English camp, near Balaklava, by his cousin, William Carte, Esq., associate member, and read the following paper thereon:—

The animals to which I have the pleasure of calling your attention are, I believe, the first fruits of natural history transmitted to this country from the seat of war in the East; the skins were sent to me, through the post, by one of your associate members, W. Carte, Esq., staff assistant-surgeon, attached to the medical department of the army in the Crimea.

The Hamsters (Cricetus, *Cuv.*), to which these animals belong, form a numerous family, and are generally placed between the Meriones and the Voles (Arvicola, *Lacep.*); the former inhabit North America, and resemble the Gerbils, save that the tails of the latter are very long, hairy, and generally tufted at the extremity; whereas, in the former the tails are nearly naked, their hind legs longer, and the dentition differs in having a very small tooth placed in front of the superior molars. The dental formulæ of the Voles and Meriones are similar to the rat's—that is to say, they have three molars above and below in each jaw; but those of the Meriones are not furnished with roots, and each tooth in the latter animal is formed of prismatic-shaped triangles, alternately disposed in two rows.

The animals before us differ very considerably from the foregoing. In these animals the body is somewhat short and stout, clothed with a very fine and soft hair, which, under different circumstances of light, presents different shades, varying from dark mouse-colour to light gray; the tail is very short, and appears almost destitute of hair—I say *appears*, because, when closely examined, it really is not without this covering, but it is coarser than that upon the body, and is disposed lengthwise, and so closely applied to the surface that the tail seems to be hairless. The eyes are full and black, and the ears large oval, and almost without hair. The feet are short, with four toes on the fore foot, and five on the hind, and do not seem well adapted for burrowing; but the most remarkable part of the organization of these animals, and that which separates them from their congeners, is the possession of cheek-pouches, somewhat analogous to those found in some of the Simiæ; these pouches are placed immediately under the ear, on the side of the head, and are formed of a dilatation or extension of the lining membrane of the mouth, in the form of two sacks, each capable of containing a large-sized kidney-bean; these sacks are used by the animal for transporting its food, and thus enabling it to lay up a store to be used during the winter. This was evinced by the fact of Mr. Carte having found these pouches filled with grain at the time of their capture. The dental formulæ of this animal is similar to the rat's—viz., incisors, $\frac{2}{2}$; molars, $\frac{3}{3}$; these latter are furnished with a double row of conoidal tubercles, placed alternately, the most anterior molar in the lower jaw being furnished with five such tubercles, the middle and posterior with four. In the upper jaw the tubercles are placed opposite to each other, and there are six tubercles in the most anterior molar, four in the middle, and in the posterior or smallest but two or three irregular; the lower jaw is remarkable for the length of its posterior, inferior, angular process; and, comparatively speaking, it appears more developed in this animal than any other rodent, with the exception, perhaps, of the rat, and approaches more closely to the insectivorous formation, as in the mole and sorex, &c. Taking these considerations into account, I am inclined to believe that this animal does not confine itself strictly to granivorous diet, but, like our rat, is occasionally carnivorous.

The habits of this peculiar species are in accordance with their anatomical organization. It has been before stated that their feet are not adapted for burrowing, which agrees perfectly with the account of their habits, as given by Mr. William Carte, in a letter which accompanied the animals; in it he writes that he found them under some stones, in a nest which was formed in the shape of an arch,

constructed of straw and feathers, and open at both ends; in this nest a considerable quantity of oats was laid up for their winter store (16th December, 1854); but the animal, though at this late period of the year, displayed no symptom of torpidity; it is, therefore, to be supposed their peculiar time for hybernation had not then arrived. The Hamster family is numerous, and dispersed rather widely. The following list of species has been taken from the fifth volume of the "Histoire Naturelle" of Lesson, in which a short and very incomplete description of each is given; it is therein stated that Buffon has described only the common Hamster (Cricetus vulgaris, *Cuv.*), or the Marmot of Germany.

Pallas has made us acquainted with many species from Siberia; M. Rafinesque, one from Kentucky; and M. Gapper, one from Canada. These are—

1st. Le hagri of Vicq-d'Azyr (Cricetus migratorius, *Desm.*), ash gray colour above; the abdomen and feet, white; from Siberia.

2nd. Le Sable Vicq-d'Azyr (Cricetus arenarius, *Desm.*), Mus arenarius, *Pallas*, grayish white, with abdomen very white, the ears hairy, its tail a little longer than the other species; it lives upon the seeds of the astragulus, in the sands of Siberia.

3rd. Le phé (Cricetus phæus, *Desm.*), grayish brown on the back, white on the abdomen, the ears large, and almost naked; it lives on cereal grain, in the desert of Astracan, in the north of Persia.

4th. Le songar (Cricetus songarus, *Desm.*), gray on the back, with a black line running along the back, the flanks vary from brown to white, the body tapering, and the tail is very short; it lives in the most desert parts of Siberia, upon the seeds of leguminous plants, which makes it very fat.

5th. L'Orozo (Mus furunculus, *Pallas*), has an elongated body, pointed nose, with ears large and naked; the fur is grayish-yellow on each side, with a black dorsal line; the abdomen and the feet are white; it is found in Daouri.

Rafinesque describes a banded Hamster (Cricetus fasciatus), of the plains of Kentucky, red on the back, with ten black transverse rays; its cheek-pouches are pendant; but a species which is less certain is the Cricetus myoides, discovered in Upper Canada, by Dr. Gapper.

To these may be added the Cricetus accedula (Mus accedula, *Pall.*), from Erzeroom, described in the proceedings of the Zoological Society, for 13th August, 1839; and also the Cricetus auratus, from Aleppo, described by Mr. Waterhouse, in the same journal, the 9th April, 1839.

There is another point of interest which more especially attaches itself to this peculiar species before us; it is, that, in all probability, it is the identical species described by Aristotle, over two thousand years ago; and from his time to the present has caused much perplexity to naturalists. The Stagirite calls it Μὺς ὃ ποντικος ὁ λευκός, which has been translated the "white pontic mouse;" and Agricola, from so translating λευκος, supposed it to be the ermine. Gesner thought it was a squirrel, and this was also the opinion of Buffon. It is true that Aristotle gives but a very brief description of the animal; but still it is such as to be sufficient to refute these opinions; he says, in his "Hist. Animal," liber viii., cap. 17, it is a gnawer, of a gray colour, hybernates, and lives near the Euxine. These facts exclude the ermine, and also the squirrel, neither of which animals hybernate; for he states the ἐλειός (dormouse) hybernates, as also does the Μὺς ὃ ποντικος ὁ λευκος; he also states, in "Hist. Animal," liber ix., cap. 50, that it ruminates; the same is said of the hare, as we all know. I, therefore, think that the gray pontic mouse, which hybernates, may probably be no other than this animal.

Mr. Ogilby said, that from his own observation of the allied species of rodents, he could explain the mode which this little Hamster (?) may probably adopt in emptying its cheek-pouches of grain, &c., these being merely formed by a thin, mucous membrane: an external upward pressure of the fore feet was quite sufficient to dislodge the contents, when needed for use; and this employment of the fore feet was characteristic of animals of a high order of intelligence, as it never obtains among those which use them merely for prehension in locomotion. He had not, however, at anytime seen them attempt to insert the claws and draw out their food.

In regard to the question, whether this species might be referred to that mentioned by Aristotle, under the name of the grey pontic mouse, there was much difficulty, owing to the looseness of his description. The word λευκός, might be translated cinereous; yet the latter term also involved confusion. But as it could not, with any probability, be identified with either the squirrel or the mouse (according to the common interpretations), he thought it not unlikely that the animal said by Aristotle to occur both on the southern and western shores of the Black Sea, might be found on the Crimea and northern coasts also, and be in reality the species under discussion. With the Mus phæas of Pallas there was more probability of this species being satisfactorily reconciled: the former was described in Pallas's last work, the "Zoographia Russica," a book of great rarity, not more than twenty copies having been circulated (one of which he had been himself fortunate enough to procure on the Continent), in consequence of a fire that destroyed the printing-office at St. Petersburgh, where the work had been just prepared for publication. Immediately before writing this zoography, Pallas had been residing in the Crimea, on an estate given him by the Empress Catherine II. of Russia, not far from Balaklava, or between the latter place and Simpheropol; therefore, it was highly probable that the species, now so abundant there, had been described by him, whether under the name Mus phæas or not. He did not think that this Hamster (?) could be the Siberian species, because barren steppes, of great extent, intervened between that country and the Crimea, besides the difference of temperature. As the northern parts of the Crimea consisted of dry, sandy plains, abounding in small, burrowing rodents, and as our armies might, ere long, visit those places, some interesting discoveries might be expected. In concluding, he would not give a decided opinion as to the identity of this species with the Mus phæas of Pallas; but, having now carefully examined the Crimean specimens, he would, on returning home, refer to the description in the "Zoographia Russica," and be happy to communicate the result to the Association.

The Entomological Secretary exhibited a specimen of Carpophilus hemipterus (a beetle new to the Dublin lists), taken by himself, in rotten wood, at Charlton, Roebuck. From being somewhat immature, and not possessing the red spots on the elytra, it resembled in appearance C. pusillus, *Ste.*; to the latter species, however, Mr. Haliday did not think it belonged.

FEBRUARY 17, 1855.

R. Ball, LL.D., President, in the Chair.

The President gave a demonstration of the families Promeropidæ and Nectarinidæ, being in continuation of a series illustrative of the collection of birds in the University Museum.

The Entomological Secretary read the following abstract statement, from J. Walter Lea, Esq., corresponding member, of the facts connected with his

CAPTURE OF ANTHOCARIS BELIA, IN WORCESTERSHIRE.

Some time ago I had the pleasure of submitting to the Dublin University Zoological Association the first part of a series of notes on the Diurnal Lepidoptera of a limited district in Worcestershire. I have hitherto been prevented from completing the communication; but, in the meantime, I am glad of the opportunity of laying before the Association the following statement relative to the capture of a specimen of Anthocaris belia, in the same district, by myself, in 1849, and still in my possession. A coloured figure of the upper side of the insect was exhibited at a recent meeting of the Association, when it was supposed to be a singular variety of Pieris daplidice; but the insect itself having been submitted to Mr. Stainton, he informed me that it was Anthocaris belia, hitherto untaken in Britain.

The evidence of its genuineness may be briefly stated, as the weight of the argument lies in a small compass; but Mr. A. R. Hogan will be able to answer questions, should any further particulars be required.

It was in 1849, between the 23rd of June and the 6th of July, that I took the insect near Bewdley. At the time of capture I noticed that there was a dissimi-

larity between its appearance and that of Pieris daplidice; but not having any suspicion that it could be any other insect, I considered it a variety, and thought no more about the matter. But as in those days the capture of a Daplidice was a great rarity in my entomological experience, as it still is, I was particular to mark it, and another true Daplidice caught in the same locality, as my own, by passing the pin transfixing the insects through labels marked—"V. B., p. m. c., J. W. L."—*i. e.*, "Vere Britannica, propriâ manu capta;" and with this note attached they were transferred from the drying case to the cabinet, where they remained undisturbed till, in 1851, I packed my cabinet for travelling, when I cleaned the insects, which had suffered considerably from damp and mites, removed the labels above mentioned, which were stained and dirty, and, at the same time, secured the insects in their places by strong braces of card-board. From circumstances, which it is needless to mention, the cabinet was never properly unpacked, nor the securing braces removed from any of the insects until the autumn of 1853, when these two supposed Daplidices were liberated, together with the rest; but I did not replace the labels. It was not of any real moment, however, for I did not, at *this* time, possess any insect at all resembling the Daplidice, except these two. They remained in their places till the summer of 1854, when I was preparing to figure the Daplidice, and, in consequence, was led more closely to examine the supposed two specimens which I possessed; then, to my surprise, I discovered that the one which I had always, rather hastily, taken for a variety, must be considered a distinct species, as it presented great differences from the typical Daplidice, both in form, marking, and neuration of the wings. These have been already enumerated in a former notice, read before the Dublin University Zoological Association, so I will not now recapitulate them. Being unacquainted with the insect, I referred it to Mr. Stainton, who immediately informed me that it was Anthocaris belia, well known on the Continent, particularly in the south of France, and appearing early in summer.

That there can be no mistake as to the identity of the specimen with the one which I caught is, I think, pretty clear, as the only other specimens at all resembling it (except the Daplidice spoken of above), which I have ever had in my possession, were two true Daplidices, which I received a few months after the capture of the former two, with the intimation that their nationality was not quite unquestionable. Without losing a moment, therefore, as I had the reputation of my own to defend, I marked the new ones "Query British" on labels rolled round the heads of their pins, and affixed by gum; I then placed them in a case *apart* from the original specimens with which they were *never* compared, nor were they even brought into each other's presence, having been laid aside in a different room. Where I placed them they remained till 1851, when I found both them and the whole of the insects in the case destroyed by mites and damp; and I burnt them all with my own hands—the remains of the dubious Daplidices, with the labels still adhering to the pins, being burnt along with the rest. I have never had any other specimens whatever, and as I think I have now given a clear statement of the different circumstances which befel the four specimens above alluded to, I trust it will be evident that the remarkable occurrence now recorded is not due to any slip of memory, or accidental misplacement of the insects under consideration.

These statements of Mr. Lea gave rise to an interesting discussion, doubts having arisen as to whether the specimen might not be a Continental one which had been overlooked, from the time that ensued before Mr. Lea called attention to the specimen in question, and from the unlikelihood of the discovery of any new British Diurnal Lepidoptera, particularly one frequenting the southern parts of Europe. The chief question appeared to be, whether the Anthocaris belia had not been imported into England in the larva, or egg state.

Mr. Haliday did not, by any means, object to the credibility of Mr. Lea's statement; but thought it would be difficult to account for the introduction of the insect into Worcestershire, an inland county, from the south of France, in either the egg or larva state.

Rev. J. Greene stated his entire concurrence in the views of Mr. Haliday. A new British *butterfly* had not been discovered for many years (Erebia melampus,

taken in Scotland, being only a variety of Erebia cassiope), and it was, therefore, absolutely necessary that the record of any such discovery should be substantiated by the most undoubted proofs. Mr. Lea appeared fully aware of this necessity, and had obligingly communicated to the Society many interesting particulars respecting its capture. Mr. Lea did not assume the insect to be *indigenous*—he merely asserted its *capture*—and this statement, coming through such a source, was surely entitled to all respect and consideration from his brother collectors; and he (Mr. Greene) would take that opportunity of expressing his regret at the contemptuous manner in which, as he understood, that communication had been received by some eminent entomologists in England—the inevitable result of such a course being to deter the inexperienced from forwarding to "head-quarters" the results of their observations. Similar incredulity had been shown regarding Mr. Weaver's statement (over and over again repeated) of his capture of Melitæa dia, near Birmingham; but he (Mr. G.) entertained no doubt whatever as to the accuracy of his account. The refusal to admit any insect into our lists, without clear and authentic proofs of its capture, was a precaution which none would object to; but, surely, inquiries on such a matter ought to be made, and *received* with all courtesy and friendliness. That Anthocaris belia had been taken by Mr. Lea in Worcestershire, he saw no good reason to doubt (however difficult to explain its appearance there); but he thought it a matter of regret that so long a time had been suffered to elapse without recording its capture.

Mr. Wright suggested that, perhaps, Dr. Ball would act the part of judge upon the matter, and give the members the benefit of his opinion.

The President said, that after the opinions which had been expressed on this subject by two eminent entomologists, he really could not add anything to them; but before acting the part of judge, he thought it would be prudent to inquire if there had been any importation of foreign plants into that part of Worcestershire, where Mr. Lea resided. Members were, doubtless, aware that the nurserymen imported largely from the south of France all the rare or tender shrubs of that region; and he conceived it very probable that the eggs, or even the larva of the Anthocaris belia, might have been introduced along with some French plants. This appeared to him to be possible; therefore, if Mr. Lea discovered that any such importation of plants had taken place within the immediate vicinity of the capture of the insect, his opinion would be, that it had taken flight from its chrysalis, attached to one of these plants.

Rev. J. Greene observed, that if an importation of plants had taken place in Mr. Lea's neighbourhood, this would remove many otherwise insuperable difficulties.

Mr. Hogan then read the following—

NOTES ON VARIOUS INSECTS CAPTURED OR OBSERVED IN THE NEIGHBOURHOOD OF DINGLE, CO. KERRY, IN JULY, 1854.

So few districts in Ireland are, as yet, known entomologically—the study of insects appearing to have been the last in attracting attention from most Irish naturalists hitherto—that the briefest records of species found in any new locality become of value, as tending to furnish a better knowledge of their relative distribution throughout the country.

With the view of promoting this object, and of supplying a guide to those who may hereafter visit the same district, I submit to the Association the following notes on various insects captured or observed by Mr. Haliday and myself, while spending a week at Dingle, last July. The paucity of the numbers will, at once, strike the reader; but he must not forget the shortness of our stay, or the season of the year, which is not so prolific, in most insects, as the earlier and later portions of the summer; at the same time, as the weather was very favourable (except on *one* unfortunate occasion, that of our ascent of Mount Brandon), we must confess that our opinion of the district, as a whole, is, that it is decidedly barren, and by no means one for any entomologist to visit, who is not prepared to sacrifice the filling of his boxes to the chance of finding some new or rare species. That the latter is not an improbability, however, is evident from our discovery of one or two new Diptera, and of the larva of one of the Microlepidoptera, besides the capture of

several specimens of Tetanops myopina (of which but a single British specimen had before been known), and of several Lepidoptera, &c., new to Ireland.

Thus much by way of preface. The localities are enumerated in the order in which we visited them, with lists of the various species found at each—common and uncommon.

Ferriter's Cove—a small inlet of the sea, close to Ballyoughteragh, which is a coast-guard station between Dunurlin and Sybil Head. Under stones and sea-weed, Staphylinus maxillosus (with the var. ciliaris, *Stephens*, not uncommon), Omalium rivulare, Diglossa mersa and its larva (the first instance on record of the occurrence of this species on the west coast of Ireland), Serica brunnea. On the sand-hills, Broscus cephalotes, Calathus mollis, Cytilus varius, Coccinella 11—notata, Otiorrhynchus atroapterus, Philopedon geminatus, Quedius fuliginosus, Philonthus varius, Oxytelus depressus, nitidulus, Stenus speculator, Bombi in the flowers of Eryngium; Asilus cingulatus, Thereva annulata, cincta, Aphrosylus ferox (var. with legs and antennæ black), Anthomyia albula, *Fln.*, Actora æstuum, Ochthiphila flavipalpis, Chlorops rufifrons; Tetanops myopina (rare), not so much among the sea-reed, as on the sand more thinly sprinkled with low tufts of Triticum, &c. Lucina fasciata was looked for, but not found. On the banks of a little stream winding through a hollow below the coast-guard station, Anchomenus albipes, Schœnomyza littorella, Beris clavipes in extraordinary abundance on Umbelliferæ in flower.

From this spot we ascended Sybil Head, a hill gradually sloping at the land side, but presenting to the Atlantic a precipitous face of 900 feet. Half way up the hill, a specimen of Myllæna gracilis was found; Synuchus vivalis, Calathus cisteloides, Harpalus ruficornis, fulvipes, Cryptohypnus obscurus, Cremastus spectator, Porphyrops cirripes, Dolichopus atripes, nigripennis. On the summit, Otiorrhynchus monticola, a minute Phora, having much the appearance of a Chersodromia, as well as many more common insects, such as Tachinus rufipes, Philonthus varius, Anisotoma picea, Brachypterus urticæ, Athous hæmorrhoidalis, Haltica tabida, &c.

Many small moths were flying among the tufts of grass, and might have rewarded attention, but we did not disturb them, our attention being almost confined to Coleoptera and Diptera. The same remark is applicable to other localities visited by us, particularly to Mount Brandon; however, it was *only* the diurnal Micros that were in any plenty; for the entire neighbourhood appeared singularly destitute as regarded butterflies.

Our next entomological day was spent at the lovely Bay of Ventry, at the end of which are sands of some extent, and at the angle nearest the village itself a little stream, the sedgy banks of which looked very tempting; nor did they altogether disappoint us, as the following testify:—Elaphrus riparius, cupreus, Trechus aquaticus, Anchomenus marginatus, dorsalis, Calathus mollis, cisteloides, Harpalus ruficornis, æneus, Amara familiaris, Loricera pilicornis, Broscus cephalotes, Carabus granulatus, Serica brunnea, Onthophagus nuchicornis, Aphodius merdarius, sordidus, &c., Simplocaria semistriata, Philopedon geminatus, Coccinella 11—notata; Pompilus plumbeus, Tryphon elongator, Cremastus spectator, Meteorus rubens, Microgaster russatus, Eurytoma verticillata (?); Stratiomys viridula, Actora æstuum; Gelechia marmorea in abundance, a species not before noted as Irish.

But a more interesting spot was the Blasquet Islands, the most westerly extremity of Europe, which we were peculiarly fortunate in reaching, as it is only in fair weather they can be visited in safety. The Great Blasquet rises to a considerable elevation from the sea, and is inhabited but at one side, that looking towards the land, and facing Dunquin; where, on the sunny slope of the hill, various crops of grain, &c., are cultivated with very fair success. Here, curiously enough, though we were hardly able to spend two hours in collecting, there appeared much greater vigour of insect life than at any spot on the main land (of the same extent); and the cliffs and sandy coves rewarded our search with Cicindela campestris, Carabus granulatus, Cychrus rostratus, Nebria brevicollis, Bembidium flavipes, celere, littorale, rufescens, Trechus aquaticus, rubens, Bradycellus fulvus, pubescens, Harpalus ruficornis, æneus, Amara fulva, familiaris,

Pterostichus melanarius, nigrita, Anchomenus lævis, albipes, Synuchus vivalis, Calathus mollis, Ocypus olens, Staphylinus maxillosus, Quedius molochinus, Philonthus fucicola, umbratilis (?), Aleochara obscurella, Homalota socialis, Tachyporus chrysomelinus, Stenus speculator, Aploderus cælatus, Silpha atrata, var. subrotundata, opaca, Cercyon melanocephalum, Simplocaria semistriata, Serica brunnea, Adrastus limbatus, Otiorrhynchus monticola, rufifrons, Haltica tabida, Sphæroderma testacea; Mellinus arvensis, Odynerus parietum; Pieris brassicæ; Pachyrrhina histrio, Scatopse bifilata, *Wlk.*, Leptis lineola, Empis stercorea, Tachydromia arrogans, Platypalpus flavipes, Cœlopa frigida, Actora æstuum, Halithea fucorum, maritima, Orygma luctuosa, Sepsis cynipsea, Piophila atrata, Psilomyia bicolor (on Tanacetum vulgare), &c.

Among these are included two or three species (Bradycellus pubescens, &c.) found on Beginnish, a smaller island, tenanted by sheep only.

The following day was fixed for ascending Mount Brandon (3,130 feet in height), which, according to the last survey, is the second highest mountain in Ireland, yielding only to the two summits of the Reeks, Carrantuohil and Cahir. At first we seemed to have obtained an auspicious morning, for it was the first on which we had seen the summit clear of mist, and the sun shone pleasantly as we went up; but mountain mists are proverbially unworthy of trust, and when we had almost reached the summit, at a little past noon, one of them came on, and, gradually thickening into a dense rain, compelled us to descend far more speedily than was at all agreeable, with but scanty trophies of our attempt. Leistus montanus, Calathus nubigena, Arpedium brachypterum, were looked for without success on the summit. Only the following were noted as occurring so high up:—Cychrus rostratus, Carabus catenulatus, Nebria nivalis (abundantly, the red-legged variety scarce), Patrobus excavatus, Trechus aquaticus, Othius 6—punctatus, Xantholinus punctulatus, Quedius variabilis (?), Falagria obscura, Lesteva bicolor (var. collina, with short wings and elytra), Catops montivagus (?). On the ascent, Carabus granulatus, Notiophilus aquaticus (the usual dark variety of the hills), Aphodius rufipes (abundant), Ceutorhynchus ericæ, Thrips ericæ, Ulopa ericæ, Tipula excisa, *Sch.*, Porphyrops cirripes, Dolichopus atripes, Campsicnemus curvipes, &c.

Our last day was devoted more entirely to collecting than any of the previous had been; other objects of interest connected with the people of the district having divided our attention with its fauna. Starting by the Ventry road we crossed the mountains to Smerwick Bay, and commencing near the rocky extremity where stood an ancient Spanish castle, Fort de L'Or, we searched, for some time, along the edge of the sea, where the Ogham stones lately stood, and then turning inland, across the extensive sands of Gallerus, ended our investigations by the banks of a rivulet which winds its way through them for a considerable distance. The list beneath will show that, with the exception, perhaps, of the small spot explored on the Great Blasquet, Smerwick formed decidedly the best place for collecting that it was our lot to find. On the rocks left bare by the ebbing tide, among multitudes of the ordinary Diptera occurring in such situations, a new species of Aphrosylus* was found, along with A. ferox; Geranomyia unicolor on the face of the cliffs; Canace nasica, Gelechia marmorea, abundant among the tufts of sea-reed; the larva of G. atrella on Anthyllis vulneraria; Sitones tibiellus on the same; the pupa of Agrotis fumosa in the sand; also, Depressaria badiella (not hitherto recorded as Irish), liturella, with Ephippiphora brunnichiana. At Gallerus sands, Carabus clathratus (dead, far out towards the sea), Cercyon melanocephalum, hæmorrhoidale, Aegialia globosa, Phyllopertha horticola (var. suturalis), Aphodius fimetarius (var. autumnalis), Cytilus varius, Philopedon geminatus, Otiorrhynchus atroapterus. In the streamlet, Gyrinus marinus, Orectochilus villosus, Hydroporus depressus, reticulatus, &c., Ploa minutissima; on its banks, Elaphrus riparius, cupreus, Anchomenus marginatus, albipes, Harpalus fulvipes, Pterostichus nigrita, Hydrocampa nymphæalis, potamogalis, and Harpalyce chenopodiaria, Bembidium littorale, Adrastus limbatus, Omalium rivulare, Staphylinus pubescens, Quedius fuliginosus, Xantholinus punctulatus, Aleochara lanuginosa.

To the above must be added the produce of a morning's walk to Conner Hill,

* A. celtiber, described and figured in this number.

and some species taken at Dingle itself, or on our way to and from Ventry—Tinea fuscipunctella, Otiorhynchus monticola, *Ste.*, Cionus scrophulariæ; Drapetis lunata, not rare under stones, on a rushy bank, at the entrance to the Causeway leading to Burnham, before the dew was off the grass, for in the afternoon it was scarcely to be found. Near the summit of the pass at Conner Hill (about 1,000 feet elevation) occurred Leistus spinilabris, Pterostichus melanarius, nigrita, Harpalus fulvipes, Olisthopus rotundatus, Patrobus excavatus, Trechus aquaticus, Quedius variabilis, &c.; Tipula excisa, *Sch.*, Diamesa ammon, *Wlk.*, waltlii, Bibio pomonae, Leptis scolopacea, Tachypeza nervosa, Dolichopus atripes, Porphyrops cirripes, &c.

As an appendix to what I have now detailed, I think it right to add some species found after Mr. Haliday and I had parted company, and while we were each yet within the limits of the county Kerry. An endeavour on my part to find Pelophila borealis at Killarney, in the locality indicated by Mr. Furlong—namely, under stones, on the margin of the Lower Lake, close to the Lake Hotel—produced a few specimens of Argutor erythropus, Anchomenus albipes, lævis, Agabus bipustulatus, and Orectochilus villosus.

Mr. Haliday has furnished the following notes of proceedings along the southern shore of Dingle Bay, &c.:—

A. H. H. crossed in a small boat from Ventry to Coolnanna Creek, near Cahirciveen; the favour of the wind quickly failing, and the current setting fast down the bay, caused a rather tedious pull across, under a heavy drizzle, which nearly hid the coasts. This left time only for a walk to Valentia ferry about sunset; the evening wet and blustery; neither time nor tide favouring entomological researches. The only beetle seen on the shore was Anchomenus lævis. The shingle swarmed with the usual Diptera, Cœlopa, Orygma, Halithea, Limosina. On some tufts of sea-pink, yet spared by the fretting tide, a few Aphrosylus ferox; and among the wet gravel a single specimen of Clunio marinus* was observed, which, however, eluded capture in its slippery habitat. The only locality where this species had been found previously having been since cut off and altered by a railway embankment, its occurrence in another and very remote part of the coast, was not without interest. Proceeding next morning to Rossbegh, a few days were spent in renewing acquaintance with the varied and lovely scenery around that sequestered spot. Some entomological notes were made, though several species found on a former visit, at a later season of the year, were missed on this occasion. On the shore at Carragh Creek, Cillenus lateralis occurred—the first recorded instance of its western range in this island; Diglossa mersa and larva, Cercyon littorale and depressum.† Diptera were numerous; Campsicnemus loripes in profusion; C. alpinus occurred on the wet rocks, with Hydrophorus nebulosus; Porphyrops cirripes along with pulicarius, Aphrosylus ferox, Cœlopa sciomyzina, Medeterus jaculus, truncorum, muralis, Glenanthe ripicola.† In the bed of little runlets of the ebbing tide, Scatella æstuans in myriads, rising with an audible buzz; with these, in smaller numbers, Canace nasica* and Anthophilina gracilis. Nanodes lythri was in abundance on Lythrum, and Haltica lutescens on Labiatæ. At the mouth of Glanbegh river, Bembidium tibiale; Sericostoma collare, rather common among the bushes; and Hilara flavipes in clouds over the stream. Rossbegh sands produced Tetanops myopina (1), Chersodromia incana; Anthrocera filipendulæ, Leucania impura, Agrotis tritici (in several instances dead, adhering to the heads of the sea-reed), A. fumosa, Gelechia marmorea, with its parasite Bracon marmoreus, n. sp. (of the same division as B. stabilis, *Wsm.*); Colletes fodiens, Crabro dimidiatus; Onthophagus fracticornis, and nuchicornis, Saprinus æneus, nitidulus, with other coprophagous beetles, especially Cercyones and Aphodii, among which the small yellowish var. of A. fimetarius, which is proper to the downs, merdarius and sordidus; Dromius foveolus, and Corticaria cylindrica, *Mnhm.* (?), at the roots of the sea-reed; Apion —— (?) on the stems. At the extreme point of the sands, connected by an isthmus of gravel, overflowed by the tide, the hollows are deeper, and the reeds more luxuriant, intermixed with Serratula arvensis, Pteris aquilina, and tangled, in parts,

* Figured. † Described and figured.

with the creeping Rosa spinosissima. Here Cryptophagus ulicis was common in the flowers of Serratula, no furze being near; Lycæna alexis and Camptogramma bilineata flitted among the reeds; Oxybelus uniglumis nestled in the hollows, and a new Dolichopus was found.* Along the inner edge of the sands, where a flat grassy margin bounds the tide, two specimens of Hydrophorus præcox appeared, but not H. lacustris, of which several specimens had been found in September of a former year. Rhaphium maritimæ was abundant, and singularly variable in size.

The next halting-place was at Milltown, near the Castlemaine river, the "slob" (silt) of which, banked off from the marshy meadows that skirt it, offered very tempting spots; here a waving forest of tall reeds, among which the rising tide was noiselessly stealing; again, a reach bordered with Carices and Aster tripolium, the consolidated mud outlying strewed with river waifs, with here and there a gravelly bank guarding a flat patch of sward; the embankment rank with a variety of herbage, and the drains fringed with tall Umbelliferæ. But the produce was not proportionate to the promise. The Coleoptera were few, chiefly Homalotæ, Steni, and Ochthebii, O. bicolor, rufomarginatus,† on the mud among the stems of the reeds, O. punctatus at the confluence of the Laune and Castlemaine rivers. Coccinella 7—punctata and 13—punctata in plenty on Aster; Strophosomus retusus, Apion craccæ on the herbage of the embankment. Loricera cœrulescens, *L.*, Bembidium concinnum, æneum, obtusum, assimile, Pterostichus erythropus, on the slob; Anchomenus micans by the bed of the Laune. Neither Amara convexiuscula nor Pæderus riparius occurred, which were taken previously by Mr. Furlong in this neighbourhood. Of Lepidoptera, Harpalyce populata, Crambus culmellus, and aquilellus were the most abundant; Cerapteryx graminis, Apamea didyma, and Leucania pallens, also occurring among the reeds. On the spikes of Carices, &c., a Phlœothrips was common, which might have passed for P. statices, did not the paler colour of the larva, occurring with it, mark specific difference. A large Arytæna (sonchi, *Frst*?) was common on an umbelliferous plant on the shore. Diptera were abundant, but not in great variety. Chrysops relictus as frequent as the Hæmatopotæ, Empis livida, Scatophaga scybalaria, Notiphila uliginosa, Myopa ferruginea, Sericomyia borealis, Helophilus pendulus, Dolichopus diadema, plumipes, nubilus, Rhaphium maritimæ, flavicolla, pallipes, pumilum, Porphyrops spinigerellus, pulicarius, cirripes, Chrysotus spp., a Geomyza,‡ seemingly nondescript, among the reeds on the slob. Culex detritus was abundant; Corethra plumicornis less so. Towards the bay, Glochina stigmatica was not rare on the short herbage, with Symplecta stictica, similis (?). Between Killorglin and Glen Carragh there are a number of small lakes, with peaty and gravelly bottoms. Here Gyrinus marinus and minutus were in profusion, with Hydropori of common kinds; but Gyrinus bicolor, found here by Mr. Furlong, was sought for in vain; G. natator was scarce, and G. celox not observed at all; Corynoneura minutissima, *Mg.*, abundant along the borders. The only specimen of Carabus clathratus found (living) during this excursion, was here; Anchomenus marginatus also.

From Rossbegh, a visit to Blackstones, reached by a short and romantic ride over the hills, afforded a few hours collecting among the native woods of the valley. Coleoptera were singularly scarce here; a few Cyphones, Halticæ, and Coccinellæ; little beside. Phryganidæ abundant, Chimarrha marginata the most striking among them. Among the gnats, Aedes cinereus occurred here first. Wiedemannia bistigma was hawking about the foaming edges of the "black stones" above the bridge. In an open, marshy spot, among the bushes, occurred Eriocephala allionella, Encyrtus scutellaris, Dolichopus notatus, &c., and Aleuodes quercus and Phibalocera quercana on the oak. The best capture of this day was a specimen of Melicerta ochroleuca, *Steph.*, on an oak, another having been taken a few weeks before at Blarney, which, with one found many years since at Holywood, in a like situation, and the mutilated specimen in the late Mr. Stephens's collection, upon which the genus was founded, are all the examples known of its occurrence hitherto.§

* Described and figured, D. prætextus. † Figured. ‡ G. cingulata, described and figured.
§ Described and figured in the present No. (Heptamelus ochroleucus.)

A few days spent at Killarney returning, (in the first week in August), afforded little to note. Aedes cinereus occurred again, chiefly in a disused swampy gravel-pit, at the entrance of the causeway which leads to Dinis island. Leja pulchella on umbelliferous flowers by the road below Torc mountain, where it was first found by Mr. Curtis. Brachystoma longicornis, Diadocidia ferruginosa, Mycetobia pallipes, Dolichopus discifer, atratus, atripes, ærosus. Sphegina clunipes, and Peplomyza litura, not unusual in the woods; Leiopus nebulosus and Strangalia armata. Othius pilicornis (first found here by Mr. Furlong), under bark of felled pines, with Rhizophagus cribratus (?). Ocypus olens was in unusual abundance. Ascending Mangerton, by Glen-na-cappul, a white-flowered variety of Pedicularis palustris was observed, not rare, on the hill side, east of the middle lake of the glen; and near the precipitous masses of rock which guard the upper outlet, dripping with moisture, and tufted with Sedum rhodiola and other Alpine plants, Leistus spinilabris occurred, at an elevation of more than 2,000 feet. On the summit of the mountain, enveloped in a cold, driving mist, Leistus montanus was sought in vain on this occasion, only Nebria nivalis and Lathrobium elongatum occurring under stones resting on the black peat. A walk up the gap of Dunlo afforded an apterous Aphis, at the roots of Ranunculus flammula, in such plenty that the ground seemed sprinkled with little flocks of bluish-white wool; and the banks of a rivulet, near the Black Lakes, produced Cryptostemma alienum.* About the rocks in the upper lake some specimens of a Halithea were observed, but the ticklish footing did not admit of their capture. This genus is usually confined to the sea coast, so that the attention of other visitors is invited to determine what species it is which frequents the lake.

Mr. Wright read the following paper

ON FUNGI PARASITIC ON INSECTS; WITH PARTICULAR REFERENCE TO SOME LATELY DISCOVERED IRISH SPECIMENS.

WITH A PLATE.

While it often happens that insects are parasitical on plants, and while they are frequently reared from the egg to the perfect state in the leaves and fruits of trees, so, as it were in turn, plants often grow parasitically on insects, in either the larval or perfect state. Even were I competent for the task, the rules of this Association—not being a botanical one—would prevent me from drawing more than a passing attention to the *plants* which are found attached to insects; and I shall, therefore, proceed only to give a brief outline of those insects which have been found thus invested. I shall narrate them in order of their classes, giving the most conspicuous of the insects in each class. Those that would wish for further details can consult O. F. Müller, on plants parasitic on insects, Dr. Mitchell's paper in Silliman's American Journal, or vol. 2 of a History of Insects, published in the "Family Library."

To begin with the

HYMENOPTERA.

The earliest account, I think, on record, is one given by Father Torrubia, in "Apparato Para la Histoira Naturale Espaniola," published in Madrid in the year 1754. The Spanish author tells us that, being at a gentleman's seat, two leagues from the City of the Havanna, in New Spain, on the 10th of February, 1749, he found some wasps in the fields (however, they were entire—the bodies, wings, and all—and, indeed, were perfect skeletons); from the belly of each wasp a plant germinated, which grew about five spans long. The natives call this plant "Gia;" and as it is full of sharp prickles, their vulgar notion is, that the said prickles owe their growth to the bellies of the wasps. Father Torrubia further informs us, that he made microscopical and other observations upon them; but, for some inexplicable reason, of this, the most important part, we get no details. The sketch exhibited is taken from his fourteenth plate. Edwards, in his history of rare and undescribed animals, published in London about 1763, gives a copy of these wasps in a corner of one of his plates of birds, and makes the following remarks upon

* Figured (Dipsocoris alienus).

their history :—" The Franciscan friar has treated his subject extremely well, and as a man of letters; but yet he is not quite divested of some vulgar errors. I remark this the rather, as the characters are necessary to be noted when extraordinary phenomena are to be set forth." So it would appear, that if the good father accuses the natives of holding vulgar errors, so also he is himself accused of the same by the librarian of the Royal College of Physicians.

Edwards was an ardent, though unscientific naturalist; he had, as Swainson observes, the simplicity and piety of Izaac Walton, and may be looked upon as one of our greatest worthies. He was one of Linneus's many correspondents, and was accustomed to send him proof impressions of his plates of rare animals, according as they were printed. On the occasion of his forwarding to Upsal the plate recently mentioned, Linneus wrote the following letter, which it may not be amiss to quote:—" I have received your new plates, all excellently delineated and coloured, according to your usual manner. But what chiefly induces me to write is, your table 336, in which you represent some ' vegetating wasps,' and which appear to be Vespæ; provided they have four wings—a circumstance I wish to be informed of. My thoughts are so taken up with these productions that I cannot sleep without dreaming of them. I conjure you to write to me the first day you can spare, to explain this phenomenon. What is the shrub, or branch of a shrub, which grows out of the back or breast of the insect? Is it a small branch of a rose? What connection is there between them? Is the branch of the plant grafted upon the insect so as to grow out of it? You are very cruel if you do not speedily relieve me from this puzzle. I never saw anything in nature like this production. If, indeed, the wasp merely cuts off the tip of a branch to build its nest with, the mystery is solved; otherwise it is altogether wonderful. Whence did you procure this wasp? Is there no deceit in the specimen?" It is to be hoped that the curiosity of the great Swede was fully satisfied on these points. Unhappily, this letter is the last that is on record as having passed between them.

It may be remarked that Edwards figures the wasps *flying*, though their original discoverer found them *dead* on the field; and this it was, perhaps, that gave Linneus the curious idea that they might have taken the tips of branches to build their nests. Some other wasps were found in the Island of Dominica, which buried themselves in May, and began to vegetate towards the end of July—or, rather, they were found so about that time. When the tree had arrived at its full growth, it resembled a coral branch, about three inches high, bearing several little pods, which were supposed by the inhabitants to " drop off and become worms, and thence flies." This plant is supposed to be a species of Clavaria, similar to the one which is sometimes found on dead horses' hoofs. An interesting account has been given by a gentleman who, while botanizing in America, found lying on the ground a wasp's nest, which had, by some means unknown to him, been separated from a branch of a laurel, near which it had fallen. The creatures were in a strange condition after this disaster to their dwelling; some were flitting about over their cells, and by the softness of their wings, and the faintness of their colours, were easily known to have been hatched but a short time. Many of them were lying dead on the ground; and on examining these he instantly perceived vegetables proceeding from their bodies, which were uniformly attached to the thorax. He collected about fifty of these vegetating wasps. On inspecting the nest he found a considerable proportion of the cells empty. This, however, was not the case with them all, for there were still some that contained young wasps in the state of larvæ. He drew them from their cells, and satisfied himself that there was an incipient vegetation; and, moreover, that its progress had kept pace with the growth of the insect. In some instances the vegetation is considered to commence only when life has ceased; and in confirmation of this view it is related that in Trinidad, a wasp was found, apparently in a perfect condition, glued somehow by one of its wings to the leaf of a tree; from all parts of its body issued filaments, from one to three inches long, shining black, and resembling the plant called " Spanish beard."

HEMIPTERA.

We also find fungi attacking the Cicadæ; and Mr. Edwards figures one, with a fungus growing out of its head, which was brought from Dominica, a neutral

island in the West Indies; many of them were found together buried in the earth, having each the like fungus shooting from their heads. Edwards supposes that the moisture of the earth caused these fungi to sprout. A parcel of these insects were sent to Isaac Mathew, Esq. (A.D. 1760), who gave him a sample of them, and thinks that the fungus dries and falls off before the Cicada arrives at its perfect state. Messrs. Kirby and Spence mention having one of this genus in their cabinet, "with a kind of Sphæria, with twisted thickish stipes, and oblong head, springing up in the space between the eyes." Dr. Hill says, in speaking of the Cicada—"This, you may be assured, is the fact, and all the fact; though the untaught inhabitants suppose a fly to vegetate, and though there exists a Spanish drawing of the plants growing into a perfoliate tree, and it has been figured with this creature flying with the tree upon its back—

"So wild are the imaginations of man;
So chaste and uniform is nature."

At a meeting of the Entomological Society of London, Mr. Westwood exhibited two specimens of Euglossa (family Aphidæ), and from the basal portion of the abdomen of each of these an elongated process had been produced, which was bent backwards, and rested on the dorsum of the abdomen. In one of the specimens the appendage was divided at the extremity into two branches; in the other it was dilated into two uniform lobes. There can be little doubt but that these are vegetable productions in various stages of development. Mr. Westwood also exhibited a specimen of Acanthocephalus (family Coreidæ), from the scutellum of which a great number of filamentous fungi had been produced, each being as long as the entire body. These insects were from the collection of the Rev. F. Hope.

DIPTERA.

In the diptera, fungoid growth appears to be rare, though we find it common in the house-fly. I suppose there are few that have paid any attention to the matter that have not observed flies stuck pretty firmly against the glass on our windows, or on the ceiling, and surrounded by a quantity of matter that, at first sight, appears like grease. This Kirby and Spence thought to be an animal exudation, and the result of a plethoric disease. However, the Rev. M. J. Berkeley, who is the best living authority upon anything connected with mycology, says, that he has no doubt but that this production is Sporendomena muscæ, first described by Fries, in his "Systema Muxologicorum," about 1834. There is little doubt but that the fly is attacked whilst yet living, but that the parasite is not fully developed until after death. At the meeting of the British Association in Liverpool (1834), Dr. Lyndley gave the following account of this excrescence:—"It is emitted from all parts of the fly. When highly magnified it appears to consist of elongated filaments in close contact. When a small portion is compressed, it yields moisture, but without the appearance of distinct filaments. When moistened with water the fibres separate from the mass, some being simple, others terminated by a minute globule; those upon the wing appeared merely globules. From the dispersion of the particles to a considerable distance around the body, it would appear as if sporules were discharged." This subject is a most interesting one, but as yet it does not appear to have been investigated with the carefulness desirable.

COLEOPTERA.

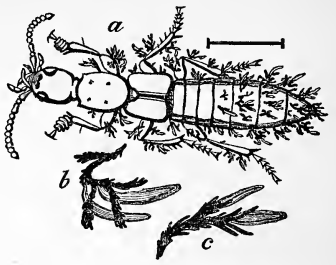
Many instances are on record of fungi growing on coleoptera, both in the larvæ and winged state. Perhaps the most remarkable is the following one:—A Curculio, from Brazil, exhibited by the Rev. Mr. Hope, at a meeting of the Entomological Society of London; from between the prothorax and elytra of which two very long and clavate fungi had been produced—one of which was entire, the other branched. Of this specimen I exhibit a sketch.

Dickson, in his "Fasciculus Plantarum Cryptogammarun Britannicarum," figures Sphæria entomorrhiza, growing from a larva, which is apparently that of one of the water beetles.

Mr. Westwood also possesses a large lamellicorn larva from South America, from the pectoral surface of the thoracic segments of which a long, slender, curved vegetable was produced.

Mr. Waterhouse has another of the same species, but the Sphæria is branched.

Perhaps the latest example that has been discovered is found in Othius fulvipennis, for the accompanying woodcut and description of which I have been indebted to the kindness of A. H. Haliday, Esq. Fig. *a* (the natural length shown by the line), *Othius fulvipennis*, found (alive) under a stone, at St. Anne's Hill, Blarney, County Cork, at the end of October, infested by a minute cryptogamic parasite, chiefly on the abdomen and legs, the head and attennæ being free. It grows attached in tufts, like a minute *Hipnum*. The stems, scarcely exceeding, at the utmost, half a line in length (fig. *b* and *c*, more highly magnified, as they appear *in situ*), are nearly black, sparingly branched, appearing imbricated and furrowed, from accumbent, smooth, compressed linear fronds, (in a more advanced stage?) becoming divergent towards the ends of the branches, which ultimately produce a thinner, foliaceous, semi-transparent, liguliform lobe, of a light brown colour (the fructification?). This parasite appears to differ from that on *Brachinus crepitans*, observed by Rouget, and figured in "Annals de la Soc. Entom. de France," Ser. 2, tome 8, pl. 3, fig. 1.



LEPIDOPTERA.

In this class we have numerous examples. In China, we read, there is found a geometrical larva, which has a long and rather thick stem, growing from the head, about $2\frac{1}{4}$ inches long. Father Parenin, who sent it to France, observes that it was a scarce plant, being found only at the palace of Pekin there; where also it was not a native, but brought from the mountains of Tibet, and some other places on the confines of the Chinese Empire. This Father had never seen the leaves or flowers of this plant, but only its roots, which were in high esteem there, not only because of their miraculous change, but from their possessing the virtues of the ginseng. The Father also sent home these roots which were supposed to be changed into a worm, for which they are called, hiatsiotonetcheon—that is to say, a plant that, at certain times, changes into a worm. The Chinese suppose that this is a plant during the summer season; but that in winter its stalk dies, and the root becomes a worm. We have also a lepidopterous larva, commonly called the New Zealand caterpillar (a number of which are exhibited). Mr. Children informs us that this grub lives entirely on the sweet potato (Convolvulus batatas, *Linn.*); during the season it continues healthy and active, but ultimately dies; it retains its natural appearance, but becomes dry and hard, when an appendage sprouts from its tail, from four to six inches long, resembling a small twig. Mr. Westwood has examined the internal appearance of some of these caterpillars, and found that the interior was filled with a hard, dry, whitish matter, like the kernel of a nut, and that a very slender, tortuous, black line ran down the centre of the body, and on each side the trachea were observed at some distance from the outside of the body. Dr. Buckland examined this whitish substance, and found it to be entirely vegetable. In this place, also, may be mentioned the Botrytis bassiana, which causes such destruction among the silk-worms abroad, and which seems to have an analogy to the fungus that attacks our house-fly.

Specimens of Sphæria attached to lepidopterous larvæ or pupæ occur but very rarely in England. The sketch I exhibit is one from the herbarium of the Rev. M. J. Berkeley. The following is its description—S. entomorrhiza:—head, one-third of an inch long, broadly elliptic, quite distinct from the stem; changes from chesnut to bright red-brown, minutely dotted with the ostiola of a tough, fleshy consistence, nearly white within; stem, two inches high; skin, thick; pale above; darker below, as the same colour of the head; slightly mottled.

No instance of this parasitism has been as yet discovered in Scotland; and it is now nearly three years since my friend, Mr. Hogan, had the pleasure of adding

these curious fungi to our Irish flora. I exhibit a drawing (plate 1) of the three specimens which he was fortunate enough to discover; and, in giving the history of the middle and most conspicuous specimen, I give that of the others also. The following is from Mr. Hogan's notes:—"The larva, bearing the Sphæria, was taken on the 10th of March, 1853, while digging for pupæ at the roots of an oak tree, in Mount Merrion, the demesne of the Right Honourable Sydney Herbert, and the residence of E. Vernon, Esq.; at this time they were quite young, the tallest not being more than a quarter of an inch in height. On examining the larva, on the 12th of April, which, acting on the advice of Professor Harvey, had been kept moist in a vessel filled with clay and moss, and covered with a piece of glass, I found fully one dozen fresh sprouts on it, pure white, and one of them about one line in height, shaped like a dagger; from that time the Sphæria continued to grow, some more and some less, rapidly for several months, always retaining the white point at the end of each stem, till, at length, the cold of winter seemed to deaden, though it did not destroy their vitality; meantime, none of the shoots showed any sign of fructification. As early spring opened, the Sphæria again threw out fresh shoots; some of the latter forming branches from the old ones, whose extremities had withered away at this stage of their growth. However, the space in which they were confined being manifestly too small, and seeming to cramp their existence, I could not resist the temptation (though, from the extreme delicacy of the plants, I knew it to be attended with great risk) of transferring the whole into a larger vessel, where they might enjoy more space, more light, and more air; but this experiment proved fatal, from what special cause I know not, and the entire nursery died away by slow degrees." Though it is a pity that none of these Sphæria fructified, so as to enable one to determine, with certainty, their species, yet it would appear that these Irish Sphærias are not either entomorrhiza or militaris, which are the only two that have been found in England. I forwarded to the Rev. Mr. Berkeley the Sphæria, No. 3, and he most kindly forwarded me, by return of post, the following:—"There is no doubt that the Sphæria is quite different from S. entomorrhiza. I know of no insect Sphæria like it. Of others, it most resembles S. filiformis."

It is to be hoped that Irish entomologists meeting with any fresh examples of these Sphæria will preserve them, and, if practicable, rear them until they fructify, as by this means alone will it be possible to determine, with accuracy, the species. I hope I may be excused for the imperfect manner in which I have accomplished my task; but, in introducing to your attention the recently mentioned Irish examples, I thought it better to give a sketch, however slight, of what is known to naturalists concerning them.

The President remarked on the advantages resulting to science from the careful collection of scattered portions of information on a subject, hitherto so little studied, as that of Mr. Wright's paper; and expressed a hope that more satisfactory results might yet arise relative to the Irish Sphæria.

Dr. Carte exhibited a fine specimen of the Egg of the Ivory Gull (Larus eburneus), which had been taken, by Captain M'Clintock, in the arctic regions. He observed the gull sitting on her nest, which was composed of dry sea-wrack, and, on a near approach to her, she flew away, leaving the single egg exhibited in the nest. Only one other specimen of this very rare egg seems to have been preserved before.

DESCRIPTIONS OF INSECTS FIGURED, AND REFERENCES TO PLATES ILLUSTRATING THE NOTES ON KERRY INSECTS. BY A. H. HALIDAY, ESQ., M.A.

N.B.—The following symbols are used in common with all the figures, where such are requisite:—

X, body; C, head; Cc, epistoma; O, eye; Oo, ocellus; B, antenna; E, mouth; L′, labrum; M′, mandible; M, maxilla; Mm, mala; L, labium; Ll, ligula; P, Palpus; P′, maxillary; P″, labial; Q, thorax; K, sternum; A, wing; S, leg; S′, fore; S″, middle; S‴, hind; Sc, coxa; St, trochanter; F, femur; T, tibia; Tc, spur; D, tarsus; Du, unguis; Dy, onychium; Dy′, empodium;

U, abdomen; V, belly; Y, hypopygium, or vagina; Z, terebra; *e*, a joint; *a*, front; *z*, back; *b*, base; *o*, tip; *l*, upper; *g*, under; *p*, side face; ⓛ, larva; ⊕, pupa.

Ord.—COLEOPTERA.

Fam.—HYDROPHILIDÆ.

Ochthebius rufomarginatus, pl. 3, fig. 1.

Erichson. K. M. Br. i. 199. 2;—Bohem. Act. Holm. X. 46. 3 (1854).

On the silt of the Castlemaine river along with O. bicolor, July.

Cercyon depressum, pl. 3, fig. 2.

Stephens's Mand. ii. 138. 5;—Manual 93. 721;—*C. dorsostriatum.* Bohem. Act. Holm. X. 54. 2.

Under fuci on sandy coasts with C. littorale, but less abundant.

Ord.—HYMENOPTERA.

Fam.—TENTHREDINIDÆ.

Gen.—HEPTAMELUS, Hal.—Melicerta* Steph. Mand. vii. 94, xxvi.

Antennæ 7-articulatæ, filiformes.

Alæ anticæ areolis radialibus 2; cubitalibus 3, 1ma. et 2da. venulam quaque excipiente; brachialibus conterminis; analis venulâ obliqua;† posticæ areolis discalibus 2 conterminis.

Heptamelus ochroleucus, pl. 2, fig. 1.

Melicerta id. Steph. Mand. vii. 95.

Long $2\frac{1}{3}$, Exp. $4\frac{1}{2}$ lines. Nearly linear, with head as broad as thorax, and depressed abdomen. Head shining black, finely stippled, and with pale pubescence; vertex with a longitudinal impression behind each lateral ocellus; epistoma with the edge nearly straight. Antennæ a little longer than the thorax, 7-jointed, pubescent, the first two joints yellowish, shorter, but scarcely thicker than the rest, 3d twice as long as 2d, the rest longer by a half only, the last not elongated. Mandibles rufescent, dusky at the tip; other parts of the mouth pale yellow; labrum entire; palpi long and slender, probably 6 and 4-jointed, respectively. Thorax shining, very faintly stippled and pubescent, rufotestaceous, pleuræ under the wings and metathorax black; sutures of mesonotum joined some way before the scutellum. Wings hyaline, with the root and tegulæ whitish, the costal vein and stigma yellow, the other veins light brown. Stigma broad oval. Radial areolets 2; cubital 3, 1st elongated, receiving the 1st discal veinlet about the middle, 2d oblong-hexagonal, receiving the 2d discal veinlet in the middle, and the radial veinlet opposite to it; pobrachial areolet not extending beyond the præbrachial, nor longer than the posterior discal; the oblique veinlet of the anal area arising as a continuation of pobrachial veinlet. Lower wings, with the two brachial areolets, of equal length, the anal one-third shorter, the two discal conterminous. Legs of moderate length, rather slender, finely pubescent, pale yellowish; spurs of tibiæ, pale, slender, subulate. Tarsi simple; ungues beneath acutely toothed in the middle. Abdomen with the first segment blackish; the following ones above with a transverse, dusky spot, attenuated at the sides, and interrupted by a pale dot in the middle; sometimes these spots are connected into a broad, jagged, dorsal band; the hindmost segments and the underside are immaculate.

This species seems to connect *Blasticotoma filiceti*, Klug. (pl. 2, fig. 2‡), and the group with 9-jointed filiform antennæ (*Emphyti*, &c.). The number of areolets, the broad stigma, and origin of the radial veinlet, agree in both genera. Peculiar to *Heptamelus* is the short pobrachial areolet, which, in the *Tenthredinidæ*, usually extends a good deal beyond the end of the præbrachial. In *Plagiocera*, also, they are conterminous;§ but the pobrachial is twice as long as the posterior discal; and

* Pluries lect.

‡ Copied from Klug.

† "Area lanceolata nervo obliquo," Hartig.

§ Klug. jb. ins. pl. 2, fig. 5.

that genus, belonging to the group with clavate antennæ, has little affinity in other respects to *Heptamelus*.

Found on the oak, Holywood (County Down), Blarney (Cork), Blackstones (Kerry)—July. Devonshire, *Stephens*, l. l.

Ord.—Hemiptera.

Fam.—Lygeidæ.

Gen.—Dipsocoris, Hal.—*Cryptostemma*,* H. Sch.

Proboscis 3-articulata, subarcuata, prosternum non superans.

Antennæ articulis 2 extremis elongatis capillaceis.

Ocelli oculorum margini appositi.

Hemelytra clavo intus appendiculato incumbente, cuneo discreto, membrana bivenia, venis medio connexis.

Tarsi articulo 2do longissimo.

Dipsocoris alienus, pl. 2, fig. 3.

Cryptostemma id. H. Schaeff. fn. g. 135. 11.—Meyer. schw. rhynch.

Long 1, Exp. 2 lines. Oblong-ovate, fusco-ferruginous, with whitish silky pile; paler beneath; abdomen brown; antennæ and legs pale yellowish; cuneus, membrane, and sutural appendage of hemelytra, glossy iridescent; wings yellowish-white, with faint ferruginous veins; head equilateral triangular, front even; ocelli ruby-red, adjacent to the upper margin of the eyes; eyes rather small, with few facets, and some fine hairs interspersed; antennæ half as long as the body; 1st joint little longer than broad; 2nd three times as long as the first, both pubescent; 3rd and 4th twice as long as the second, very slender and flexible, thinly beset with long hairs. Proboscis somewhat hairy, with the three segments of nearly equal length, the base more arched and free than usual, the last joint slender, not extending back beyond the fore coxæ, between which it reposes; thorax trapezoid, gradually widened behind in continuation of the outline of the head, one-half shorter than its anterior breadth, the fore edge nearly straight, the sides slightly sinuated, the hind edge nearly straight, the hinder angles slightly rounded; scutellum triangular, broader than long, but the apex acuminate. Wings ample, extending beyond the abdomen on all sides, and rather broader than the thorax; the fore pair with the exterior vein of the corium thick, dividing before one-third of its course into two branches, the exterior curved, approaching and then following the costal edge, the interior branch oblique, running to join the internal vein at the tip, and connected with it by a tranverse veinlet before that; veins of the clavus united before the tip, the inner edge dilated into a narrow triangular, membranous appendage, superincumbent in repose. Cuneus separated from both corium and membrane, triangular, and nearly membranous itself, marked with two oblique impressed lines; the anterior suture diaphanous, notched at the costa. Membrane ample, obliquely traversed by two veins, arising from the end of the clavus and its appendage respectively, connected about the middle by a transverse veinlet, and diverging a little as they approach the margin behind the apex. Lower wings with a deep narrow incision of the hinder edge, corresponding to the costal notch of the opposite hemelytrum when incumbent; a simple vein runs from the base to this incision, another originates from a thickened root, near the base of the wing, between this vein and the costal; from the latter, at about one-third of its course, a fainter vein springs, which soon parts into two branches, that reuniting enclose a small lanceolate areolet, and then runs towards the tip of the wing. Legs of moderate length; the fore femora especially rather thick; the posterior tibiæ armed with a few weak spines; the fore pair merely pubescent, thickened at the tip, under which lies a very minute, narrow, membranous hollow (far less developed than in *Xylocoris*). Tarsi with the first joint very short; the second twice as long as the third; the ungues as long as the latter, simple, acute, curved at the base; empodium very minute; anterior tarsi short. Abdomen brown, shining and naked above, pubescent beneath.

* Bis. lect.

Inhabits the banks of rivers, throughout the summer, gliding among the wet gravel, its silky down protecting it from the wet. It takes flight readily, even off the surface of water. The yellowish larvæ and pupæ are found in the same situation, leaping like the perfect insect.

Herrich Schæffer, the first describer, has pronounced no opinion on the affinities of this insect. Meyer doubtingly refers it to the *Capsidæ*, influenced probably by the supposed want of ocelli, which both these authors have overlooked. It seems to me better to place it, for the present, with the *Lygeidæ*, in a peculiar section, next the *Anthocorini*, and approaching, perhaps, to the *Capsidæ*, with both of which it has considerable likeness in the wings; although the dilated and imbricated sutural margin of the hemelytra is peculiar to it, and the rather short, detached proboscis makes some approach to the structure of the *Reduvidæ*. On the whole, *Xylocoris* is probably the nearest allied native genus. In its habits it most resembles the *Saldæ*, but shuns the light more than they do.

Ord.—DIPTERA.

Fam.—CHIRONOMIDÆ.

Gen.—CLUNIO.

Proboscis obsoleta.
Antennæ 11-articulatæ, articulis 3tio et ultimo elongatis.
Alæ alutaceæ, venis longitudinalibus furcatis binis, transversis nullis.
Tarsi postici articulo tertio subelongato.

Clunio marinus, pl. 2, fig. 4.

Long $\frac{4}{5}$, Exp. $\frac{2}{5}$ lines. Head rounded, dusky ferruginous, concealed under the projecting front of thorax, the mouth inflected to the prosternum. Eyes round, composed of few facets, with some hairs interspersed, approximate on the face. Antennæ inserted near the mouth, shorter than the thorax, 11-jointed, whitish, the 3rd joint elongated, the others short and more dusky, the last again elongated and thickened, elliptical. Proboscis obsolete, only the lower margin of the head scalloped, the rounded lateral lobes a little hairy at the tip, perhaps representing palpi, and the intermediate divided lobe the labium. Thorax dusky ferruginous, with the scutellum and pleuræ yellowish; oblong, a little compressed; the mesonotum tripartite by two impressed parallel longitudinal lines, an elevated line down the middle, ending in the depression before the scutellum; this convex, semicircular; metathorax very short; mesosternum gibbous backwards. Legs rather short, compressed, dingy white, pubescent; the hind tibiæ at the tip, and the hind tarsi ciliated. Fore coxa twisted, the trochanter toothed, and the base of the femur curved. Tibiæ blackish at the very base, armed at the tip with a minute black pointed spur. Anterior tarsi with the first joint linear, the following ones short suborbiculate, the last ovate; hind tarsus with the first and third linear, the second oblong, half as long as the third, the fourth short suborbiculate. Ungues dusky; empodium apparently dilated more than the onychia. Posterior coxæ extending backwards under the base of the abdomen. Wings oblong, with the axillary sinus semicircular, and the anal angle strong; the membrane adiaphanous, dingy whitish, microscopically stippled, glabrous, only the margin finely pubescent. The veins faint, the first* ending a little before the middle of the costa, the next† is forked opposite the end of the first, the posterior branch running to the tip, the anterior ending not far before it; another‡ runs to the posterior margin, becoming forked beyond the middle, with the posterior branch§ curved, and another very faint simple vein‖ accompanies the course of this. Halteres whitish. Abdomen scarcely as long as the thorax, gradually widened behind, of 7 segments, dusky, with a hoary bloom, and a pearly gloss on the posterior segments. Hypopygium as long as the abdomen, and thicker, fusco-ferruginous, with yellowish silky down, and composed of an oblong plate below, rounded at the tip, and a pair of massive compressed lateral arms, with a double ridge beneath, and rounded at the tip, where they are articulated to a smaller compressed piece, dilated at the tip, and truncated (mallet-shaped). The female unknown.

* Radial. † Præbrachial. ‡ Pobrachial. § Subanal. ‖ Anal.

Found on gravelly sea-coasts below high-water mark, walking with the wings half raised, and in rapid vibration, without taking flight. In such a situation I found, also, the empty puparia lying about, somewhat like those of a *Chironomus*. I have observed the insect only in blustery weather, as it happened, and could not find any trace of the female among them. When shut up in a box they survived but a few minutes, and all the limbs curled up.

. There are two other small Diptera known, which seem to bear an affinity to this species—viz., *Corynocera ambigua*, Zett. Ins. Lap. 856, 1, from the shore of an Alpine lake in Lapland; and *Monodicrana terminalis*, Loew Bernst. Fna. 32, an amber insect.

Fam.—DOLICHOPIDÆ.

Dolichopus prætextatus, pl. 2, fig. 5.

Pallide viridi-æneus, antennis nigris, arista glaberrima, pedibus flavis, tarsis posticis fuscis basi flavis, alis apice nigro-marginatis, alulis pallido-ciliatis, lamellis obtusis fuscis, Mas. *(Metatarso postico mutico, ciliis genarum pallidis).*

Long 2½, Exp. 5 lines. Robust; brassy-green, with hoary bloom; the thorax faintly streaked in front. Face narrow, shorter than the eyes, silvery white; lower occiput with yellowish beard. Antennæ black, short, third joint obcordate. Arista glabrous, arched, the penultimate joint as long as the third of antennæ, the last twice as long, slender. Palpi black. Wings hyaline, the tip with a narrow black edge, the hind margin sinuated, the subcostal areolet long, the subapical vein sinuated, the discal veinlet straight. Alulæ with pale fringe. Legs rather short, testaceous; coxæ cinereous; femora below, the anterior pairs only at the base, ciliated with fine pale hairs; the posterior ones above ciliated with black bristles; before the tip, in front, two spines on the middle, one on the hind thigh. Fore tarsus short, the metatarsus as long as the following three joints together; middle tarsus dusky at the joints, hind pair dusky, with only the base of the metatarsus yellowish; this is spineless and shorter than the following joint. Hypopygium, two-thirds of the length of the abdomen, and closely applied to the ventral surface; aculeus shorter than it, internally bidentate, the tip produced into a straight spine; next a forceps, with nearly linear arms, angulated near the tip; near the apex another forceps, with broader, somewhat curved, triangular lobes, pale, with dusky tip, extending beyond the lamellæ, which are blackish brown, broad at the tip, obtuse, and slightly ciliated. The length of the subcostal areolets indicates an approach to *Argyra*.

A single specimen found among the sea-reeds, on the sandhills of Rossbegh Point (Kerry), in July.

Rhaphium flavicolle, pl. 2, fig. 6.

Mg. Zw. iv. 56. 24.—Wlk. Ins. Br. i. 195. 1.—*Pallidum*, Ztt.

Aphrosylus celtiber, pl. 2, fig. 7.

Obscure schistaceus, femoribus apice posterioribus fere totis rufopiceis, antennis nigris; Mas, *lamellis fuscis longe crinitis, tarsi antici articulis 2 primis subincrassatis.*

Long 2½, Exp. 5½ lines. Dark slate-gray, head above and mesonotum blackish, the latter with two faint lighter streaks in front. Antennæ black; third joint conical, thickened at the base, twice as long as the two preceding together in female, yet longer in male. Arista about as long as the antenna, naked, thick at the base, very slender at the tip. Face ochre-brown; epistoma blackish, in male hoary. Proboscis black and glossy, except the wrinkled membranous space at the base in front. Palpi dusky ferruginous; outwardly silvered and naked in male, duller white and with black pubescence in female. Beard yellowish, with some blackish hairs next the orbit. Prosternum at each side, with three black spines (as in *A. raptor*). Wings sooty-hyaline, with blackish veins. Legs grayish black, the fore femora rufescent at the tip, the posterior femora almost wholly piceous; the armature of the legs as in *A. raptor*, the spur of fore tibia springing directly from the straight tip of this, under the thin, fluted, whitish, transparent edge. In the male, the fore metatarsus is gradually thickened to the

tip, the following joint more thickened at the base, and tapering to the end, scarcely compressed. In *A. raptor* (Wlk. Ins. Br. i. 221, 1), these two joints are much more slender and compressed, the second a little gibbous at the base only, the metatarsus still less thickened at the very extremity (fig. 8). In other respects the two species are singularly like, except in colour, and differ equally from the third species, *A. ferox* (Wlk. Ins. Br. i. 221, 2), see fig. 9.

Not uncommon on the wet rocks and tangle at Smerwick Bay (Kerry), in July.

Fam.—MUSCIDÆ.

Trib.—GEOMYZINI.

Geomyza cingulata, pl. 2, fig. 10.

Ferruginea nitida, thoracis vittis lateralibus abdominisque cingulis fuscis, articulo tarsorum extremo apice nigro, alis immaculatis.

Long 1, Exp. 2½ lines. Pale ferruginous, shining; a dusky band of the pleuræ ending under the wing, and a fainter one above it, dusky; the hind edge of the abdominal segments in the male, the second segment entirely, dusky; in the female only the edge of the second and following segments dusky, and this interrupted in the anterior ones. Face with two black bristles at each lower angle, a few very minute ones along the cheeks. Antennæ with the third joint rounded, arista hairy black. The tip of the last tarsal joint and the claws black; fore femora with a black spine beneath beyond the middle, besides a few slighter, scattered bristles. In the male, the hind femora are ciliated beneath with very short black hairs. Wings hyaline, rounded at the tip; the costal vein yellowish, minutely and sparingly pectinated, the rest light brown; the præbrachial veinlet before the middle of the discal areolet. Halteres pale.

On the silt of the Castlemaine river (Kerry), among the reeds, in July, not rare.

Trib.—EPHYDRINI.

Canace nasica, pl. 2, fig. 11.

Hal. Ann. Nat. Hist. iii. 411.—Wlk. Ins. Brit. ii. 269.

Cinereous, with pale pubescence, inclining to ferruginous on the mesonotum and scutellum, elsewhere rather glaucous. Head broader than thorax, as long as broad, above brassy-green, except the orbit and the stemmatic triangle, at each side of which there is a small impression; the ocelli very minute; the orbit with pale cilia. Eyes transversely oval, glabrous. Face, cheeks, and epistoma, glossy whitish; face short, convex in the middle, concave under the antennæ, faintly ciliated at the lower angles; cheeks broad; epistoma ample, vaulted. Antennæ short black, first joint very short, second transverse, third rounded, rather broader than long; arista finely pubescent, penultimate joint black, as long as third of antenna, the last twice as long, slender, pale. Labium glaucous gray, palpi and liplets rusty yellow. Wings whitish or obscure hyaline, veins brown, towards the base yellowish, costal vein dusky ferruginous; subapical and cubital both straight, parallel; discal veinlet straight, a little oblique, distant by little more than its own length from the end of the pobrachial vein; præbrachial veinlet a little beyond the first third of the discal areolet; mediastinal vein distinct, rejoining the subcostal at the end. Tibiæ ferruginous at the base and tip; trochanters sometimes tinged with the same colour; tarsi rusty yellow, the last joint dusky; ungues curved, black; onychia large, whitish; empodium setaceous, pubescent, pale. Abdomen somewhat conical, depressed, of seven segments, the second largest; hypopygium of male ending behind in two very short and stout black spines.

A maritime species, not rare at Rossbegh creek; found also at Smerwick Bay; July to September.

Glenanthe ripicola, pl. 2, fig. 12.

Hal. Ann. Nat. Hist. iii. 404.—Wlk. Ins. Br. ii. 258.

On grassy sea-coasts; Holywood, Portmarnock, Carragh creek, &c.

MARCH 10, 1855.

R. Ball, LL.D., President, in the Chair.

Mr. T. W. Warren said that he had the pleasure of announcing the occurrence in Ireland of Bonaparte's gull (Larus Bonapartii). The bird was shot by Captain Watkins, near Dublin, and given to Mrs. Baker, of Grafton-street, to stuff. She was under the impression that it was the little gull (Larus minutus); but Mr. Montgomery happening to see it, at once announced it to be Bonaparte's gull, with which view he coincided.

Dr. Carte produced Richardson's Fauna Boreali Americana, vol. ii., in which the Larus Bonapartii was figured, and said, that on a careful examination of the bird, he was of the same opinion as Mr. Warren and Mr. Montgomery. The bird had been beautifully stuffed by Mrs. Baker.

Dr. Ball exhibited several specimens of the L. Bonapartii, from North America (one of which specimens Dr. Carte said was the facsimile of Captain Watkin's bird). He was of opinion that the gull was not so rare as was supposed, and thought it very likely that other specimens would be obtained.

Mr. Grainger said that the only other recorded Irish specimen was that in the Belfast Museum, the species of which was determined by the late W. Thompson, Esq., with the assistance of some of the London ornithologists.

Mr. Wright, though he had no doubt but that the bird in question was the Larus Bonapartii, having the testimony of such good Irish ornithologists as Mr. Warren and Mr. Montgomery, would wish that an opportunity was afforded of comparing the bird in question with Mr. Thompson's, which is in the Museum of the Belfast Natural History Society.

Mr. John Grainger exhibited a crustacean of the genus Hyas, which he believed to be distinct from either of the described species. The circumstances of its capture were somewhat interesting. Some years ago a friend of his had taken a cod-fish, by a line, when on the banks of Newfoundland. The fish came up with its lips fastened together by the hook. It is usual, in such circumstances, for the contents of the stomach to be discharged; but, of course, on this occasion, these got no farther than the fish's mouth. On opening this, there appeared about twenty crustaceans, more or less decomposed. The most perfect was selected and sent home. It was submitted to the late Wm. Thompson, Esq., of Belfast, who pronounced it a Hyas; but neither Hyas coarctatus nor araneus, and probably an intermediate species. Mr. Grainger thought it the same species as was mentioned in DeKay's "Natural History of New York" as constituting the principal food of the cod-fish off Newfoundland, and considered by that author as identical with *coarctatus*. The principal ground on which a distinction appeared obvious was, that the carapace was very little contracted behind the orbits—indeed the entire outline of the carapace was more even than in any specimen of *coarctatus* he had seen. Again, the fingers of the hand were much shorter in proportion, and had no well-marked gap between them at their base. He, accordingly, thought the American naturalist would have been justified in establishing a distinct species; and he submitted the question to the members.

The general opinion expressed was, that there appeared well-marked differences between the specimen presented and numerous examples of coarctatus and araneus from the University and Dublin Society's collections, and that it agreed very well with the plate of Mr. DeKay, though not with his description, which included the strong contraction behind the orbits, characteristic of coarctatus.

Mr. Wright read the following notes

ON COLLECTING AND ARRANGING THE BRITISH MOLLUSCA.

The accompanying hints for collecting and naming the British mollusca are chiefly compiled from the preface to Messrs. Forbes and Hanley's history. They contain nothing that is unknown to naturalists, but I have appended them to my catalogue of Irish mollusca, under the impression that it may be of service to some who may be tyros in malacology, and to whom the smallest hint is useful;

besides, it is not every young collector who possesses a copy of Messrs. Forbes and Hanley's expensive work. The portion about dredging is a recapitulation of instructions I have personally received from Dr. Ball, no mean authority on this subject; and I need hardly add that the same instructions will apply whether the naturalist be collecting mollusca or any other marine animals for aquariums. I have endeavoured to be as brief as possible, and hope, in my endeavour to do so, I have not become unnecessarily obscure.

COLLECTING.

The first animals that appear in a list of British mollusca are the Acephala tunicata. If, when walking upon the sea-shore, about low-water mark, we turn over large stones, or look under the projecting eaves of rocks, we are almost sure to find some translucent, jelly-like masses, of various hues of orange, purple, yellow, blue, gray, and green—sometimes nearly uniform in tint, sometimes beautifully variegated, and very frequently pencilled as with stars of gorgeous device—now encrusting the surface of the rock, now depending from it in icicle-like projections—these are the Botryllidæ, or true compound Ascideans, the first family of the Tunicata. They are also found attached to the stalks of sea-weeds. The Clavelinidæ, or social Ascideans, will be found attached to rocks, stones, and sea-weeds; and the Ascidiadæ, or simple Ascideans, are taken in quantities, in dredging, attached to shells, and pieces of rocks; the Peloniadæ are also taken in the same situations; while the last family—namely, the Salpidæ—are free, and habitually swim in the waters of the ocean. Having thus briefly pointed out the localities where the Acephala tunicata may be expected to be found, we shall proceed at once to the more important part of this chapter—the collecting of the testaceous mollusca.

The division of the testaceous mollusca into marine, land, fresh-water, and fluviatile, will, I think, be the most convenient to adopt—as, if we take them in the natural order of their affinities, we would have, on more than one occasion, to leave our station on the sea-side, or, perhaps, many miles from land, to seek some inland lake or stream. As the mollusca are arranged in the accompanying list in their proper order, this departure from it here will be of less importance. To begin, then, with the marine mollusca. Messrs. Forbes and Hanley speak of zones or depths of growth, and mean by this phrase the several belts or spaces margining the land, or occupying the floor of the sea, distinguished from each other by the presence of peculiar features dependent on arrangements of their animal and vegetable inhabitants.

The highest of these belts is the space between tide-marks, an interval of very great importance in the marine fauna of our islands. It is termed the Littoral Zone. Its features vary with the geological, or, rather, mineralogical characters of the coast, and its population—both as to kind and number—varies correspondently. Where it is rocky, it is inhabited by numerous gasteropodous mollusks; where muddy or sandy, by burrowing bivalves; or in such localities it is not unfrequently devoid of Testacea. The common limpets (*Patella vulgata*), the various species of periwinkles (*Littorina*), the dog-whelk (*Purpura lapillus*), certain forms of *Trochus* and *Rissoa*, the little *Skenea planorbis*, the common mussel, and the minute *Kellia rubra*, inhabit this zone on hard, rocky ground. On sandy and muddy shores, numerous bivalves are often thrown up by the waves, not a few of which are to be found alive in the lower division of this zone. In places where the water is brackish, it swarms with *Rissoa ulvæ*.

It is capable of being divided into several sub-regions, each marked by prevailing forms of animals. The uppermost is distinguished by the presence of the smaller varieties of *Littorina rudis* and *L. neritoides;* a second belt, by the abundance of *Mytilus edulis*, and the larger forms of *Littorina rudis;* a third, by the prevalence of *Littorina littorea* and *Purpura lapillus;* a fourth and lowermost, by the dominance of *Littorina littoralis*, various *Rissoæ*, especially *R. parva* and *Trochus cinerarius* These divisions into sub-regions will not, I think, be found carried fully out by the practical malacologist, for he will most generally find all the characteristic mollusca of the four regions in a space intermediate between the second and third. On some shores it is possible these distinctions may be traced.

A second region is the Circum-littoral or Laminarian Zone, so called from

the abundance of tangles or sea-weeds of the genus *Laminaria* which flourish in it around the shores of Europe. On sandy ground these are replaced by the grass-wrack or *Zostera*. Vegetable-feeding shell-fish and naked mollusca are exceedingly numerous in this space. Its usual vertical extent may be stated to be between low-water mark and fifteen fathoms (90 feet). Owing to the depth of the Laminarian Zone, no mollusca can be obtained from it except by dredging; and here, for the sake of those who are not quite masters of this subject, I may add a few words about the dredge itself, and of how and where to use it.

There are several kinds of dredges, but the one that is now universally used is called the *naturalist's dredge*, first recommended, many years since, by Dr. Ball. It consists of an iron, rectangular frame (if the iron be galvanized it will resist the action of the sea-water better)—13 inches by 3 will make a convenient-sized dredge; but, of course, it can be made of any size; a scraper is attached to *each* side, having a bag attached in the usual manner. This bag can be made of spun yarn, or of fishing-line, netted with a small mesh, or, what is best of all, when it can be obtained, raw hide, cut into fine thongs, and netted in like manner. The meshes might be three-fourths of an inch at the iron rim, and diminish to one-fourth at the end of the bag; but there should always be a free current of water through it while the dredge is on the bottom, or else it only acts as a scraper, driving every thing before it and coming up empty. The handles of the dredge are moveable, and are nearly the length of the frame, so as that they may both lie evenly in the space between the scrapers of the dredge; to each of the handles is attached half a dozen links of a chain, which are connected by a plain ring, to which the rope is attached; the flexibility of the chain increases the biting power of the scraper.

The dredge may be thrown out of either the stern or side of the boat; and it will economize time, if to the same rope two dredges be attached; so that while one is examining the contents of one dredge, the other may be actively employed—of course, as you pull up the one you let down the other; you should allow nearly thrice as much rope to be overboard, as the perpendicular depth would require; thus, if you were dredging in seven fathoms of water, you should, at least, have, overboard, twenty-one fathoms of rope, otherwise your dredge will only hop along the bottom. In case the dredge gets fast in a rock, or in a large Laminarian forest, it is advisable to reverse the rowing, so as to pull contrariwise to that in which the dredge has been entangled, and this will generally succeed in getting it free. In dredging in sounds, or where currents prevail, in a row-boat, of course, you always row with the current; and in sailing, the boat is put before the wind—the inward edge of the rope, in all cases, being made fast to one of the boat's thwarts; but this should be done with great caution; for if the dredge gets suddenly entangled, and the rope that connects it be good, it will be very likely to carry away the mast, if not upset the boat. This accident has happened in dredging in the west of Ireland. For deep-sea dredging, where there is danger of the dredge floating, this difficulty can be removed by affixing a weight at a short distance from its mouth.

It is not on every coast that dredging can be practised. On some, the surf is habitually too great to admit of boating. On some shores no boats are to be had, there being no harbours where they can be kept in safety. On the west coasts of Ireland, for example, the broad waves of the Atlantic continually rolling in, keep up a troubled water, in which the pursuits of the deep-sea naturalists can rarely be carried on. In other places, a rocky, or, as it is technically called, a foul bottom, and, in other terms, fields of sea-weeds, marine forests, present insuperable obstacles to the use of a dredge. Land-locked bays and harbours, where a quiet water flows over a smooth or a shingly bottom, or lies on oyster or scallop beds, are the favourite grounds for the amateur dredger—not that but sometimes he will even face the roar of the Atlantic in the cause of science. Where large banks occur at a long distance from land, they greatly reward the naturalist; but require an absence from the shore of several days. The naturalist will frequently find, thrown up on the Littoral Zone, large heaps of dead shells, the proper inhabitants, when living, of the Laminarian or, perhaps, more frequently those of the Coralline Zones; by paying accurate attention to the currents which set in and about the heap, he will be able, in general, to trace the locality of the living shells, which will be mostly found in beds.

Before leaving the subject of dredging, I would wish to record the following note from Captain M'Clintock, in reference to the naturalist's dredge:—

"My Dear Dr. Ball—Although we have left our ships and almost *all* our private property, as well as that belonging to the crown, behind us, yet the very small collection my other duties permitted me to collect with the dredge, I have brought home for you. There may be something of interest; and, according to Sir Edward Belcher, we have obtained some rare and new creatures.

"Although Sir Edward has devoted so many years of his life mainly to shell collecting, he was much struck with your little dredge; he immediately borrowed it, and had a larger one made of the same pattern. He confesses (and it is a great confession for him) that it is the *best* he has ever seen.

"Yours, very sincerely,

"F. L. M'Clintock."

The Genera *Lacuna* (except one species), *Calyptræa aplysia*, *Scrobicularia*, and *Donax* do not range in our seas below this, the Laminarian belt, and *Rissoa*, *Chiton*, *Bulla*, *Trochus*, *Mactra*, *Venus*, and *Cardium* have the majority of their species within its precincts.

A third region is the Median or Coralline Zone, occupying the space been fifteen and fifty fathoms. In its upper portion, Trochus ziziphinus and tumidus, Chiton asellus, Acmæa virginea, Turritella communis, Venus ovata, and V. fasciata, Pecten opercularis, Modiola modiolus, the common form of Crenella, Pectunculus glycimeris, and Nucula nucleus, are characteristic testacea; and on its lower half, Solen pellucidus, Pecten varius, Dentalium, and Mactra elliptica. It is marked more by the peculiarities of its species than by the exclusive presence of genera.

The fourth region is the infra median; its most characteristic portions are in the extreme north. There are very few species of mollusca peculiar to it in our seas; those that are found are, for the most part, of rather small dimensions, and remarkable for being of dull or pale colouring. Beneath this zone is the *Abryssal region*, which cannot be said to be developed within the British seas.

Besides these several subdivisions of the floor of the ocean, there are the high levels of the sea-water itself, inhabited by a small assemblage of mollusks. The Genera Ianthina and Spirialis among our testacea, and our solitary species of Salpa, as well as the curious and anomalous Appendicularia among Tunicata, are inhabitants of this marine atmosphere; all these forms are, however, very local around our coasts. Bivalve mollusca would appear to be more extensively distributed in depth and to constitute more constant links between zone and zone than univalves.

Having thus given some idea where the student will be likely to find the several genera and species of marine testacea, we must turn our attention to the Nudibranchs, or naked mollusca. These can be dismissed in a very few words; they are chiefly to be found in rocky places, which, indeed, is the favourite locality for the majority of the Gasteropoda, and will be discovered creeping in the rock-pools, or upon the fronds of algæ. Next in order we come to land shells, and there is not a place throughout the length and breadth of our country that some one species may not be found. The common Helix aspersa is a follower of cultivation; and where is the garden that cannot boast of the garden snail? Some of them prefer the sea-side, as Helix pisana, H. virgata, H. ericetorum, H. nemoralis, Bulimus acutus, and others; some keep themselves strictly secluded to the chalk regions, as H. pomatia, H. carthusiana, Pupa secale, &c.; some hide themselves beneath moss, and it requires diligent search to find them, as H. pulchella, many of the Pupa and Zonites; others, again, climb to the tops of mountains, or love the retired recesses of deep woods, as Helix arbustorum; endless are the situations in which we find the land shells, and few, if any, districts are without their fair proportion of them.

The fresh-water shells are also found very widely distributed. In the swift-running streams Cyclas cornea will be found, with others of the same genus, and Ancylus fluviatilus holds hard to some large stone, braving most boldly the vigour of the stream. In ponds of stagnant water, Limneus palustris, truncatulus, Bithinia tentaculata, Planorbis corneus, and others will be found; while, again, up in a

a small Alpine lake, on Cromaglaun mountains, near Killarney, Limneus involutus enjoyed itself in perfect safety, until our learned professor, Dr. Harvey, took away the chiefest of them. Quick-flowing rivers are the favourite places for the Unio margatiferus, Pisidium pulchellum, and others; while on the green leaves of the water-lily, or on the white petals of its flower, cling the local Ancylus oblongus; others live in thick mud, at the bottom of lakes and ponds, and hence, from this circumstance, have received their generic names, as Paludina and others. This enumeration of places where the mollusca are likely to be found would be incomplete did we not mention those damp places near the vicinity of the sea, within reach of its salt spray, where Conovolus bidentatus and Carychimum minimum are to be found. These might come under the denomination of fluviatile shells. In conclusion, we have the Cephalopoda; and, as far as regards them, the collector must act the reverse of Mahommed and the mountain, and, as he cannot go to them, he must wait until they come to him. Free and unshackled, they live in the dark-blue waters of the ocean, tied to no zone, peculiar to no country.

The testaceous mollusca are easily preserved, as few things in nature are more indestructible than shells, and we find them, after the lapse of many years, even retaining some of their vivid colours, though imbedded in the coralline or red crags. The naked mollusca and Tunicata are preserved in either spirits of wine or Goadby's solution, and either will do for dissections of the testaceæ. To kill the animals of the latter, they can be immersed in hot water; but it should never be boiling at the time, as it often spoils the colour of the shells. A crooked pin will enable the collector to extract the body of the univalve, and by cutting the strong muscle which keeps the bivalve shut, they will be easily cleaned out. The siphons in the bivalves should be cleaned out, and neatly stuffed with a little fine cotton. The Chitons when taken had better be allowed to settle themselves flat at the bottom of the vessel in which they are carried home; and I have always found them, when once attached to the sides or bottom of my collecting-box, die in a few days perfectly flat; however, if they once curl themselves up, they will have to be unrolled, and a piece of string tied across them, and left for some time until they harden.

In some of the minute Rissoa, Pupa, and others, it is better not to attempt to take out the animal, as, even with the greatest caution, the mouth of the shell will be injured; and this is an important part in the discrimination of the species.

Of the many ways of arranging collections, I think the following will be found the most convenient—*i.e.*, for private collections—to gum the shells on pieces of paper, and these to be placed in card boxes. If gum tragacanth be used, the shell can be at any time taken from the paper, by putting paper and shell into a basin of warm water, and leaving them there for some time. Bivalves should always have one specimen open to show the arrangement of the hinge and the impression of the muscle and univalves, one turned so as to exhibit the mouth of the shell.

In public collections the French method is now very generally adopted—viz., that of fixing the shells on thin pieces of wood, covered with a neutral-coloured paper. These slips are made multiples of each other, so that they all fit in a cabinet, without any interstices. A convenient size is—for small shells, $2\frac{1}{2}$ by 3 inches; for larger size, 5 by 3 inches; and for the largest, 5 by 6 inches. By this plan any single species can be removed without disturbing the rest. The Tunicata, naked mollusca, and Cephalopoda can be arranged in glass bottles over the cabinet.

CATALOGUE OF BRITISH MOLLUSCA.

[Those marked thus † are Irish.]

The following catalogue of mollusca is compiled from Messrs. Forbes and Hanley's splendid history, in four volumes, of the British mollusca. I thought it better to give the whole of the British mollusca, and mark those that are Irish, than only to give the latter, as it will show the difference between the faunas.

Those marked with a dagger, are species which have been taken in Ireland; and I have great pleasure in returning thanks to Drs. Allman, Ball, Melville, and Farran, and to Messrs. T. W. Warren, J. Grainger, W. W. Walpole, and A. R. Hogan, for the assistance they have given me in determining these. I have also had recourse to Mr. W. Thompson's list of Irish mollusca, and Messrs. Forbes and Hanley's History.

Of course, the nomenclature which appears in the above work is strictly followed, with one exception, which one is sufficiently accounted for in the proper place. But as Dr. Gray's edition of Turton's Manual of Land and Fresh-water Mollusca is in extensive use among naturalists in this country, it has been thought better to give his names as synonyms, hoping, by this means, that collectors will adopt the *prior*, though apparently *new*, names for those mollusca, fully confident as we are that this History, by Messrs. Forbes and Hanley, must unquestionably rank as the first work upon this subject, and will be the standard of reference to all who study the objects upon which it treats.

The figures after the authority for the specific names, refer to the volume and page where the history of the mollusc is given in Messrs. Forbes and Hanley's work. The synonyms, in italics, are the names given by Dr. Gray in his edition of Turton's Manual of Land and Fresh-water Shells.

ACEPHALA TUNICATA.

I. BOTRYLLIDÆ.

1 Aplidium ficus, *Linneus.* v. 1. p. 11.
2 Aplidium fallax, *Johnston.* v. 1. p. 11.
3 Aplidium nutans, *Johnston.* v. 1. p. 12.
†4 Sydnyum turbinatum, *Savigny.* v. 1. p. 14.
5 Polyclinum aurantium, *Milne-Edwards.* v. 1. p. 14.
†6 Amouroucium proliferum, *Milne-Edwards.* v. 1. p. 15.
7 Amouroucium Nordmanni, *Milne-Edwards.* v. 1. p. 15.
8 Amouroucium Argus, *Milne-Edwards.* v. 1. p. 16.
†9 Leptoclinum maculosum, *Milne-Edwards.* v. 1. p. 16.
†10 Leptoclinum asperum, *Milne-Edwards.* v. 1. p. 17.
†11 Leptoclinum aureum, *Milne-Edwards.* v. 1. p. 17.
†12 Leptoclinum gelatinosum, *Milne-Edwards.* v. 1. p. 17.
13 Leptoclinum Listerianum, *Milne-Edwards.* v. 1. p. 17.
14 Leptoclinum punctatum, *Forbes.* v. 1. p. 18.
†15 Distoma rubrum, *Savigny.* v. 1. p. 18.
†16 Distoma variolosum, *Gœrtner.* v. 1. p. 19.
†17 Botryllus Scholsseri, *Pallas.* v. 1. p. 19.
†18 Botryllus polycyclus, *Savigny.* v. 1. p. 21.
†19 Botryllus gemmeus, *Savigny.* v. 1. p. 22.
20 Botryllus violacens, *Milne-Edwards.* v. 1. p. 22.
†21 Botryllus smaragdus, *Milne-Edwards.* v. 1. p. 22.
†22 Botryllus bivittatus, *Milne-Edwards.* v. 1. p. 23.
†23 Botrylloïdes Leachii, *Savigny.* v. 1. p. 23.
†24 Botrylloïdes albicans, *Milne-Edwards.* v. 1. p. 24.
†25 Botrylloïdes rotifera, *Milne-Edwards.* v. 1. p. 24.
†26 Botrylloïdes rubrum, *Milne-Edwards.* v. 1. p. 24.

II. CLAVELINIDÆ.

†27 Clavelina lepadiformis, *O. F. Müller.* v. 1. p. 26.
†28 Perophora Listeri, *Wiegmann.* v. 1. p. 28.

III. ASCIDIADÆ.

29 Ascidia intestinalis, *Linneus.* v. 1. p. 31.
†30 Ascidia canina, *O. F. Müller.* v. 1. p. 31.
†31 Ascidia venosa, *O. F. Müller.* v. 1. p. 31.
†32 Ascidia mentula, *O. F. Müller.* v. 1. p. 32.
33 Ascidia arachnoidea, *Forbes.* v. 1. p. 32.
†34 Ascidia scabra, *O. F. Müller.* v. 1. p. 33.
35 Ascidia virginea, *O. F. Müller.* v. 1. p. 33.
†36 Ascidia parallelogramma, *O. F. Müller.* v. 1. p. 34
†37 Ascidia prunosa, *Müller?* v. 1. p. 34.
†38 Ascidia orbicularis, *Müller.* v. 1. p. 34.

†39 Ascidia aspersa, *Müller*. v. 1. p. 35.
†40 Ascidia vitrea, *Van Beneden*. v. 1. p. 35.
†41 Ascidia conchilega, *O. F. Müller*. v. 1. p. 35.
†42 Ascidia echinata, *Linneus*. v. 1. p. 35.
43 Molgula oculata, *E. Forbes*. v. 1. p. 36.
44 Molgula tubulosa, *Rathke*. v. 1. p. 36.
†45 Cynthia microcosmus, *Savigny*. v. 1. p. 37.
†46 Cynthia claudicans, *Savigny*. v. 1. p. 37.
47 Cynthia tuberosa, *Macgilivray*. v. 1. p. 37.
48 Cynthia quadrangularis, *E. Forbes*. v. 1. p. 38.
49 Cynthia informis, *E. Forbes*. v. 1. p. 38.
50 Cynthia tessellata, *E. Forbes*. v. 1. p. 38.
51 Cynthia Limacina, *E. Forbes*. v. 1. p. 39.
52 Cynthia morus, *E. Forbes*. v. 1. p. 39.
53 Cynthia rustica, *Linneus*. v. 1. p. 39.
54 Cynthia grossularia, *Van Beneden*. v. 1. p. 40.
55 Cynthia ampulla, *Brugière*. v. 1. p. 40.
56 Cynthia mammillaris, *Pallas*. v. 1. p. 40.
57 Cynthia aggregata, *Rathke*. v. 1. p. 41.

IV. PELONAIADÆ.

58 Pelonaia corrugata, *Forbes and Goodsir*. v. 1. p. 43.
59 Pelonaia glabra, *Forbes and Goodsir*. v. 1. p. 43.

V. SALPIDÆ.

†60 Salpa runcinata, *Chamisso*. v. 1. p. 53.

ACEPHALA LAMELLIBRANCHIATA.

I. PHOLADIDÆ.

†61 Teredo Norvagica, *Spengler*. v. 1. p. 66.
62 Teredo navalis, *Linneus*. v. 1. p. 74.
†63 Teredo megotara, *Hanley*. v. 1. p. 77.*
†64 Teredo bipennata, *Turton*. v. 1. p. 80.*
65 Teredo malleolus, *Turton*. v. 1. p 84.*
†66 Teredo palmulata, *Lamarck*. v. 1. p. 86.*
†67 Xylophaga dorsalis, *Turton*. v. 1. p. 90.
†68 Pholas dactylus, *Linneus*. v. 1. p. 108.
†69 Pholas parva, *Pennant*. v. 1 p. 111.
†70 Pholas crispata, *Linneus*. v. 1. p. 114.
†71 Pholas candida, *Linneus*. v. 1. p. 117.
†72 Pholadidea papyracea, *Solander*. v. 1. p. 123.

II. GASTROCHÆNIDÆ.

†73 Gastrochæna modiolina, *Lamarck*. v. 1. p. 132.
†74 Saxicava Arctica, *Linneus*. v. 1. p. 141.
†75 Saxicava rugosa, *Linneus*. v. 1. p. 146.
†76 Petricola lithophaga, *Retzius*. v. 1. p. 151.
†77 Venerupis irus, *Linneus*. v. 1. p. 174.

III. MYADÆ.

†78 Mya truncata, *Linneus*. v. 1. p. 163.
†79 Mya arenaria, *Linneus*. v. 1. p. 168.
80 Panopæa Norvegica, *Spengler*. v. 1. p. 175.

* Species not proved to be of British origin.

IV. CORBULIDÆ.

†81 Corbula nucleus, *Lamarck.* v. 1. p. 180.
†82 Corbula rosea, *Brown.* v. 1. p. 185.
83 Corbula ovata, *Forbes.* v. 1. p. 187.
†84 Sphænia Binghami, *Turton.* v. 1. p. 190.
†85 Neæra cuspidata, *Olivi.* v. 1. p. 195.
86 Neæra costellata, *Deshayes.* v. 1. p. 199.
87 Neæra abbreviata, *Forbes.* v. 1. p. 201.
88 Poromya granulata, *Nyst and Westendorp.* v. 1. p. 204.

V. PANDORIDÆ.

89 Pandora rostrata, *Lamarck.* v. 1. p. 207.
†90 Pandora obtusa, *Leach.* v. 1. p. 210.
†91 Lyonsia Norvegica, *Chemnitz.* v. 1. p. 214.

VI. ANATINIDÆ.

†92 Trachia phasseolina, *Lamarck.* v. 1. p. 221.
†93 Trachia villosiuscula, *Macgilivray.* v. 1. p. 224.
†94 Trachia pubescens, *Pulteney.* v. 1. p. 226.
†95 Trachia convexa, *Wood.* v. 1. p. 229.
†96 Trachia distorta, *Montagu.* v. 1. p. 231.
†97 Cochlodesma prætenue, *Pulteney.* v. 1. p. 235.

VII. SOLENIDÆ.

†98 Solen marginatus, *Pulteney.* v. 1. p. 242.
†99 Solen siliqua, *Linneus.* v. 1. p. 246.
†100 Solen ensis, *Linneus.* v. 1. p. 250.
†101 Solen pellucidus, *Pennant.* v. 1. p. 252.

VIII. SOLECURTIDÆ.

†102 Ceratisolen legumen, *Linneus.* v. 1. p. 256.
†103 Solecurtus coarctatus, *Gmelin.* v. 1. p. 259.
†104 Solecurtus candidus, *Renieri.* v. 1. p. 263.

IX. TELLINIDÆ.

†105 Psammobia vespertina, *Chemnitz.* v. 1. p. 271.
†106 Psammobia Ferröensis, *Chemnitz.* v. 1. p. 274.
†107 Psammobia tellinella, *Lamarck.* v. 1. p. 277.
†108 Psammobia costulata, *Turton.* v. 1. p. 279.
†109 Diodonta fragilis, *Linneus.* v. 1. p. 284.
†110 Tellina crassa, *Pennant.* v. 1. p. 288.
†111 Tellina balaustina, *Linneus.* v. 1. p. 290.
†112 Tellina donacina, *Linneus.* v. 1. p. 292.
†113 Tellina pygmæa, *Philippi.* v. 1. p. 295.
†114 Tellina incarnata, *Linneus.* v. 1. p. 298.
†115 Tellina tenuis, *Da Costa.* v. 1. p. 300.
†116 Tellina fabula, *Gronovius.* v. 1. p. 302.
117 Tellina solidula, *Pulteney.* v. 1. p. 304.
†118 Tellina proxima, *Brown.* v. 1. p. 307.
†119 Syndosmya alba, *Wood.* v. 1. p. 316.
†120 Syndosmya intermedia, *Thompson.* v. 1. p. 319.
†121 Syndosmya prismatica, *Montagu.* v. 1. p. 321.
†122 Syndosmya tenuis, *Montagu.* v. 1. p. 323.
†123 Scrobicularia piperata, *Gmelin.* v. 1. p. 326.

X. DONACIDÆ.

†124 Donax anatinus, *Lamarck.* v. 1. p. 332.
†125 Donax politus, *Poli.* v. 1. p. 336.
†126 Ervilia castanea, *Montagu.* v. 1. p. 341.

XI. MACTRIDÆ.

†127 Mactra solida, *Linneus*. v. 1. p. 351.
†128 Mactra truncata, *Montagu*. v. 1. p. 354.
†129 Mactra elliptica, *Brown*. v. 1. p. 356.
†130 Mactra subtruncata, *Da Costa*. v. 1. p. 358.
†131 Mactra stultorum, *Linneus*. v. 1. p. 362.
132 Mactra Helvacea, *Chemnitz*. v. 1. p. 366.
†133 Lutraria elliptica, *Lamarck*. v. 1. p. 370.
†134 Lutraria oblonga, *Chemnitz*. v. 1. p. 734.

XII. VENERIDÆ.

†135 Tapes decussata, *Linneus*. v. 1. p. 379.
†136 Tapes pullastra, *Wood*. v. 1. p. 382.
†137 Tapes virginea, *Linneus*. v. 1. p. 388.
†138 Tapes aurea, *Gmelin*. v. 1. p. 392.
†139 Cytherea Chione, *Linneus*. v 1. p. 396.
†140 Venus verrucosa, *Linneus*. v. 1. p. 401.
†141 Venus casina, *Linneus*. v. 1. p. 405.
†142 Venus striatula, *Donovan*. v. 1. p. 408.
†143 Venus fasciata, *Donovan*. v. 1. p. 415.
†144 Venus ovata, *Pennant*. v. 1. p. 419.
†145 Artemis exoleta, *Linneus*. v. 1. p 428.
†146 Artemis lincta, *Pulteney*. v. 1. p. 431.
†147 Lucinopsis undata, *Pennant*. v. 1. p. 435.

XIII. CYPRINIDÆ.

†148 Cyprina Islandica, *Linneus*. v. 1. p. 441.
†149 Circe minima, *Montagu*. v. 1. p. 446.
†150 Astarte sulcata, *Da Costa*. v. 1. p. 452.
151 Astarte crebricostata, *Forbes*. v. 1. p. 456.
†152 Astarte elliptica, *Brown*. v. 1. p. 459.
153 Astarte Arctica, *Gray*. v. 1. p. 461.
†154 Astarte compressa, *Montagu*. v. 1. p. 464.
†155 Astarte triangularis, *Montagu*. v. 1. p. 467.
†156 Isocardia cor, *Linneus*. v. 1. p. 472.

XIV. CARDIADÆ.

†157 Cardium aculeatum, *Linneus*. v. 2. p. 4.
†158 Cardium echinatum, *Linneus*. v. 2. p. 7.
†159 Cardium rusticum, *Linneus*. v. 2. p. 11.
†160 Cardium edule, *Linneus*. v. 2. p. 15.
†161 Cardium nodosum, *Turton*. v. 2. p. 22.
†162 Cardium fasciatum, *Montagu*. v. 2. p. 25.
†163 Cardium pygmæum, *Donovan*. v. 2. p. 29.
†164 Cardium Suecicum, *Reeve*. v. 2. p. 33.
†165 Cardium Norvegicum, *Spengler*. v. 2. p. 35.

XV. LUCINIDÆ.

†166 Lucina Borealis, *Linneus*. v. 2. p. 46.
†167 Lucina spinifera, *Montagu*. v. 2. p. 49.
168 Lucina divaricata, *Linneus*. v. 2. p. 52.
†169 Lucina flexuosa, *Montagu*. v. 2. p. 54.
†170 Lucina leucoma, *Turton*. v. 2. p 57.
171 Lucina ferruginosa, *Forbes*. v. 2. p. 60.
†172 Diplodonta rotundata, *Montagu*. v. 2. p. 66.

XVI. KELLIADÆ.

†173 Montacuta ferruginosa, *Montagu*. v. 2. p. 72.
†174 Montacuta bidentata, *Montagu*. v. 2. p. 75.
†175 Montacuta substriata, *Montagu*. v. 2. p. 77.

†176 Turtonia minuta, *O. Fabricius.* v. 2. p. 81.
†177 Kellia suborbicularis, *Montagu.* v. 2. p. 87.
†178 Kellia nitida, *Turton.* v. 2. p. 92.
†179 Kellia (Poromia) rubra, *Montagu.* v. 2. p. 94.
†180 Lepton squamosum, *Montagu.* v. 2. p. 98.
†181 Lepton convexum, *Alder.* v. 2. p. 102.
†182 Galeomma Turtoni, *Sowerby.* v. 2. p. 105.*

XVII. CYCLADIDÆ.

183 Cyclas rivicola, *Leach.* v. 2. p. 111.
†184 Cyclas cornea, *Linneus.* v. 2. p. 113.
†185 Cyclas caliculata, *Draparnaud.* v. 2. p. 115.
†186 Pisidium obtusale, *Pfeiffer.* (?) v. 2. p. 118.
†187 Pisidium pusillum, *Turton.* v. 2. p. 120.
†188 Pisidium cinereum, *Alder.* v. 2. p. 123.
†189 Pisidium nitidum *Jenyns.* v. 2. p. 125.
†190 Pisidium pulchellum, *Jneyns.* v. 2. p. 126.
†191 Pisidium Henslowianum, *Sheppard.* v. 2. p. 128.
†192 Pisidium amnicum, *Müller.* v. 2. p. 131.

XVIII. UNIONIDÆ.

193 Unio tumidus, *Retzius.* v. 2. p. 133.
194 Unio pictorum, *Linneus.* v. 2. p. 140.
†195 Unio margatiferus, *Linneus.* v. 2. p. 142.
†196 Anodonta cygnea, *Linneus.* v. 2. p. 146.

XIX. MYTILIDÆ.

197 Dreissena polymorpha, *Pallas.* v. 2. p. 155.
†198 Mytilus edulis, *Linneus.* v. 2. p. 170.
†199 Modiola modiolus, *Linneus.* v. 2. p. 182.
200 Modiola phaseolina, *Philippi.* v. 2. p. 186.
†201 Modiola tulipa, *Lamarck.* v. 2. p. 187.
†202 Modiola barbata, *Linneus.* v. 2. p. 190.
†203 Crenella discors, *Linneus.* v. 2. p. 195.
†204 Crenella marmorata, *Forbes.* v. 2. p. 198.
†205 Crenella nigra, *Gray.* v. 2. p. 202.
206 Crenella costulata, *Risso.* v. 2. p. 205.
207 Crenella rhombea, *Berkeley.* v. 2. p. 208.
†208 Crenella decussata, *Montagu.* v. 2. p. 210.

XX. ARCADÆ.

†209 Nucula nucleus, *Linneus.* v. 2. p. 215.
†210 Nucula nitida, *Sowerby.* v. 2. p. 218.
†211 Nucula radiata, *Hanley.* v. 2. p. 220.
†212 Nucula decussata, *Sowerby.* v. 2. p. 221.
†213 Nucula tenuis, *Montagu.* v. 2. p 223.
†214 Leda caudata, *Donovan.* v. 2. p. 226.
215 Leda pygmæa, *Munster.* v. 2. p. 230.
†216 Arca tetragona, *Poli.* v. 2. p. 234.
†217 Arca lactea, *Linneus.* v. 2. p. 238.
†218 Arca raridentata, *Searles Wood.* v. 2. p. 241.
†219 Pectunculus glycimeris, *Linneus.* v. 2. p. 245.

XXI. AVICULACEÆ.

†220 Avicula Tarentina, *Lamarck.* v. 2. p. 257.
†221 Pinna pectinata, *Linneus.* v. 2. p. 255.

* This mollusc is marked as Irish on the authority of a single valve marked "Ireland," in the collection of Mr. Humphreys.

XXII. OSTREADÆ.

†222 Lima subauriculata, *Montagu*. v. 2. p. 263.
†223 Lima Loscombii, *Sowerby*. v. 2. p. 263.
†224 Lima hians, *Gmelin*. v. 2. p. 268.
†225 Pecten varius, *Linneus*. v. 2. p. 273.
†226 Pecten niveus, *Macgillivray*. v. 2. p. 276.
†227 Pecten pusio, *Pennant*. v. 2. p. 278.
†228 Pecten striatus, *Müller*. v. 2. p. 281.
†229 Pecten tigrinus, *Müller*. v. 2. p. 285.
230 Pecten Danicus, *Chemnitz*. v. 2. p. 288.
†231 Pecten similis, *Laskey*. v. 2. p. 293.
†232 Pecten maximus, *Linneus*. v. 2. p. 296.
†233 Pecten opercularis, *Linneus*. v. 2. p. 299.
†234 Ostrea edulis, *Linneus*. v. 2. p. 307.
†235 Anomia ephippium, *Linneus*. v. 2. p. 325.
†236 Anomia aculeata, *Müller*. v. 2. p. 332.
†237 Anomia patelliformis, *Linneus*. v. 2. p. 334.
†238 Anomia striata, *Lovèn*. v. 2. p. 336.

ACEPHALA PALLIOBRANCHIATA.

I. TEREBRATULIDÆ.

†239 Hypothyris psittacea, *Chemnitz*. v. 2. p. 346.
†240 Terebratula caput-serpentis, *Linneus*. v. 2. p. 353.
241 Terebratula cranium, *Müller*. v. 2. p. 357.
242 Megathyris cistellula, *Searles Wood*. v. 2. p. 361.

II. CRANIADÆ.

†243 Crania anomala, *Müller*. v. 2. p. 366.

PTEROPODA.

I. HYALEADÆ.

†244 Hyalea trispinosa, *Lesueur*. v. 2. p. 380.

II. LIMACINIDÆ.

245 Spiralis Flemingii, *Forbes*. v. 2. p. 384.
†246 Spiralis Mac-Andrei, *Forbes and Hanley*. v. 2. p. 385.
†247 Spiralis Jeffreysii, *Forbes and Hanley*. v. 2. p. 386.

GASTEROPODA PROSOBRANCHIATA.

I. CHITIONIDÆ.

†248 Chiton fascicularis, *Linneus*. v. 2. p. 393.
249 Chiton discrepans, *Brown*. v. 2. p. 396.
†250 Chiton Hanleyi, *Bean*. v. 2. p. 398.
†251 Chiton ruber, *Linneus*. v. 2. p. 399.
†252 Chiton cinereus, *Linneus*. v. 2. p. 402.
†253 Chiton albus, *Linneus*. (?) v. 2. p. 405.
†254 Chiton asellus, *Chemnitz*. v. 2. p. 407.
255 Chiton cancellatus, *Sowerby*. v. 2. p. 410.
†256 Chiton lævis, *Pennant*. (?) v. 2. p. 411.
†257 Chiton marmoreus, *O. Fabricius*. v. 2. p. 414.

II. PATELLIDÆ.

†258 Patella vulgata, *Linneus*. v. 2. p. 421.
†259 Patella athletica, *Bean*. v. 2. p. 425.
†260 Patella pellucida, *Linneus*. v. 2. p. 429.

†261 Acmæa testudinalis, *Müller*. v. 2. p. 434.
†262 Acmæa virginea, *Müller*. v. 2. p. 437.
†263 Palidium fulvum, *Müller*. v. 2. p. 441.
†264 Propilidium Ancyloide, *Forbes*. v. 2. p. 443.

III. DENTALIADÆ.

†265 Dentalium entalis, *Linneus*. v. 2. p. 449.
†266 Dentalium Tarentinum, *Lamarck*. v. 2. p. 451.

IV. CALYPTRÆADÆ.

†267 Pileopsis Hungaricus, *Linneus*. v. 2. p. 459.
†268 Calyptræa sinensis, *Linneus*. v. 2. p. 463.

V. FISSURELLIDÆ.

†269 Fissurella reticulata, *Donovan*. v. 2. 469.
270 Puncturella Noachina, *Linneus*. v. 2. 474.
†271 Emarginula reticulata, *Sowerby*. v. 2. p. 477.
272 Emarginula rosea, *Bell*. v. 2. p. 479.
†273 Emarginula crassa, *J. Sowerby*. v. 2. p. 481.

VI. HALIOTIDÆ.

274 Haliotis tuberculata, *Linneus*. v. 2. p. 485.

VII. TROCHIADÆ.

†275 Trochus ziziphinus, *Linneus*. v. 2. p. 491.
276 Trochus conulus, *Linneus*. v. 2. p. 495.
277 Trochus alabastrum, *Beck*. v. 2. p. 497.
†278 Trochus granulatus, *Born*. v. 2. p. 499.
†279 Trochus millegranus, *Philippi*. v. 2. p. 502.
†280 Trochus exiguus, *Pulteney*. v. 2. p. 505.
†281 Trochus striatus, *Linneus*. v. 2. p. 508.
†282 Trochus Montagui, *Gray*. v. 2. p. 511.
†283 Trochus tumidus, *Montagu*. v 2. p. 513.
†284 Trochus cinerarius, *Linneus*. v. 2. p. 516.
†285 Trochus umbilicatus, *Montagu*. v. 2. p. 519.
†286 Trochus Magus, *Linneus*. v. 2. p. 522.
†287 Trochus lineatus, *Da Costa*. v. 2. p. 525.
288 Trochus undulatus, *Sowerby*. v. 2. p. 528.
†289 Trochus helicinus, *O. Fabricius*. v. 2. p. 531.
290 Trochus pusillus, *Jeffreys*. v. 2. p. 534.
†291 Phasianella pullus, *Linneus*. v. 2. p. 538.
†292 Adeorbis subcarinata, *Montagu*. v. 2. p. 541.
†293 Scissurella crispata, *Fleming*. v. 2. p. 544.

VIII. IANTHINIDÆ.

†294 Ianthina communis, *Lamarck*. v. 2. p. 549.
†295 Ianthina pallida, *Harvey*. v. 2. p. 553.
†296 Ianthina exigua, *Lamarck*. v. 2. p. 555.

IX. NERITIDÆ.

†297 Neritina fluviatilis, *Linneus*. v. 3. p. 3.

X. PALUDINIDÆ.

298 Paludina Listeri, *Forbes and Hanley*. v. 3. p. 8. (P. vivipara of *Turton*.)
299 Paludina vivipara, *Linneus*. v. 11. p. 8. (P. achatina of *Turton*.)
†300 Bithinia tentaculata. v. 3. p. 14.
301 Bithinia Leachii, *Sheppard*. v. 3. p. 16. (B. ventricosa of *Turton*.)
†302 Valvata piscinalis, *Müller*. v. 3. p. 19.
†303 Valvata cristata, *Müller*. v. 3. p. 21.

XI. LITTORINIDÆ.

†304 Littorina neritoides, *Linneus*. v. 3. p. 26.
†305 Littorina littorea, *Linneus*. v. 3. p. 29.
†306 Littorina rudis, *Donovan*. v. 3. p. 32.
307 Littorina patula, *Jeffreys*. v. 3. p. 36.
†308 Littorina tenebrosa, *Montagu*. v. 3. p. 39.
†309 Littorina saxatilis, *Johnston*. v. 3. p. 43.
†310 Littorina littoralis, *Linneus*. v. 3. p. 45.
311 Littorina fabalis, *Turton*. v. 3. p. 49.
312 Littorina palliata, *Say*. v. 3. p. 51.
†313 Lacuna pallidula, *Da Costa*. v. 3. p. 56.
†314 Lacuna puteolus, *Turton*. v. 3. p. 58.
†315 Lacuna vincta, *Montagu*. v. 3. p. 62.
316 Lacuna crassior, *Montagu*. v. 3. p. 67.
317 Assiminia Grayana, *Jeffreys*. v. 3. p. 70.
†318 Rissoa striatula, *Montagu*. v. 3. p. 73.
319 Rissoa lactea, *Michaud*. v. 3. p. 76.
320 Rissoa Zetlandica, *Montagu*. v. 3. p. 78.
†321 Rissoa crenulata, *Michaud*. v. 3. p. 80.
†322 Rissoa calathus, *Forbes and Hanley*. v. 3. p. 82.
†323 Rissoa Beanii, *Hanley*. v. 3. p. 84.
324 Rissoa abyssicola, *Forbes*. v. 3. p. 86.
325 Rissoa sculpta, *Philippi*. v. 3. p. 88.
†326 Rissoa punctura, *Montagu*. v. 3. p. 89.
†327 Rissoa costata, *Adams*. v. 3. p. 92.
†328 Rissoa striata, *Montagu*. v. 3. p. 94.
†329 Rissoa parva, *Da Costa*. v. 3. p. 98.
†330 Rissoa costulata (*Risso ?*), *Alder*. v. 3. p. 103.
†331 Rissoa rufilabrum (*Leach*), *Alder*. v. 3. p. 106.
†332 Rissoa labiosa, *Montagu*. v. 3. p. 109.
†333 Rissoa inconspicua, *Alder*. v. 3. p. 113.
†334 Rissoa semistriata, *Montagu*. v. 3. p. 117.
†335 Rissoa rubra, *Adams*. v. 3. p. 120.
†336 Rissoa cingillus, *Montagu*. v. 3. p. 122.
†337 Rissoa vitrea, *Montagu*. v. 3. p. 125.
†338 Rissoa proxima, *Alder*. v. 3. p. 127.
†339 Rissoa (?) fulgida, *Adams*. v. 3. p. 128.
340 Rissoa pulcherrima, *Jeffreys*. v. 3. p. 129.
†341 Rissoa soluta, *Philippi*. v. 3. p. 131.
342 Rissoa littorea, *Delle Chiaje*. v. 3. p. 132.
343 Rissoa anatina, *Draparnaud*. v. 3. p. 134.
344 Rissoa ventrosa, *Montagu*. v. 3. p. 138.
†345 Rissoa ulvæ, *Pennant* (?) v. 3. p. 141.
†346 Jeffreysia diaphana, *Alder*. v. 3. p. 152.
347 Jeffreysia opalina, *Jeffreys*. v. 3. p. 154.
†348 Skenea planorbis, *O. Fabricius*. v. 3. p. 156.
†349 Skenea nitidissima, *Adams*. v. 3. p. 158.
†350 Skenea (?) rota, *Forbes and Hanley*. v. 3. p. 160.
†351 Skenea (?) divisa, *Fleming*. v. 3. p. 161.
352 Skenea (?) Cutleriana, *Clark*. v. 3. p. 164.
353 Skenea (?) lævis, *Philippi*. v. 3. p. 165.
354 Skenea (?) costulata. v. 3. p. 167.

XII. TURRITELLIDÆ.

†355 Turritella communis, *Risso*. v. 3. p. 172.
†356 Cœcum trachea, *Montagu*. v. 3. p. 178.
†357 Cœcum glabrum, *Montagu*. v. 3. p. 181.

XIII. CERITHIADÆ.

358 Aporrhais pes-carbonis, *Brongniart.* v. 3. p. 186.
†359 Aporrhais pes-pelicani, *Linneus.* v. 3. p. 188.
†360 Cerithium reticulatum, *Da Costa.* v. 3. p. 192.
361 Cerithium adversum, *Montagu.* v. 3. p. 195.
362 Cerithium metula, *Lovèn.* v. 3. p. 198.

XIV. SCALARIADÆ.

†363 Scalaria Turtonis, *Turton.* v. 3. p. 204.
†364 Scalaria communis, *Lamarck.* v. 3. p. 206.
†365 Scalaria clathratula, *Montagu.* v. 3. p. 209.
366 Scalaria Grœnlandica. v. 3. p. 211.
†367 Scalaria Trevelyana, *Leach.* v. 3. p. 213.

XV. PYRAMIDELLIDÆ.

†368 Aclis ascaris, *Turton.* v. 3. p. 219.
†369 Aclis supranitida, *S. Wood.* v. 3. p. 220.
†370 Aclis unica, *Montagu.* v. 3. p. 222.
†371 Aclis nitidissima, *Montagu.* v. 3. p. 223.
†372 Stytifer Turtoni, *Broderip.* v. 3. p. 226.
†373 Eulima polita, *Linneus.* v. 3. p. 229.
†374 Eulima distorta, *Deshayes.* v. 3. p. 232.
†375 Eulima subulata, *Donovan.* v. 3. p. 235.
†376 Eulima bilineata, *Alder.* v. 3. p. 237.
†377 Chemnitzia elegantissima, *Montagu.* v. 3. p. 242.
†378 Chemnitzia rufa, *Philippi.* v. 3. p. 245.
†379 Chemnitzia fulvocincta, *Thompson.*
†380 Chemnitzia formosa, *Jeffreys.* v. 3. p. 248.
381 Chemnitzia fenestrata, *Forbes and Jeffreys.* v. 3. p. 249.
382 Chemnitzia scalaris, *Philippi.* v. 3. p. 251.
383 Chemnitzia rufescens, *Forbes.* v. 3. p. 253.
384 Chemnitzia indistincta, *Montagu.* v. 3. p. 255.
385 Chemnitzia eximiæ, *Jeffreys.*
†386 Chemnitzia clathrata, *Jeffreys.* v. 3. p. 258.
†387 Odostomia conoidea, *Brocchi.* v. 3. p. 260.
388 Odostomia conspicua, *Alder.* v. 3. p. 263.
389 Odostomia unidentata, *Montagu.* v. 3. p. 264.
390 Odostomia striolata, *Alder.* v. 3. p. 267.
391 Odostomia acuta, *Jeffreys.* v. 3. p. 269.
†392 Odostomia plicata, *Montagu.* v. 3. p. 271.
†393 Odostomia eulimoides, *Hanley.* v. 3. p. 273.
394 Odostomia dubia, *Jeffreys.* v. 3. p. 276.
†395 Odostomia alba, *Jeffreys.* v. 3. p. 278.
396 Odostomia nitida, *Alder.* v. 3. p. 280.
397 Odostomia glabrata, *Mühlfeldt (?)* v. 3. p. 283.
†398 Odostomia rissoides, *Hanley.* v. 3. p. 284.
†399 Odostomia cylindrica, *Alder.* v. 3. p. 287.
400 Odostomia insculpta, *Montagu.* v. 3. p. 289.
401 Odostomia obliqua, *Alder.* v. 3. p. 291.
†402 Odostomia Warrenii, *Thompson.* v. 3. p. 292.
403 Odostomia truncatula, *Jeffreys.* v. 3. p. 294.
†404 Odostomia interstincta, *Montagu.* v. 3. p. 296.
†405 Odostomia spiralis, *Montagu.* v. 3. p. 299.
406 Odostomia dolioliformis, *Jeffreys.* v. 3. p. 301.
†407 Odostomia decussata, *Montagu.* v. 3. p. 303.
†408 Odostomia excavata, *Philippi.* v. 3. p. 305.

†409 Odostomia gulsonæ, *Clark*.
410 Eulimella Scillæ, *Scacchi*. v. 3. p. 309.
†411 Eulimella acicula, *Philippi*. v. 3. p. 311.
412 Eulimella affinis, *Philippi*. v. 3. p. 313.
413 Eulimella clavula, *Lovèn* (?). v. 3. p. 314.
†414 Truncatella Montagui, *Lowe*. v. 3. p. 317.
†415 Otina otis, *Turton*. v. 3. p. 321.

XVI. NATICIDÆ.

†416 Natica monilifera, *Lamarck*. v. 3. p. 326.
†417 Natica nitida, *Donovan*. v. 3. p. 330.
†418 Natica sordida, *Philippi*. v. 3. p. 334.
†419 Natica Montagui, *Forbes*. v. 3. p. 336.
420 Natica helicoides, *Johnston*. v. 3. p. 339.
421 Natica pusilla, (*Say ?*) *Gould*. v. 3. p. 341.
†422 Natica Kingii, *Forbes and Hanley*. v. 3. p. 343.

XVII. VELUTINIDÆ.

†423 Velutina lævigata, *Linneus* (?). v. 3. p. 347.
†424 Velutina flexilis, *Montagu*. v. 3. p. 350.
†425 Lamellaria perspicua, *Linneus*. v. 3. p. 355.
†426 Lamellaria tentaculata, *Montagu*. v. 3. p. 358.

XVIII. CANCELLARIADÆ.

†427 Trichotropis Borealis, *Broderip and Sowerby*. v. 3. p. 361.
†428 Cerithiopsis tuberculare, *Montagu*. v. 3. p. 365.

XIX. MURICIDÆ.

†429 Murex erinaceus, *Linneus*. v. 3. p. 370.
430 Murex corallinus, *Scacchi*. v. 3. p. 374.
431 Lachesis minima, *Montagu*. v. 3. p. 377.
†432 Purpura lapillus, *Linneus*. v. 3. p. 380.
†433 Nassa reticulata, *Linneus*. v. 3. p. 388.
†434 Nassa incrassata, *Müller*. v. 3. p. 391.
435 Nassa pygmæa, *Lamarck*. v. 3. p. 394.
†436 Buccinum undatum, *Linneus*. v. 3. p. 401.
†437 Buccinum Dalei, *J. Sowerby*. v. 3. p. 408.
†438 Buccinum Humphreysianum, *Bennett*. v. 3. p. 410.
†439 Buccinum fusiforme, *Broderip*. v. 3. p. 412.
†440 Fusus Islandicus, *Chemnitz*. v. 3. p. 416.
†441 Fusus propinquus, *Alder*. v. 3. p. 419.
442 Fusus Berniciensis, *King*. v. 3. p. 421.
†443 Fusus antiquus, *Linneus*. v. 3. p. 423.
444 Fusus Norvegicus, *Chemnitz*. v. 3. p. 428.
445 Fusus Turtoni, *Bean*. v. 3. p. 431.
†446 Trophon clathratus, *Linneus*. v. 3. p. 436.
†447 Trophon muricatus, *Montagu*. v. 3. p. 439.
†448 Trophon Barvicensis, *Johnston*. v. 3. p. 442.

XX. CONIDÆ.

†449 Mangelia (Bela) turricula, *Montagu*. v. 3. p. 450.
450 Mangelia (Bela) Trevelliana, *Turton*. v. 3. p. 452.
†451 Mangelia (Bela) rufa, *Montagu*. v. 3. p. 454.

†452 Mangelia (Bela) septangularis, *Montagu.* v. 3. p. 458.
453 Mangelia nana, *Lovèn.* v. 3. p. 461.
†454 Mangelia teres, *Forbes.* v. 3. p. 462.
455 Mangelia purpurea, *Montagu.* v. 3. p. 465.
†456 Mangelia Leufroyi, *Michaud.* v. 3. p. 468.
†457 Mangelia linearis, *Montagu.* v. 3. p. 470.
†458 Mangelia gracilis, *Montagu.* v. 3. p. 473.
†459 Mangelia nebula, *Montagu.* v. 3. p. 476.
†460 Mangelia brachystoma, *Philippi.* v. 3. p. 480.
†461 Mangelia striolata, *Scacchi.* v. 3. p. 483.
†462 Mangelia costata, *Pennant. (?)* v. 3. p. 485.
†463 Mangelia attenuata, *Montagu.* v. 3. p. 488.

XXI. CYPRÆADÆ.

†464 Cypræa Europæa, *Montagu.* v. 3. p. 495.
†465 Ovula patula, *Pennant.* v. 3. p. 498.
†466 Ovula (?) acuminata, *Bruguiere.* v. 3. p. 500.
467 Marginella lævis, *Donovan.* v. 3. p. 502.

GASTEROPODA OPISTHOBRANCHIATA.

I. BULLIDÆ.

†468 Cylichna cylindracea, *Pennant.* v. 3. p. 508.
469 Cylichna truncata (*Adams ?*) *Montagu.* v. 3. p. 510.
†470 Cylichna obtusa, *Montagu.* v. 3. p. 512.
†471 Cylichna mammillata, *Philippi.* v. 3. p. 514.
472 Cylichna nitidula, *Lovèn.* v. 3. p. 515.
473 Cylichna conulus, *Deshayes.* v. 3. p. 517.
474 Cylichna strigella, *Lovèn.* v. 3. p. 518.
†475 Cylichna umbilicata, *Montagu.* v. 3. p. 519.
†476 Amphisphyra hyalina, *Turton.* v. 3. p. 521.
†477 Tornatella fasciata, *Linneus.* v. 3. p. 523.
†478 Akera bullata, *Müller.* v. 3. p. 527.
†479 Bulla hydatis, *Linneus.* v. 3. p. 530.
†480 Bulla Cranchii, *Leach.* v. 3. p. 533.
†481 Scaphander lignarius, *Linneus.* v. 3. p. 536.
†482 Philine aperta, *Linneus.* v. 3. p. 539.
483 Philine quadrata, *Searles Wood.* v. 3. p. 541.
†484 Philine scabra, *O. Müller.* v. 3. p. 543.
†485 Philine catena, *Montagu.* v. 3. p. 545.
†486 Philine punctata, *Clark.* v. 3. p. 547.
†487 Philine pruinosa, *Clark.* v. 3. p. 549.

II. APLYSIADÆ.

†488 Aplysia hybrida. v. 3. p. 554.

III. PLEUROBRANCHIDÆ.

†489 Pleurobranchus membranaceus, *Montagu.* v. 3. p. 558.
†490 Pleurobranchus plumula, *Montagu.* v. 3. p. 559.

IV. PHYLLIDIDÆ.

491 Diphyllida lineata, *Otto.*

GASTEROPODA NUDIBRANCHIATA.

I. DORIDIDÆ.

492 Doris tuberculata, *Cuvier*. v. 3. p. 563.
493 Doris flammea, *Alder and Hancock*. v. 3. p. 564.
†494 Doris Johnstoni, *Alder and Hancock*. v. 3. p. 564.
495 Doris coccinea, *Forbes*. v. 3. p. 565.
†496 Doris planata, *Alder and Hancock*. v. 3. p. 565.
†497 Doris repanda, *Alder and Hancock*. v. 3. p. 566.
†498 Doris ulidiana, *Thompson*. v. 3. p. 566.
499 Doris aspera, *Alder and Hancock*. v. 3. p. 567.
500 Doris Diaphana, *Alder and Hancock*. v. 3. p. 567.
501 Doris bilamellata, *Linneus*. v. 3. p. 567.
502 Doris oblonga, *Alder and Hancock*. v. 3. p. 568.
503 Doris depressa, *Alder and Hancock*. v. 3. p. 568.
504 Doris inconspicua, *Alder and Hancock*. v. 3. p. 569.
505 Doris pusilla, *Alder and Hancock*. v. 3. p. 569.
506 Doris sparsa, *Alder and Hancock*. v. 3. p. 570.
507 Doris pilosa, *Müller*. v. 3. p. 570.
508 Doris subquadrata, *Alder and Hancock*. v. 3. p. 571.
†509 Goniodoris nodosa, *Montagu*. v. 3. p. 572.
510 Goniodoris castanea, *Alder and Hancock*. v. 3. p. 572.
†511 Triopa claviger, *Müller*. v. 3. p. 573.
†512 Ægirus punctilucens, *D'Orbigny*. v. 3. p. 574.
513 Thecacera pennigera, *Montagu*. v. 3. p. 575.
514 Thecacera virescens, *Alder and Hancock*. v. 3. p. 576.
†515 Polycera quadrilineata, *Müller*. v. 3. p. 576.
†516 Polycera Lessonii, *D'Orbigny*. v. 3. p. 577.
†517 Polycera ocellata, *Alder and Hancock*. v. 3. p. 578.
518 Idalia aspersa, *Alder and Hancock*. v. 3. p. 578.
519 Idalia inæqualis, *Forbes*. v. 3. p. 579.
520 Idalia quadricornis, *Montagu*. v. 3. p. 580.
†521 Ancula cristata, *Alder*. v. 3. p. 580.

II. TRITONIADÆ.

522 Tritonia hombergi, *Cuvier*. v. 3. p. 582.
523 Tritonia plebeia, *Johnston*. v. 3. p. 583.
524 Tritonia lineata, *Alder and Hancock*. v. 3. p. 583.
525 Scyllæa pelagica, *Linneus*. v. 3. p. 584.

III. EOLIDIDÆ.

526 Lomonotus marmoratus, *Alder and Hancock*. v. 3. p. 585
527 Lomonotus flavidus, *Alder and Hancock*. v. 3. p. 586.
†528 Dendronotus arborescens, *Müller*. v. 3. p. 586.
529 Doto coronata, *Gmelin*. v. 3. p. 587.
530 Doto fragilis, *Forbes*. v. 3. p. 588.
531 Oithona nobilis, *Alder and Hancock*. v. 3. p. 589.
†532 Eolis papillosa, *Linneus*. v. 3. p. 590.
533 Eolis peachii, *Alder and Hancock*. v. 3. p. 591.
534 Eolis glauca, *Alder and Hancock*. v. 3. p. 591.
535 Eolis coronata, *Forbes*. v. 3. p. 592.
536 Eolis longicornis, *Montagu*. v. 3. p. 592.
537 Eolis Drummondi, *Thompson*. v. 3. p. 593.
538 Eolis rufibranchialis, *Johnston*. v. 3. p. 593.
539 Eolis punctata, *Alder and Hancock*. v. 3. p. 594.
540 Eolis lineata, *Lovèn*. v. 3. p. 594.
541 Eolis elegans, *Alder and Hancock*. v. 3. p. 595.

542 Eolis smaragdina, *Alder and Hancock*. v. 3. p. 595.
543 Eolis gracilis, *Alder and Hancock*. v. 3. p. 595.
544 Eolis pellucida, *Alder and Hancock*. v. 3. p. 596.
545 Eolis Landsburgii, *Alder and Hancock*. v. 3. p. 596.
546 Eolis purparascens, *Fleming*. v. 3. p. 597.
547 Eolis alba, *Alder and Hancock*. v. 3. p. 597.
548 Eolis stipata, *Alder and Hancock*. v. 3. p. 597.
549 Eolis inornata, *Alder and Hancock*. v. 3. p. 598.
550 Eolis angulata, *Alder and Hancock*. v. 3. p. 598.
551 Eolis concinna, *Alder and Hancock*. v. 3. p. 598.
552 Eolis nana, *Alder and Hancock*. v. 3. p. 599.
553 Eolis olivacea, *Alder and Hancock*. v. 3. p. 599.
554 Eolis aurantiacea, *Alder and Hancock*. v. 3. p. 600.
555 Eolis cingulata, *Alder and Hancock*. v. 3. p. 600.
556 Eolis vittata, *Alder and Hancock*. v. 3. p. 601.
557 Eolis glottensis, *Alder and Hancock*. v. 3. p. 601.
558 Eolis amœna, *Alder and Hancock*. v. 3. p. 602.
559 Eolis Northumbrica, *Alder and Hancock*. v. 3. p. 602.
560 Eolis arenicola, *Forbes*. v. 3. p. 602.
561 Eolis viridis, *Forbes*. v. 3. p. 603.
562 Eolis cœrulea, *Montagu*. v. 3. p. 603.
563 Eolis picta, *Alder and Hancock*. v. 3. p. 603.
564 Eolis tricolor, *Forbes*. v. 3. p. 604.
565 Eolis amethystina, *Alder and Hancock*. v. 3. p. 604.
566 Eolis Farrani, *Alder and Hancock*. v. 3. p. 605.
567 Eolis despicta, *Johnston*. v. 3. p. 605.
568 Eolis exigua, *Alder and Hancock*. v. 3. p. 606.
569 Embletonia pulchrea, *Alder and Hancock*. v. 3. p. 607.
570 Embletonia minita, *Forbes and Goodsir*. v. 3. p. 607.
571 Proctonotus mucroniferus, *Alder and Hancock*. v. 3. p. 608.
572 Antiopa splendida, *Alder and Hancock*. v. 3. p. 609.
573 Hermæa dendritica, *Alder and Hancock*.
574 Hermæa rifida, *Montagu*. v. 3. p. 610.
575 Alderia modesta, *Lovèn*. v. 3. p. 611.
576 Runcina Hancocki, *Forbes*. v. 3. p. 611.

IV. ELYSIADÆ.

577 Elysia viridis, *Montagu*. v. 3. p. 614.
578 Limapontia nigra, *Johnston*. v. 3. p. 614.
579 Acteonia corrugata, *Alder and Hancock*. v. 3. p. 615.
580 Cenia Cocksii, *Alder and Hancock*. v. 3. p. 616.

GASTEROPODA PULMONIFERA.

I. ONCHIDIADÆ.

581 Onchidium Celticum (*Cuvier?*), *Couch*. v. 4. p. 3.

II. LIMACIDÆ.

†582 Arion empiricorum, *Ferussac*. v. 4. p. 7.
583 Arion flavus, *Müller*. v. 4. p. 9.
†584 Arion hortensis, *Ferussac*. v. 4. p. 10.
†585 Geomalacus maculosus, *Allman*. v. 4. p. 12.
†586 Limax agrestis, *Müller*. v. 4. p. 13.
†587 Limax cinereus, *Müller*. v. 4. p. 15.
†588 Limax arborum, *Bouchard Chantereaux*. v. 4. p. 17
†589 Limax flavus, *Linneus*. v. 4. p. 19.

590 Limax brunneus, *Draparnaud?* v. 4. p. 20.
591 Limax tenellus, *Müller.* v. 4. p. 21.
†592 Limax Sowerbii, *Ferussac.* v. 4. p. 22.
†593 Limax gagates, *Draparnaud.* v. 4. p. 24.

III. TESTACELLIDÆ.

†594 Testacella haliotoidea, *Draparnaud.* v. 4. p. 26.

IV. HELICIDÆ.

†595 Vitrina pellucida, *Müller.* v. 4. p. 30.
†596 Zonites cellarius, *Müller.* v. 4. p. 33.
†597 Zonites alliarius, *Müller.* v. 4. p. 34.
†598 Zonites nitidulus, *Draparnaud.* v. 4. p. 36.
†599 Zonites purus, *Alder.* v. 4. p. 37.
†600 Zonites radiatulus, *Alder.* v. 4. p. 38.
†601 Zonites nitidus, *Müller.* v. 4. p. 39. (Z. lucidus of *Gray's Turton.*)
†602 Zonites excavatus, *Bean.* v. 4. p. 40.
†603 Zonites crystallinus, *Müller.* v. 4. p. 41.
604 Helix aperta, *Born.* v. 4. p. 43.
†605 Helix aspersa, *Müller.* v. 4. p. 44.
606 Helix pomatia, *Linneus.* v. 4. p. 46.
†607 Helix arbustorum, *Linneus.* v. 4. p. 48.
608 Helix cantiana, *Montagu.* v. 4. p. 50.
609 Helix carthusiana, *Müller.* v. 4. p. 51.
†610 Helix nemoralis, *Linneus.* v. 4. p. 53.
†611 Helix hortensis, *Draparnaud.* From comparison of some hundreds of this Mollusc, and the one immediately preceding—in a living state, and of all ages—we are led to consider them as totally different species. It is stated in Messrs. Forbes and Hanley's "British Mollusca," "that complete series may be obtained, beginning with the typical 'nemoralis' to 'hybrida,' and ending in 'hortensis.'" Although some five or six hundred specimens have been examined by us, we have never yet found such a series; but have been, in all cases, able to distinguish between both shells. We regard the Helix hybrida as a variety of H. hortensis, and have specimens of every shade of gradation between the two. Without entering fully into particulars in this place, we may add, that in all cases where we were shown a series of shells between H. nemoralis and hortensis, some of the specimens, and those the most important in the chain, were invariably either drift shells or had been scorched during the process of burning the furze (Ulex Europæus), a practice common throughout Ireland.
†612 Helix Pisana, *Müller.* v. 4. p. 56.
†613 Helix virgata, *Da Costa.* v. 4. p. 57.
614 Helix caperata, *Montagu.* v. 4. p. 59.
†615 Helix ericetorum, *Müller.* v. 4. p. 61.
616 Helix obvoluta, *Müller.* v. 4. p. 63.
617 Helix lapicida, *Linneus,* v. 4. p. 65.
†618 Helix rufescens, *Pennant.* v. 4. p. 66.
†619 Helix hispida, *Linneus.* v. 4. p. 68. (Includes as varieties H. sericea, H. concinna, and H. depilata of *Gray's Turton.*)
620 Helix revelata, *Ferussac.* v. 4. p. 70.
621 Helix Sericea, *Draparnaud.* v. 4. p. 71. (H. granulata of *Gray's Turton.*)
†622 Helix lamellata, *Jeffreys.* v. 4. p. 73.
†623 Helix aculeata, *Müller.* v. 4. p. 74.
†624 Helix fulva, *Müller.* v. 4. p. 75.
†625 Helix fusca, *Montagu.* v. 4. p. 77.
†626 Helix pulchella, *Müller.* v. 4. p. 78.
†627 Helix rotundata, *Müller,* v. 4. p. 80. (Zonites rotundatus of *Gray's Turton.*)

†628 Helix umbilicata, *Montagu*. v. 4. p. 81. (Zonites umbilicatus of *Gray's Turton*.)
†629 Helix pygmæa, *Draparnaud*. v. 4. p. 83. (Zonites pygmæus of *Gray's Turton*.)
†630 Bulimus acutus, *Müller*. v. 4. p. 86.
631 Bulimus Lackhamensis, *Montagu*. v. 4. p. 89.
†632 Bulimus obscurus, *Müller*. v. 4. p. 90.
†633 Pupa umbilicata, *Draparnaud*. v. 4. p. 95.
†634 Pupa muscorum, *Linneus*. v. 4. p. 97. (Pupa marginata of *Gray's* edition of *Turton*.)
†635 Pupa Anglica, *Ferussac*. v. 4. p. 99.
636 Pupa secale, *Draparnaud*. v. 4. p. 101.
†637 Pupa edentula, *Draparnaud*. v. 4. p. 103. (Vertigo edentula of *Gray's* edition of *Turton*.)
638 Pupa minutissima, *Hartmann*. v. 4. p. 104. (V. cylindrica of *Gray's* edition of *Turton*.)
†639 Pupa pygmæa, *Draparnaud*. v. 4. p. 106. (V. pygmæa and Alpestris of *Gray's* edition of *Turton*.)
†640 Pupa substriata, *Jeffreys*. v. 4. p. 108. (V. substriata of *Gray's* edition of *Turton*.)
†641 Pupa antivertigo, *Draparnaud*. v. 4. p. 109. (V. palustris of *Gray's* edition of *Turton*.)
†642 Pupa pusilla, *Müller*. v. 4. p. 111. (V. pusilla of *Gray's* edition of *Turton*.)
†643 Pupa Venetzii, *Charpentier*. v. 4. p. 112. (V. Venetzii of *Gray's* edition of *Turton*.)
†644 Balea fragilis, *Draparnaud*. v. 4. p. 114. (B. perversa of *Gray's* edition of *Turton*.)
†645 Clausilia laminata, *Montagu*. v. 4. p. 116. (C. bidens of *Gray's* edition of *Turton*.)
646 Clausilial biplicata. *Montagu*. v. 4. p. 118.
647 Clausilia plicatula, *Draparnaud*. v. 4. p. 120. (C. Rolphii of *Gray's* edition of *Turton*.)
†648 Clausilia nigricans, *Maton and Rackett*. v. 4. p. 121.
†649 Zua lubrica, *Müller*. v. 4. p. 125.
650 Azeca tridens, *Pulteney*. v. 4. p. 128.
†651 Achatina acicula, *Müller*. v. 4. p. 130.
†652 Succinea putris, *Linneus*. v. 4. p. 132. (S. Pfeifferi of *Gray's Turton* a var. of this.)
†653 Succinea oblonga, *Draparnaud*. v. 4. p. 137.

V. LIMNÆADÆ.

†654 Physa fontinalis, *Linneus*. v. 4. p. 140.
†655 Physa hypnorum, *Linneus*. v. 4. p. 143. (Aplexus hypnorum of *Gray's* edition of *Turton*.)
†656 Planorbis corneus, *Linneus*. v. 4. p. 147.
†657 Planorbis albus, *Müller*. v. 4. p. 149.
†658 Planorbis glaber, *Jeffreys*. v. 4. p. 150. (P. lævis of *Gray's* edition of *Turton*.)
†659 Planorbis Nautileus, *Linneus*. v. 4. p. 152. (P. imbricatus of *Gray's* edition of *Turton*.)
†660 Planorbis carinatus, *Müller*. v. 4. p. 153.
†661 Planorbis marginatus, *Draparnaud*. v. 4. p. 155.
†662 Planorbis vortex, *Linneus*. v. 4. p. 157.
†663 Planorbis spirorbis, *Linneus*. v. 4. p. 159.
†664 Planorbis contortus, *Linneus*. v. 4. p. 160.
†665 Planorbis nitidus, *Müller*. v. 4. p. 161.
†666 Planorbis lacustris, *Lightfoot*. v. 4. p. 162. (Segmentina lineata of *Gray's* edition of *Turton*.)

†667 Limneus pereger, *Müller*. v. 4. p. 165.
†668 Limneus auricularius, *Linneus*. v. 4. p. 169. (L. pereger, var. acutus of *Gray*'s edition of *Turton*.)
669 Limneus Burnetti, *Alder*. v. 4. p. 172.
†670 Limneus stagnalis, *Linneus*. v. 4. p. 174.
†671 Limneus truncatulus, *Müller*. v. 4. p. 177.
†672 Limneus glaber, *Müller*. v. 4. p 178.
†673 Limneus palustris, *Linneus*. v. 4. p. 180.
†674 Limneus glutinosus, *Müller*. v. 4. p. 182. (Amphipeplea glutinosa of *Gray*'s edition of *Turton*.)
†675 Limneus involutus, *Harvey*. v. 4. p. 184.
†676 Ancylus fluviatilis, *Müller*. v. 4. p. 186.
†677 Ancylus oblongus, *Lightfoot*. v. 4. p. 188. (Velletia lacustris of *Gray*'s edition of *Turton*.)

VI. AURICULIDÆ.

†678 Conovulus bidentatus, *Montagu*. v. 4. p. 191. (C. albus of *Gray*'s edition of *Turton*.)
†679 Conovulus denticulatus, *Montagu*. v. 4. p. 194.
†680 Carychium minimum, *Müller*. v. 4. p. 198.

VII. CYCLOSTOMIDÆ.

†681 Cyclostoma elegans, *Müller*. v. 4. p. 201.
†682 Acme lineata, *Draparnaud*. v. 4. p. 204. (Acme fusca of *Gray*'s edition of *Turton*.)

CEPHALOPODA DIBRANCHIATA.

I. OCTOPODIDÆ.

683 Octopus vulgaris, *Lamarck*. v. 4. p. 209.
†684 Eledone cirrhosus, *Lamarck*. v. 4. p. 211.

II. TEUTHIDÆ.

†685 Sepiola Atlantica, *D'Orbigny*. v. 4. p. 217.
†686 Sepiola Rondeletii, *Leach*. v. 4. p. 220.
†687 Rossia macrosoma, *Delle Chiaje*. v. 4. p. 222.
†688 Rossia Owenii, *Ball*. v. 4. p 223.
†689 Loligo vulgaris, *Lamarck*. v. 4. p. 226.
†690 Loligo media, *Linneus*. v. 4. p. 228.
†691 Loligo marmoræ, *Verany*. v. 4. p. 230.
†692 Ommastrephes sagittatus, *Lamarck*. v. 4. p. 231.
†693 Ommastrephes todarus, *Delle Chiaje*. v. 4. p. 233.
†694 Ommastrephes Eblanæ, *Ball*. v. 4. p. 235.

III. SEPIADÆ.

†695 Sepia officinalis, *Linneus*. v. 4. p. 238.
†696 Sepia bisserialis, *De Montfort*. v. 4. p. 241.
†697 Clio borealis, *Pallas*. v. 4. p. 292.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 17, 1855.

Dr. ANDREWS, President, in the Chair.

Mr. Joseph John Murphy read a paper on

THE FIORDS OF NORWAY, AND OTHER SIMILAR COASTS.

A fiord was defined as a mountain valley, partly filled by the sea; and it was remarked, that were the sea to rise on almost any mountain chain, so as to submerge its base, the coast thus formed would present a succession of headlands and fiords, like that of Norway. Comparatively few mountainous coasts, however, do present such features, in consequence, probably, of their indentations being filled up with alluvium. But the original mountain valleys are left, so as to present the fiord formation, where the rocks are too hard to permit alluvium to be washed down, as in Dalmatia and Greece; and where the coast is exposed to frequent storms that wash the alluvium away, as in Norway. The most storm-beaten coasts in the world are those which front the west in high latitudes, and there alone is the fiord formation to be seen in perfection, especially in Norway, Scotland, the northern part of the west coast of North America, and the southern part of the west coast of South America. A variety of geographical facts were brought to bear on the writer's theory, that the fiord formation is, in general, the result of exposure of the coast to violent storms.

JANUARY 31, 1855.

Dr. DICKIE, V.P., in the Chair.

Professor Wyville Thomson, LL.D., gave a lecture on some of the

NATIVE ZOOPHYTES.

He alluded to the old idea, that most of the beings now included in the class "Zoophyta" were marine plants, and to the more recent speculation, that they formed a distinct tribe intermediate between the animal and the vegetable kingdom. He pointed out the distinctly animal nature of the whole series, but admitted that they must be placed near the base of the animal scale, at a point where some of the more prominent peculiarities of vegetables appear to encroach on the limits of the sister kingdom. He suggested, as an interesting subject for inquiry, the question, what are those properties, peculiarly animal, which attained their maximum amongst the highest members of the animal series, becoming less distinct as we descend to simpler forms, till, at length, they become completely merged at a point where the two kingdoms appear to blend? And, in the second place, what are those peculiarities, essentially vegetable, which, most fully developed among higher plants, became obscure in simpler orders, till they likewise disappear at the point of junction; some of them appearing still, however, to encroach on the lower members of the animal tribes? The distinct appropriation of several defined portions of a general whole for the performance of different functions of life, and the occurrence of *similar* organs singly, or, at most, in pairs (*e.g.*, a single liver to assist in the process of digestion—a pair of lungs to subserve the function of respiration), were adduced as highly animal peculiarities. The absolute necessity of the complete integrity of these single organs, the fact, that if lost, they cannot be reproduced, and the disastrous consequences to life, consequent on the injury or destruction of one of them—the perfection of the nervous system, binding them all together in a consciousness of unity, and the high perfection of the sensory portion of this system, a consequence of the absolute necessity of removing those precious

organs out of all danger, on the slightest appearance of pain or discomfort; an active locomotive system, in the higher tribes, and usually complicated organs of defence were alluded to, as means of avoiding risk of irreparable bodily injury. Instances were taken from lower orders, showing that even among undoubted animals these characteristics gradually decline, the cone-like glands attached in numbers by slender pedicles to the back of Doto among the mollusca, combining in themselves the functions of both liver and lung, easily broken off, and, if lost, easily and rapidly renewed; the reproducible limbs of crustacea, and the sensation of this tribe, blunted by their hard tegumentary covering, and, in every case, imperfect through the diffusion of the nervous centres—acute sensation being rendered less necessary, on account of the smaller value to life of the reproducible limbs, whose integrity it is intended to preserve. Dr. Thomson then described, as bearing on the same point, the Hydroid Zoophyte, a central tubular common column, beset with multitudes of distinct flask-shaped bodies, formed of a homogeneous gelatinous granular substance, each hollowed out into a simple digestive cavity, the aperture surrounded by a whorl of arms for the capture of food—these polyps or stomachs, all exactly similar, all connected with the tree-like central column and canal; and each contributing digested nutriment for its support and extension, without any appearance of localized organs, every part of the general gelatinous mass performing the functions of nutrition, of respiration, and of reproduction. The structure of this being was adduced as one of the most perfect instances of the *vegetative repetition of similar parts*, met with in the animal kingdom. With the complete localization of organs, and their combination in an unity of purpose in the higher animals, was contrasted the luxuriant vegetative repetition in the higher plants—each leaf an epitome of all the parts of the entire tree, complete in itself, and perfect in the performance of all vegetative functions; what in animals was an indication of imperfect development, becomes in plants a sign of high perfection. Could we imagine an oak rooted in the ground, and exposed to all the winds and fires of heaven, with an essential heart localized in a single branch? could we imagine an elm deprived of the power of reproducing the foliage stripped from it by the gales of autumn?

At the public meeting on 7th March, a second lecture was given on the same subject. Dr. Thomson described more fully the various tribes of Zoophytes and their allies. First, the hydroids and sertularians, with a gelatinous body, usually enclosed in a free homogeneous horny tube, unconnected in any way with the animal, whose heads are freely protruded from the perfectly free margins of the polype cells. The ova contained in many cases in capsules, formed, as in plants, of compressed branches—but each polype capable of transformation into an ovum—the ovum assuming, in some forms, the character of a free medusoid. He objected to the usual definition of the term "ovum" ("Cyclopædia of Anatomy," &c.), and contended that it might rather be defined as a mass of cells separated from the parent, and containing a cell capable of being influenced, as to its multiplication, by a heterologous cell. In this sense he considered the medusoids true ova, and advanced, in proof, instances in which arrest in development of the ovum, and formation of the embryo within the capsule, render the ovoid characters more distinct. He compared the formation of these ova in the egg capsule of the genus campanularia to the formation of ovules round the free central placenta in the primulaceæ, and described capsules analogous to anthers, with their contained pollen, in the same genus. The hydroids are usually rooted to the ground, gently waving in the water currents. Connected with the hydroids, he referred to the acalephæ, an order closely related to them, though apparently differing so widely. The internal development of this series does not correspond with the prestige of their external appearance, the large variegated disk is simply a gelatinous locomotive apparatus, increased in size, in order to overcome, by the large quantity of fresh water contained in it, the extra weight of the important parts of the animal, and to reduce it to a density equal to that of sea water. The only anomalous elevation in its structure being the presence of a very simple nervous system, and a simply developed ear, the disk is provided with a regular muscular arrangement. The important parts of the medusæ surround the mouth. In some of the simpler forms they resemble closely a single hydroid polype, attached to a locomotive

umbrella, instead of being fixed to the ground; in others (sarsia), this polype becomes compound, rendering the resemblance still more complete; and in some (diphyes and its allies), we have an organism closely resembling, in many particulars, a very compound hydroid attached to a bell-like locomotive. He was inclined, then, to consider the Hydroid Zoophyte homologous with the depending stomach and mouth of the Acaleph.

Next to the sertularians, Dr. Thomson thought himself justified, with all deference to Agassiz's contrary opinion, in placing the graptolites, a set of extinct zoophytes, highly characteristic of the earliest palæozoic formations. In this tribe the root-fastening is usually wanting, the polypidom having apparently stood upright, with its base immersed in soft mud. The horny covering is free, as in the sertularians, and so are, in many cases, the opening of the cells, although in some the edge is prolonged into a lax tubular orifice, as if at that point there had been an union between the body of the animal and the case. The whole polypidom was strengthened by a delicate horny rod passing up along the side of the common tube. In some mature specimens of several species, the lecturer had observed a minute roughened aperture towards the base of each cell, at which point something had apparently been broken off, possibly a vesicle. This last series naturally fills up a blank between the sertularians and the next set, the asteroids. In this latter series the external tube is wanting; the whole strengthening material being concentrated in an internal calcareous or horny support, and the polyps continuous, with an external fleshy cortical substance, which incrusts the support on all sides, being only retractile into cavities in this crust. This order is represented in this country by the beautiful Virgularia, Pennatula, and Gorgonia. After a short exposition of the Helianthoid tribe, and the formation of coral, the lecturer concluded with a few general remarks on the phenomena of the so-called alternations of generation.

KILKENNY LITERARY AND SCIENTIFIC INSTITUTION.

MAY 13, 1855.

Dr. Cane in the Chair.

Mr. Robertson read the following paper, entitled

NOTES ON THE EFFECTS OF THE LATE FROST.

Since the weather of a district forms a part of its history, but more especially of its natural history, I have thrown together a few notes on the late frost, which was the most severe that we have known for many years, and remarkably injurious to evergreens. Some account of its effects may, therefore, be useful, and not unacceptable, to persons who delight in planting, as it is of importance to every planter who wishes to escape the mortification of losing, in a few days, the labour and hopes of many years, to make himself acquainted with such shrubs as are most likely to withstand the ravages of an unusually severe winter.

In many countries, historians and naturalists have recorded the occurrence of remarkable phenomena connected with the climate of their several localities, so that we have an ample field for reference and comparison. On referring to that most pleasing little work, White's "Natural History of Selborne," I find that its observant author records the severity of three hard frosts which occurred in the years 1768, 1776, and 1784; I also learn, that the evergreens which suffered most in England in those years are the same which have been destroyed here in the late frost, to which, however, a long list of more recently-introduced plants must be added. According to White's account, the severest frost occurred early in the month of January in the years 1768 and 1776, and in the month of December in 1784; I need hardly remind my hearers that February was far advanced when the late frost was most severe with us, and I find, on consulting a table kept by Mr.

Butler at Woodstock, that the thermometer at midnight on the 11th of February indicated 25 degs.; on the 12th, 19 degs.; on the 13th, 15 degs.; and on the 14th, 10 degs.; thus confirming White's theory, "that frosts advance to their utmost severity by somewhat of a regular gradation." Another theory of White's is, "that intense frosts seldom take place till the earth is completely glutted and chilled with water," giving as examples the winters of 1739-40 and 1768, which set in after wet autumns. Most of you will recollect that last autumn was with us unusually dry, so much so, that the springs supplying many of the public wells were dried up—amongst them, that of St. Canice's Well, an event which had not been known to occur before. White, in describing the situation of his plantations, and the manner in which the shrubs were affected, thus writes—"It was in such an aspect (sheltered) that the snow on the author's evergreens was melted every day, and frozen intensely every night; so that the laurustines, bays, laurels, and arbutuses looked, in three or four days, as if they had been burnt in the fire; while a neighbour's plantation of the same kind, in a high, cold situation, where the snow was never melted at all, remained uninjured." "From hence (continues White) I would infer, that it is the repeated melting and freezing of the snow that is so fatal to vegetation, rather than the severity of the cold."

I quote this passage as it so well describes the appearance of the same shrubs which have been blasted by the frost in this vicinity; although the Rev. James Graves tells me, that at his father's residence, the Rectory of Coolcullen, about nine miles from Kilkenny,* and eight hundred feet above the level of the sea, shrubs of the same kind were not injured, owing to the coldness of the situation; and Mr. Jesse, in a note in his edition of White's "Selborne," states, that "a few years ago, laurels, laurustines, &c., were killed to the ground in the more sheltered situations, while those in bleak, exposed situations escaped. Tender plants have more chance of surviving frost when in cold spots than when in those more sheltered. The sap is kept back, and, of course, the plants are not so likely to be affected by the frosts."

To this I may add, that if there were sufficient snow upon the ground to wrap up the more humble vegetation, plants on a high, cold situation, or those planted at the north side of a wall or hedge, would suffer less than plants of the same kind in more sheltered spots, or those planted at the south side of a wall, as in the former localities the snow would continue longer. I have here a plant, in a pot, of the Deodar pine, which is one of a large number plunged in a border of Mr. Fennessy's nursery; you will observe so much of the plant as was enveloped in snow is quite green—the upper part, not having been so protected, is quite brown, and I fear destroyed; this illustrates very well the manner in which plants are saved in very cold countries from the ravages of frost; since it is so ordained, that in those countries where cold is the most intense, that there the covering of snow is the deepest. In this beautiful arrangement of nature, we must recognise design—that is, "an adaptation of means to an end"—in this case the snow being *the means* and *the end*, the saving of vegetable life, which without such a covering would cease to exist in the northern regions.

One of the consequences of the late frost was, that the River Nore, between St. John's-bridge and Green's-bridge, was frozen over, a circumstance which had not taken place since the winter of 1813-14. As those who do not recollect this winter, have heard of it, I have made inquiries of several persons about its severity and effects. One of my informants (Mr. Fennessy's foreman) has been employed in the Kilkenny nurseries for the last forty-three years; he assures me that evergreens were not affected by the frost of 1814 as they have been this year; and I am convinced that he is correct in saying so; for some splendid specimens of arbutus, aristotelia, Chinese privet, and bay have been killed in the Castle gardens—these very large shrubs must have been, at least, fifty years old; the frost has also destroyed the fine hedge of laurustinus which crowned the Castle wall, and formed so striking and pleasing a feature in that beautiful view to be had from St. John's-bridge—a view to which Kilkenny-men may direct the eyes of strangers with feelings of pride and pleasure. I have been unable to learn the lowest degree

* Kilkenny stands about 186 feet above the level of the sea.

of cold, as indicated by the thermometer in 1814; but from the effect produced on the water of the Nore, we may fairly infer that it was as low as in this year. Why, then, it may be asked, had it not the same effect on vegetable life? I would answer this question by saying, that, from all I can learn, the frost in 1814 did not continue long; it was, also, preceded by a very heavy fall of snow, which lay so deep on the ground as to impede the travelling of coaches between Kilkenny and Dublin for the space of three weeks. Again, the severe weather in 1814 commenced on the first day of January, at which season the sap in plants would be more dormant; and, consequently, less liable to injury from frost than in the middle of February. Another cause why the frost of 1814 was less injurious to plants than that of 1855 may be found, if we assume that the frost in the former year followed a cold autumn, as I need hardly tell you, that the frost in this year succeeded a very mild season, so much so, that the beautiful scarlet blossoms of the Pyrus Japonica might be seen contrasted with their snowy covering, from which they peeped out, until blighted by repeated attacks of frost.

This allusion to a Japan plant reminds me that I may safely say, from observation, that plants from Japan have withstood the effects of the frost better than most others, a peculiarity which, in addition to their great beauty, ought to recommend them to those planting. A striking proof of the hardy nature of Japan plants may be seen in front of Dr. Kearns's house on the parade, where an arbutus and gold plant have been growing for many years—the former (said to be indigenous to Ireland, being found growing wild at Killarney) is completely killed, the latter (a native of Japan) remains quite green and untouched by the frost. The aspect of Dr. Kearns's house is north-east.

As I have already, in quoting from Mr. White, given you the names of some of the more common evergreens which have been destroyed, I will now mention those which he says withstood the severity of the frost; he says—"To the great credit of Portugal laurels and American junipers, be it remembered, that they remained untouched amidst the general havoc." During the late frost, Portugal laurels have suffered *very little;* and, if for American juniper we may read American arbor-vitæ, I know of no evergreen that has escaped so well. As I purpose attaching to these notes lists of plants, under the heads of "killed" and "injured," I have not embodied them in my paper.

A careful examination of a large number of shrubs leads me to state, that old and well-grown plants withstand the effects of frost better than smaller and younger specimens of the same kind; it appears as if the frost completely penetrated the pores and dried up the sap of small branches.

The late severe weather has been indirectly very fatal to birds, as whilst the earth was covered with snow, or bound up by hard frost, their supply of food was equally shut up from them; the consequence was, that great numbers of birds perished from starvation more than from cold, particularly those sweet songsters—blackbirds and thrushes. I have, also, heard that want of food made the common rooks carnivorous, as they have been seen devouring small birds. I only observed one strange bird during the frost; it was a specimen of the gray wagtail, not uncommon in other parts of Ireland, but certainly rare in this locality. I fear, however, that the cold or want of food has deprived us of one of our most graceful birds, the yellow wagtail, as I miss them from a spot which I have known a pair to frequent for several years. The cold had, also, the effect of retarding the singing of birds, as the chaffinch did not begin to sing until the 22nd of February; for many years I have remarked that it invariably sang about the 12th.

To the late severe weather we may also attribute the great mortality which has, unfortunately, prevailed in many flocks, as in too many cases farmers, encouraged by the general mildness of our winters, had neglected to provide food, suitable to the emergencies of an exceptional winter.

Shrubs Killed.—Cypress, Aristotelia, Arbutus, Bay, Eschalonia rubra, Tree Lupine, Furze (common and upright), Cytisus (budded on laburnum), Crimson China Rose, White Noisette Rose, Rosemary, Leycesteria formosa, Phylerea, Mediterranean Heath, Laurustinus, Chinese Privet, Photinia serrulata, Edwardsia (on a wall), and Clianthus (on a wall).

Shrubs Injured.—Minorca Box, Portugal Laurel, Common Laurel, Butcher's Broom, Cotoneaster, Evergreen Oak, Auracaria, China Rose (blush), Gum cistus, Ivy, and Privet.

Shrubs not Injured.—Rhododendrons, Mahonia, Gold Plant, Arbor-vitæ, Hollies, and Ribes.

DUBLIN NATURAL HISTORY SOCIETY.

MARCH 23, 1855.

Dr. Croker, M.R.I.A., in the Chair.

The minutes and preliminary business being confirmed and disposed of,

Mr. Williams read the following communication from Dr. George Gray Creighton to Dr. J. R. Harvey, of Cork, relative to the capture of the Iceland gull (Larus Islandicus), which had been presented to the Society at the last meeting:—

"Kenmare, February 23, 1855.

"Sir—In reply to yours of the 19th, received yesterday, the circumstances connected with the capture of the Iceland gull are as follows:—Walking one day last December near the suspension-bridge, I observed, at a distance of about twenty yards from the edge of the surf, a large gull settled on the water—none of his own kind or others being near. I am not in the habit of shooting gulls or other birds without an object, but the uniform whiteness this bird presented in the distance induced me to go towards it, and shoot it as it languidly rose at my approach. My dog fetched him out apparently little injured—in fact, he lived a couple of days after in the garden. I have been living at and on the sea the most part of thirty years, and been in the constant habit of shooting sea birds for collections, particularly at such places as Lambay, Rathlin Island, Fair Head, &c., and, accordingly, have rumpled the feathers of many an unfortunate burgomaster, saddleback, shearwater, rosy Tern, &c., and a species of entirely sooty-black gull on the shores of South America and the Gulf of Darien, 'but never ought like this.' I am, therefore, very glad it has fallen into such good quarters, where his visit (though, no doubt, unfortunate) can be so well appreciated and honourably communicated.

"Geo. Gray Creighton, M.D.

"J. R. Harvey, Esq., M.D."

The donations announced were—from Mr. Williams, two fine specimens of the female Hawfinch (Coccothraustes vulgaris), shot in the Phœnix Park; and from Mr. Dombrain, one male and two females of the mountainfinch (Fringilla montifringilla), obtained at the Meeting of the Waters.

Mr. Andrews, Honorary Secretary, was then called on for his paper,

NOTES ON THE SOUTH-WEST COAST, AND ON THE OCCURRENCE OF THE GREATER SHEARWATER (PUFFINUS MAJOR).

He said—At a meeting in the month of February last year I had the pleasure, through the kindness of Mr. and Mrs. Blackburne, of Valentia, of submitting to the Society a specimen of the dusky petrel (Puffinus obscurus), which was captured off the Island of Valentia, being the only known occurrence of this rare petrel on the shores of the British Isles; at the same time were exhibited the female of the Manx Shearwater, with the egg, which were taken from the nest in the cliffs of the same island. I propose making some further remarks on the Petrels this evening, and upon the occurrence of the Greater Shearwater (Puffinus major) on the south-west coast of this country; but, before doing so, I will submit a brief outline of the features of the south-west coast, descriptive of the localities where the marine birds that visit annually that coast resort to in the breeding

season. Taking that portion, with the Arran Islands and the coast of Clare, as the northern bound, and the Skellig Islands, off the coast of Kerry, as the southern, I shall touch on those points along the ranges of those coasts, which present an almost uninterrupted series of lofty and formidable cliffs opposed to the furious surges of the Atlantic Ocean. On visiting the Arran Islands in the year 1844, I endeavoured to trace every information relative to the marine birds that periodically visited those islands, and I was surprised to find, even at that time, that there was a great diminution in the numbers that annually bred there—the repeated robberies of the nests during the subsequent years of famine had caused very considerable desertions of the birds in different parts of the islands. The three Islands of Arran—Inishmor, Inishmaan, and Inisheer—are of much more interest to the botanist than to the ornithologist; for the varieties of marine birds are but few. At one time they were largely obtained for their feathers, a pound weight of feathers being generally the produce of sixteen gulls, and an expert catcher had frequently taken in one night 500 gulls. The several kinds resorting there, and on the high cliffs on the S.W. of the Great Island, were herring gulls (more abundant than all the others), razor-bills, guillemots, cormorants, with kittiwakes and the lesser black-backed gull. On the flats and sands of the middle island oyster-catchers were frequent in flocks. To the E.S.E. of the southern island are the bold cliffs of Blackhead (Cean dubh), only tenanted by the common gull (Larus canus), and by hawks and ravens. Foxes and other animals are there very destructive to the breeding birds. Southerly, along the coast of Clare, we come to the magnificent cliffs of Mohcr, where the most towering of these are Cnoc arda Quin and Ail na Sharroch, with the bird-cliff, Ail na Nean. The great resort of birds on this part of the coast is the lofty-pinnacled rock, styled Breanan Mor, the Great Dunghill, from the innumerable birds that visit it for nidification. From the 1st of April to the end of May the eggs are so plentifully obtained that horse-loads might be brought away, if the weather permitted a landing. It is approachable only by canoes, a perpetual surf playing around this island rock. The canoemen around the rock take great quantities of pollock (Pollog) and connor fish (Bullachs). About the 24th of June the birds are most numerous there, being the breeding place of the greater and lesser black-backed gulls, herring gulls, kittiwakes, razor-bills, guillemots, puffins, and cormorants. It is the chief breeding place on the coast of Clare, although the cliffs of Baltard and Cahoo na Faoilean (Sea-gulls' Quarter) are also much frequented. The cliffs and caves at the entrance of the Shannon are famous for the multitudes of the rock pigeon (Columba livia), and also those on the Kerry side. In the neighbourhood of Ballybunnion, Sterna hirundo and S. minuta, and on the cliffs, guillemots, Uria grylle, U. Brunnichii, and U. troile, Larus fuscus, L. argentatus, and L. tridactylus have been noticed; and I have seen on the flat lands about the Cashin River L. ridibundus in abundance. Cormorants and oyster-catchers are very numerous, as also, on the grassy cliffs, the chough (Fregilus graculus). The Muchloch Rock—a lofty and steep rock off Tralee and Ballyheigue Bays, with deep water all round—is a famous place for the greater and lesser black-backed gulls, and most of the other birds already named. The nests of the Arctic and Roseate Terns are met in the Magheree Islands. Sybil Head and the Three Sisters are tenanted by immense numbers of rock pigeon, hawks, ravens, and the sea eagle; but the most noted places on the coast of Kerry are, the Blasket Islands and the Lesser Skellig. Of the Blasket group, which are numerous, the principal are, the Great Island, the northern, Inishtuskert, Inishnabro, the Western Island, Inishmakeilaun, and the Tearaght Rock—the four last are the most frequented breeding places, the chief being the Tearaght Rock. I shall, therefore, confine myself to a brief view of the birds during the breeding season, that I noticed in a visit to that island rock in 1850. The Tearaght is but rarely visited, except in the finest weather, and then only by herdsmen from the Western Island, who go to and fro, with sheep, and to Inishnabro, where they leave the sheep to fatten on the herbage which the cliffs of those islands afford. Men are sometimes employed in obtaining the birds for their feathers. According to the Ordnance Survey, the Tearaght contains 47 acres, and the highest points of the island attain 602 feet. Situated as it is in the Atlantic Ocean, being seven miles W.N.W. of the Great Island, surrounded by the

heavy rolling seas of the Atlantic, and without any accessible approach or landing, it is but rarely visited. From this account it may be conceived to be the resort of an enormous number of Pelagian birds, and it is scarcely credible the numbers that could be recounted at the time of my landing there, early in the month of July, 1850. The part of the island where we landed bore N.N.E., which was sheltered, being the lee side, from the wind, which was N.E. The view of the island facing seaward forms a very remarkable appearance, and is a striking object or mark to vessels from the westward in making the Irish coast; the singular perforation which forms a wide opening through the island, and the Froze Rock, cause the bearings to be easily known to the American traders. On landing I found the ascent to be exceedingly difficult from the extreme slipperiness of the rock, which rose abruptly and steeply from the sea, while many portions throughout the ascent were so easily detached as to render every step slow and cautious. Here, on all points around, were congregated such myriads of fowl, and their habits so amusing, that I almost fancied myself in the region of the Gallipagos Archipelago, or the Falkland Islands, where the extreme tameness and stupidity of the birds are so amusingly and interestingly described by Darwin. Preparation for the object and time would have enabled us to have captured any number. My object, however, being a fishing expedition, and the cutter I had with me superintending canoes, engaged off the island in an experimental trip, I could only remain a short time. From my notes the following brief observations are taken:—Along the line of rocks which margined the base of the island, the cormorants, both Phalacrocorax carbo and P. graculus, were in gangs, perched motionless on the rocks, and most with expanded wings, in the act of drying them after their morning's fishing. The ledges of the rocks presented tiers of birds, in singular array, old and young, beside their nests. The kittiwakes (Larus tridactylus) seemed to occupy the lowest ledges, higher up were observed the greater and lesser black-backed gulls (L. marinus and L. fuscus), and above them and to the highest summits, L. canus and L. argentatus. About midway up the cliffs a very beautiful white gull with dark legs was pointed out to me by one of the men, and which bore a strong resemblance to the ivory gull (Larus eburneus). Being an expert climber he succeeded in reaching near to the nest, and, stretching with his foot, kicked down several, but they, unfortunately, fell beyond our reach. Immature birds of this species and of the glaucous gull (L. glaucus) have been obtained along the west coast. The innumerable numbers of guillemots, razor-bills, and puffins congregated on all the ledges led me strongly to suspect that the species Uria Brunnichii and U. lacrymans were both frequent there. The difficulty, however, of picking up those that were shot, and of grasping those around us, as we were obliged to hold on with one hand to prevent falling with the detached portions of rock, or being capsized by a sudden squall, marred any successful captures. The young of the razor-bill (Alca torda), called Crossacaun, from the white mark on the bill, are delicious when skinned and broiled, and their eggs are good.

It is singular that the fox has been seen on the island. Ravens and the sea eagle (Fiolar na Mara) build on the highest cliffs, and a splendid race of hawks, of noble size, the Falco peregrinus, breed there. These are termed Foraidheach—fierce or cruel. I obtained a very fine female bird from that island. The eggs are similar in colour and shape to the kestrel, but of larger size; like the eagle, it lays but two eggs; the kestrel has four. These rocks and those of the Western Island abound in fine lichens. Roccella fusiformis, with Borrera flavicans and B. atlantica, were fine. Ramalina scopulorum grew in very long pendant tufts, and Parmelia aquila I found in beautiful fructification. Lichena pygmæa was abundant near the water's edge, and I found it equally so with L. confinis on the highest point of Sybil Head. I have never seen anywhere Plantago coronopus growing of such extraordinary size—the radical leaves long, spreading, and almost succulent. The herdsmen of the West Island inform me that the sheep were extremely fond of the plant. Seals were seen in different directions, and I fired at an enormously large one as he raised himself above the water. The seal was of a very dark colour, and not at all like Halichœrus gryphus.

It is not the object of this paper to enter into any details of geological features; but, as I have alluded to the peculiar outline of form of the Tearaght Rock, I may

mention, that the loose and slaty rock, so easily detached, and which renders the ascent difficult and dangerous, belongs to the silurian strata, and possesses great interest in a palæontological character—this, with the fossiliferous slates in the neighbourhood of Ventry, Dunquin, and Ferriter's Cove, will afford investigation of interest to the geologist; and, while we have such men here as Professor Jukes, we may expect records of views similar to that which brought about such important changes in the classification of formations, as the establishment of the "Devonian system," by Professors Sedgwick and Murchison, who, in April, 1839, clearly maintained their opinions with reference to this geological epoch, and which the previous suggestions of Messrs. Lonsdale and Sowerby, whose intimate knowledge of the organic remains of the carboniferous and silurian systems materially influenced them to adopt. The North Blasket and Western Island, as well as Inishnabro, are famous for the multitude of rabbits, and are the breeding haunts of the storm petrel (Thalassidroma pelagica), termed in Irish Gourdal. I have passed close under both Skellig Islands, but have been unable to land. The Lesser Skellig is the breeding place of the gannet, and, I am certain, of several of the shearwaters and petrels.

Having drawn this outline, I shall turn to another portion of my paper, the occurrence of the Greater Shearwater (Puffinus major), and to which I have been led by the rather dubious accounts of the distinctive characters, and of the mode of capture of the birds taken on the Irish coast. In the "Annals of Natural History" for 1842, page 433, Mr. Thompson records two specimens of Puffinus major, on the authority of Mr. Robert Davis, jun., of Clonmel, as obtained off the coast of Waterford, and, having subsequently the opportunity of examining one of the birds, he remarked that the Irish specimens were identical with those described by Temminck as frequenting the more northern seas of Europe, and with the Puffinus cinereus figured by Selby. Doctor Ball, who observed the Greater Shearwater off Bundoran, states that they appeared to be much more dusky than the Manx petrel, and these views are continued by Mr. Thompson in his work on the birds of Ireland, also giving in addition the remarks of Mr. Robert Warren, jun., who says—"In August, 1849, when hake-fishing off Cork Harbour, he saw two of the Greater Shearwaters, which were easily distinguished from the P. anglorum (of which numbers were seen the same day) by their larger size and darker colour." About two years ago a very fine specimen of the Greater Shearwater was obtained by Richard Chute, Esq., from Dingle Bay, and, as I saw it in the recent state, I noticed that it had all the characteristics of the bird obtained in 1832 by Mr. Strickland from the Tees mouth, and described by him as P. fuliginosus. Mr. Strickland, however, subsequently obtained another bird of lighter markings and colour, apparently in the adult plumage, and in relation to which the inquiries would lead us to be satisfied that P. fuliginosus of Strickland, and the P. cinereus of Selby, were but the young of P. major, and not identical with the true P. cinereus.

You will observe that the birds now before you, and which were captured in Dingle Bay, have very different characters from those hitherto described as occurring on the Irish coasts. They have been beautifully and accurately preserved by Mrs. Baker, of Grafton-street, whose merits I shall have occasion hereafter to mention. Superior in size, they are also very different from those of the Manx Shearwater, and with the plumage of the dusky petrel, lighter in all the upper surface, the head, cheeks, and back of an ash gray, with the edges of the feathers, on their external margins, beautifully marked, of a lighter colour, waves of light gray on the sides, while the throat, and all the under surface, is pure white, thus being lighter in all its shades, and not having the dusky and dark colour of the backs and wings of the P. anglorum and P. obscurus. These birds are evidently the true P. major in the adult plumage; and although it has been recently noticed as having been taken off Youghal, on gentlemen's lines, these are the first descriptive characters of the adult bird captured on the Irish coast, as Mr. Thompson's descriptions only refer to the figure and characters of the bird given by Selby, and which is identical with the specimen in Mr. Chute's collection, being an immature bird, or the young of the year. The true P. cinereus would strike me as being altogether distinct, of a larger size, and of an universally dark colour. Darwin

mentions the P. cinereus to be similar in colour to P. gigantea, being of a dirty black. He saw hundreds of thousands of them behind the Island of Chiloe, flying for several hours in one direction; and when part of the flock settled on the water the surface was blackened. They are frequent in the Antartic regions, and numerous on the great banks of Newfoundland, attendant on the fishing vessels. The are equally numerous with the Fulmar Petrel (Procellaria glacialis), and recorded in the birds of Greenland by Captain Sabine, now Colonel Sabine, R.A. The whale-fishers of the Arctic Seas term them, with the Fulmar Petrel, Mallemucks, and, when a series of visiting is carried on by the captains of the whale ships when together, it is termed Mallemauking.

The manner in which the Irish specimens were described as captured on hooks when hake-fishing, puzzles me, as hake-fishing is carried on with hand-lines, at a depth of 20 to 30 fathoms, and these birds, with long acuminate wings, are by no means adapted as divers; so I wrote to my friend, Mr. Chute, to obtain the information of their capture from our fishermen. These shearwaters arrived in Dingle Bay about the end of September last (1854), and left early in November. They appeared in thousands in mild, foggy weather, and during that time were exceedingly bold, approaching near to the canoes engaged in hake-fishing, and seizing on all refuse thrown to them. They were then easily captured with a baited hook, the line and the bait always floating, and any number could have been taken by the canoe-men in that manner. Their appearance always indicates a successful fishing season, particularly of hake. They seemed in pursuit of sprats; and, except some odd birds, they had not appeared in such numbers for seven years before. It was then in the month of February, and at that time the glasson, or black pollock, fishing was most successful; and the fishermen recollected a man to have caught, in one day, nine score of pollock, and to have killed with a rod three score of the shearwaters. Had I been aware of these facts last year I could have obtained any number of the birds. The men who had been in American vessels had noticed these birds all across the Atlantic. Like all the petrels, they are weak on the legs, but untiring on the wing, treading the surface of the billows; hence the French name, Petit Pierre. Like the gannet, however, when settled on the water, they are unable to rise in flight, or do so with great difficulty, in calm weather. They have not as yet been traced to breed on the Irish coast.

To note the peculiar flight of marine birds is a study of interest to the ornithologist. The Greater Shearwater, from its long and pointed wings, speeds rapidly and steadily, skimming the surface of the billows, while the storm petrel, swallow-like, darts into the hollow, and over the crest of the wave.

> "From the base of the wave to the billow's crown,
> Amidst the flashing and feathery foam,
> The storm petrel finds a home;
> And only seeking her rocky lair
> To warn her young, and teach them to spring
> At once o'er the waves on their stormy wing."

Captain Lyon, when in H.M.S. *Griper*, off Hatton's Headland, in Hudson's Straits, and running in rather a heavy sea, saw large flocks of rotages, or rotche, the little auk (Alca alle), fly directly against the steep sides of a wave and bury themselves headlong in a moment, a most singular mode of diving, which their short wings assisted.

I now turn to another point of interest, the description of a beautiful little gull, which has been entrusted to me by Mrs. Baker, of Grafton-street, and I only wish that she had placed it in abler hands, as I cannot at present, without the opportunity of comparison with an authenticated specimen, satisfy myself on several points relative to its distinctive characters. I may here be permitted to remark, and I do so with much pleasure, on the intelligence, industry, and acuteness of observation which Mrs. Baker possesses in the avocation she is engaged in. Her prompt attention to the wishes of those who place any objects of natural history in her hands for preservation, and the amount of intelligence displayed in carrying out such objects, I cannot speak too highly of. The beautifully-preserved specimens of shearwater, this evening exhibited, prove to some extent the success of her manipulation. The specimen of the beautiful little gull before the meeting has been submitted to me as

the Bonapartian gull (Larus Bonapartii), and most kindly, by Mrs. Baker, has been sent to be recorded in the proceedings of this Society. This small gull was shot at Skerries, on the 18th of February last, by Captain Watkins, of the Northampton Regiment of Militia. Not having examined the bird in its recent state, I had no opportunity of learning accurately its measurement or weight. Mr. Robert J. Montgomery, who first drew attention to the characters, was so satisfied of their identity with those recorded by Thompson, that he, on very good grounds, assumed the present specimen to be the Bonapartian gull described by that author. The bird is immature; and as I do not place much reliance on measurements in the young state, I have drawn out the following:—Bill, dusky orange at the base, dark at the tip, form slender, similar to L. ridibundus; a black spot at the anterior corner of each eye; a dark mark behind each ear; crown of the head, slightly marked; forehead and all under parts, white; black scapulars, greater coverts of the secondaries, and the upper series of the smaller coverts, light pearl gray; several rows of brown spots on the small wing coverts, edged with dull white; two first primaries, white, margined with black on both webs; third, white increases on the outer margin, more black bordering the inner margin, and the extremity of the feather considerably more tipped with black; fourth, very nearly all white in the margin, dark margin of the inner fainter; feather, pale gray; tail, with a band of chocolate brown, edged with dull white; underneath tail, white, with slight markings of pale chocolate brown at the extremity; ridges of the wings, white, with a slight dark mark. In the recent state, Mrs. Baker informs me, that the legs were of a pale flesh colour.

Now, on comparing these characters with the descriptions of L. Bonapartii of Richardson, L. capistratus of the Prince of Musignano, L. capistratus of Yarrell, and the L. ridibundus of Montagu, Selby, and others, I am inclined to refer the bird before us to one of those varied forms and gradations of the L. ridibundus, as they so nearly correspond with the state of the second change described by Montagu and Latham, that I cannot separate the one from the other. Mr. Thompson has, very judiciously, decided L. capistratus of Yarrell to be but a variety of L. ridibundus, and that the examination of numerous specimens of both have shown such difference in their relative proportions and size, that it would seem that much dependence could not be placed on measurements. Mr. Thompson (at p. 339, vol. iii., "Birds of Ireland") alludes to an adult bird of L. ridibundus having been shot at Lough Clay, smaller in proportions than any forms described of either L. ridibundus or L. capistratus. We are aware how the eggs of gulls vary in size, even in the same nest, and that when the first, or early eggs of the season, are taken, the eggs of the succeeding layings are, in general, of a smaller size—hence we may naturally infer that those incubations may affect the growth of the birds. Now, the different gradations of L. ridibundus, so carefully and accurately noticed by Montagu, I will concisely submit. In the first plumage of the young of L. ridibundus, it is nearest to the description of Ray's brown Tern; the second material change brings it to the Lathamian brown gull, of the second supplement of the general synopsis of Latham, and which exactly accords with the description by Montagu of a recent specimen shot on the 14th of February, and agrees in most characters with the specimen before you. The next change brings it to the brown-headed gull of Latham, L. erythropus, and approaching to L. capistratus, and the fourth change perfects it to L. ridibundus. In several of the characters, detailed by Mr. Thompson, of L. Bonapartii, particularly of the Tern-like form and length of the wings, so many are identical with forms described both of L. capistratus and L. ridibundus, that it is difficult to separate them.

I will here give the characters of Larus capistratus of Temm., by the Prince of Musignano, in his synopsis of the birds of the United States (No. 293)—Mantle, pearl-gray; quills, black at the point, outer white, internally pale-ash; shafts, white; bill, very slender; tarsus, less than one inch and a half; tail, subemarginate; summer plumage, head only with a brown hood; winter, no hood. Brown-masked gull (Larus capistratus)—Nob. am. Orn. IV. pl.—inhabits the north of both countries; not very rare during the autumn on the Delaware, and especially the Chesapeake; found as far inland as Trenton; very rare on the coasts of Europe; closely allied and similar to L. ridibundus of Europe, hardly distinguished but by its smaller

size, and its still more slender, Tern-like bill. These references are shown to prove the confusion that might possibly arise in the distinguishing of the alliances of birds in the immature plumage, more especially those of the Laridæ, or the gulls; and, as Wilson most truly remarks on the much-varied species L. ridibundus, "that less confusion would arise among authors if they would occasionally abandon their accustomed walks, their studies, and their museums, and seek correct knowledge in the only place where it is to be obtained—in the great temple of Nature."

No discussion having arisen on this subject,

Mr. Hopkins read the following paper on the

OCCURRENCE OF IANTHINA COMMUNIS AND SPIRULA PERONII AT KILKEE.

At your last meeting, when I had the pleasure of adding a few specimens of Ianthina communis to your collection of Irish mollusca, I was requested, by Mr. Andrews, your secretary, to give a short paper on this interesting shell, and now beg to bring the occurrence of this and other species on the west coast of this country under your notice.

In the month of August, 1851, being at Kilkee, which I knew to be a locality where the Ianthinæ are of tolerably frequent occurrence at certain seasons, I determined to watch closely for them. The wind was N.W., and, after three days had elapsed, I was rewarded with finding the Ianthina communis in large numbers, in company with five specimens of Ianthina pallida and three of Spirula Peronii, together with quantities of the Velella and several species of Anatifa and Vitrea. From the circumstance of the Ianthina being drifted in after N.W. winds, it is evident that, though a native of the warmer latitudes of the ocean, these individuals must have been floating fully as far, if not farther north than Kilkee.

The best locality for them I found to be at the south side of the entrance to the bay, on the Duggana reef, where I took them alive, immediately after high water, floating on the surface, in pools, situated in clefts of the rock. I would here remark, that from the coast being so rocky, more than two-thirds of the specimens I obtained were, unfortunately, irretrievably damaged.

The float or vesicular appendage by which the Ianthina is buoyed up on the surface of the ocean has occasioned many very conflicting opinions; among others, I will refer to Whitelaw and Walsh's "History of Dublin" (London, 1818), in the appendix to which is a catalogue of Irish shells, and, from a note to Helix janthina, by which name it was then known, I take the following extract. Brown, in his "Account of Jamaica," gives the following account of this shell:—"Purple ocean shell.—The creature which forms and inhabits this shell is a native of the ocean, and lives frequently many hundred leagues from any land; but having met with many of the kind between Bermuda and the Western Islands, in my voyage from Jamaica, it enables me to communicate the following account of them:—The creature probably passes the greater part of life at the bottom of the sea, but rises sometimes to the surface, and, to do so, is obliged, *piscium more*, to distend an air-bladder, which, however, is formed only for the present occasion, and made of tough, viscid slime, swelled into a vesicular, transparent mass, that sticks to the head of the animal, at the opening of the shell. This raises and sustains it while it pleases to continue on the surface; but, when it wants to return, it throws off its bladder, and sinks."

Though, as I believe, this account of Brown's coincided with the generally received opinion at that time, it will be found incorrect, on referring to Forbes and Hanley, who, in their work on the British mollusca, remark that Cuvier observed there was no anatomical connection between the two bodies—*i.e.*, between the animal and the float—and this was confirmed by Dr. Coates, who, in the fourth volume of the "Journal of the Academy of Natural Sciences of Philadelphia," gives an interesting account of his experiments on the float in the living animal. He found that it was entirely secreted by the foot, and that when a portion was removed, the injury was rapidly repaired.

After having quoted such high authority, it may appear superfluous for me to remark, it is my opinion that were the Ianthina capable of inflating and exhausting this float, it would never be found on our coasts in any profusion, as it would

naturally, on the appearance of stormy weather, retreat from the surface, by exhausting the float, and remain at the bottom until the gale had subsided.

A very interesting paper on the Ianthina, from the pen of that talented naturalist, Mr. William Clark, of Bath, is published in the "Annals of Natural History" (January, 1853), and, as it contains much valuable information, I claim permission to make the following extract:—"This genus has long caused embarrassment to naturalists, and is still a source of difficulty in regard to the structure of the animal and its natural position; but I think the obstacles to a true determination will disappear on attentive consideration. The great stumbling-block is the float, as it is called, or vesicular mass, attached to the foot, which has been considered an hydrostatic apparatus. This idea is erroneous. The organ is the membraneous vehicle of the contents of the ovarium and matrix that has descended from under the mantle, and fixed itself to the foot, for a very obvious purpose of the animal economy, in reference to the pulli in the genial season. It is probable, that as the animal, from its peculiar habitat, cannot, like the tribes of the coasts, deposit the germs of reproduction on marine substances, it makes use of the foot as a substitute, until its young emerge from the agglomerated mass of capsules to shift for themselves, and then the temporary vesicular deposit is cast off. I have seen a similar appendage to the foot of the Pileopsis hungaricus and several other gasteropoda. That this organ is not necessary for the floatation of the animal is strongly supported by the fact, as the sexes are distinct, that many may be presumed the males, and such often occur without the so-called float. Many of the Littorinæ, with a shell ten times more ponderous in proportion than the globular, delicate Ianthina, float, with the shell beneath and foot uppermost, in every direction, for days, without descending from the surface of the waters."

I would now beg to observe, that I cannot make all my specimens agree with the description given by Forbes and Hanley, who say of this shell—"the suture is distinct, but simple, and never canaliculated;" and I have the pleasure of laying before you a series exactly answering to this description. I have also selected another, in all of which, from the young up to the adult, the suture is strongly marked, and, I think, I should be justified in stating that it is slightly canaliculated. In addition to this, as far as I have observed, the shell grows to a larger size, is heavier, more spiral, the whorls more globose, and it is often more closely striated. I beg to lay this series also before you, in order that you may judge of the correctness of my observations. I would suggest, though with much diffidence, that there are sufficient distinguishing characteristics in this second series of Ianthinæ to entitle them to be made, at least, a variety of the species *communis*.

I had written thus far, when I was much gratified by accidentally finding that my views—though not, as I imagined, original—agreed with those adopted by Forbes and Hanley, in the appendix to their work on the British mollusca, as in this they figure an Ianthina closely approximating to those in my second series, respecting which they write, that "until the genus Ianthina shall have experienced a thorough revision, and the effect of local circumstances in producing variation of colouring, chasing, and contour upon its migratory members shall have been duly estimated, it will be hazardous to define the limits of the several varieties or species which, by the past generation of conchologists, were included in the Helix janthina—by the present, in the I. fragilis or communis. Krauss, in his useful work on the Testacea of Southern Africa, remarks, "that the indigenous shell, figured by Chemnitz, is very different from the Neapolitan one, termed bicolor by Philippi, though both are usually cited as identical. Our British examples, again, seem different from either, and were considered so by Dr. Leach, who, we are informed by Mr. Jeffreys, termed them Britannica." Referring to this plate, which, I might mention, is taken from an Irish example, they say "that it differs from those previously described in so many particulars, that it becomes of importance to specify them." But I will not introduce that description here, as I have not given a detailed one of that which I consider to be truly entitled to the specific name of fragilis. It is only just for me to mention, that they, in conclusion, express some doubts as to its being admitted as a distinct species, inasmuch as they remark, that "a more than ordinary latitude seems permitted to shape in this species, because the larger turns do not always strictly coil in a regular spiral, but, sometimes de-

flecting, attach themselves below the periphory; in which event, the spire is wont to become more elevated, and its more rounded turns to swell out, in some degree, above the suture."

I hope I have succeeded in establishing sufficiently good claims for this shell, to induce naturalists to give it a more attentive investigation; and it is a subject of so much interest, that it will, I think, amply reward them.

At the same time, as I before observed, I obtained Ianthina pallida. This very rare species has only twice before been found on our coasts—once at Miltown Malby and once at Kilkee. The specimens of Spirula Peronii which I found were all dead. This beautiful shell has only, I believe, occurred five times on the Irish coast, and but once in England, on the Cornish coast. It has been provisionally excluded from the list of British Mollusca, "because," as Dr. Fleming observes, "we have to determine their capability of living in our seas before their right to a place in our Fauna can be established."

Large numbers of the Velella were also thrown ashore in company with the Ianthinæ. When floating on the surface, with the sail or membrane raised, drifting before the wind, they present an interesting spectacle, which I observed to advantage when rowing in the bay in one of the small canoes or coracles peculiar to the west coast of Ireland. The Velella when captured throws off a very deep-purple, viscous liquid, which stains the hand much more intensely than that exuded by the Ianthina; indeed, I believe, some naturalists have expressed it as their opinion that the purple colour of the Ianthina was probably derived from devouring these Velellæ.

I omitted mentioning that I found the Lepas pectinata and Vitrea vitrina attached to numerous specimens both of Ianthina communis and I. pallida. A few of these Cirripedes were fixed almost on the apex of the shell, but by far the greater number were attached immediately below the umbilicus.

Mr. Wakeman gave the following continuation of his remarks on the remains of animals, &c., at Dunshaughlin:—

A few weeks ago I had the pleasure of presenting to this Society a couple of heads of the ancient Irish cow, found, with a vast accumulation of animal remains, round what had been an artificial island, in a lake (now dried up) in the vicinity of Dunshaughlin. Of late years several large heads of similar remains have been discovered in various parts of the country, and it is to be regretted that our Society does not possess a selection from these interesting relics of ruins of animals which anciently existed in our island, and some of which, at least, have become extinct. The first, and, perhaps, the most important, of these discoveries was made, about twelve years ago, at Dunshaughlin, in the county of Meath. The locality is well known in Irish history as Lough Gabor, a name now softened to Lagore, and may be described as a boggy flat, about one mile and a half in length by about a mile in breadth. The lake, properly speaking, has not existed in the memory of any living person; but in winter time, after heavy rains, the greater portion of the bog is covered with water. A slight eminence, crowned by a solitary tree, is still called "The Island;" and it was about this spot that the animal remains, amounting to so many hundreds of cart-loads, were found. The bones were those of cows, deer, swine, sheep, horses, and, I believe, of hogs. Several human skulls and other bones were also observed, bearing testimony to the struggles which the annals inform us took place round the island of Lough Gabor. Intermixed with the bones were found an immense quantity of antiquities, consisting of spear-heads, swords, knives, brooches, combs, &c.; and these articles, so highly interesting to the antiquary, are scarcely less so to the naturalist, as, by an examination of their form and style of ornamentature, some conclusion may be arrived at as to the date of the deposit. From the fact of the frontal bone in most of the skulls, which had belonged to the lower animals, having been fractured, apparently by the blow of a hatchet, many of which instruments were found among the debris, there can be but little doubt that the creatures to which they had belonged had been killed as food by the occupants of "The Island." How much, then, is it to be regretted that no tolerable collection of these very interesting remains is known to exist. By a careful collection and examination of such subjects, much light might be thrown

on the history, and even pedigrees, of existing species. Surgeon Wilde, indeed, to whom is due the credit of having first mentioned the Dunshaughlin discovery, about twelve years ago, has, fortunately, preserved many interesting specimens; but his collection is far from complete. And when we recollect that, since that period, at least two similar bone peaks have been found—one in the lake of Ballinderry, near Moate, the other at Strokestown, county of Roscommon—we cannot help fearing that many subjects of great interest to the Irish naturalist have been lost. I may add, that judging from the character of the antiquities found, under the same circumstances, in each of the three localities, the animals of which the horns had formed a portion, could not have existed later than the ninth or tenth century. In each of the localities referred to, antlers of the red deer, similar to those before the Society, were found in considerable numbers. In conclusion, I trust, on a future occasion, to be able to present to our museum some additional specimens.

Mr. Ffennell, Inspecting Commissioner of Fisheries, said that he would be prepared to give a paper on the habits of the salmon, and on some peculiarities with regard to the young state, at the next meeting of the Society.

A ballot having taken place, Henry Charles Horner, Esq., of Mountjoy-square, was elected a member.

The meeting then adjourned to the month of April.

APRIL 27, 1855.

CHARLES FARRAN, Esq., M.D., in the Chair.

The previous minutes being confirmed and preliminary business disposed of,

Mr. Andrews, Honorary Secretary, said that he had to express his regret that, owing to some disarrangement in the rooms, the usual night of the meeting had been postponed to this evening. He trusted, however, that such an alteration would not again occur.

The first paper on the list for the evening being Mr. Ffennell's—"On the Salmon, and on Peculiarities with regard to the Young State,"

Mr. Andrews said he had been handed a note from Mr. Ffennell, Commissioner of Fisheries, expressing his regret that he was unable to fulfil the object of the notice which he had given, to make some communications "on the salmon," as he was unexpectedly obliged to be absent on public duty.

Mr. Watters was then called on for his paper

ON THE HABITS AND ON THE VARIETIES OF SOME OF THE LARIDÆ.

At the last meeting of your Society, a paper was read by your Honorary Secretary, Mr. Andrews, which contained a notice of one of the Xemæ, or Black-headed Gulls, which coincided very closely with the measurements and descriptions of Bonaparte's Gull (Larus Bonapartii). At the suggestion of Dr. Farran I have put together some notes on the habits of the Laridæ, and on varieties incident to the family, which, with some specimens to illustrate my observations, I beg to submit for your approval. In the entire range of our Irish Fauna there is no family comprised in it which demands more notice from the ornithologist than the well-known and widely-distributed family of the Laridæ. Tenanting every variety of shore—sandy-beach as well as precipitous rocks—the study of their habits not alone affords interest to the observer, but offers a criterion and infallible index to the fisherman, that where they most congregate, fish is plentiful. Simple as their habits may appear, I feel my own incompetency in endeavouring to create in your minds the interest with which the birds of this family are invested. Indeed it must appear to the ordinary observer as something very strange, that these mere sea-gulls flying past him along our quays could possess habits of the slightest interest. But to any one who has observed them in the neighbourhood of some rocky shore-line, where story after story of birds take their position along the precipices, and on whose tabular projections stand, not in tens or hundreds, but in thousands and tens of thousands, the various members of this interesting tribe, there is almost an injunction conveyed in the sight that the ornithologist is bound to make known that such things exist. On several occasions I have been fortunate enough in observing a great proportion

of the species comprised in the Laridæ at their breeding haunts; amongst these I may mention the great and lesser black-backed gulls, the herring gulls, common gull, and kittiwake. Widely differing in their habits with the great and lesser black-backed gulls, we find the bustle and ceaseless activity of the smaller species replaced with a sedateness and dignity consistent with their appearance. Flying sedately from a crag in the neighbourhood of the nest, they employ themselves in sailing leisurely through the air, often at an immense height; at times their loud hoarse cackle comes distinctly from above, and is at once answered by a continuous kleeking or yelping note from their partner on the nest. Frequently we observe single birds rise from the rocks, and fly in a direct line seaward for an immense distance and then quietly settle down upon the water. Occasionally we see pairs resting on the water in the vicinity of the rocks, the tail being held so high, from the peculiar buoyancy of the bird, that often at a distance it is difficult to determine which is the head and which the tail. When flying from the sea, the great black-backed gull never hesitates passing through a flock of terns or herring-gulls, a proceeding which the lesser black-back appears to be timid of, as it rises and soars over them, or swerves sideways to escape them. Retired in habits as the great black-backed gull appears to be, the lesser species is yet more so, as on one occasion I saw a rook (Corvus frugilegus) in a ploughed field walk towards a gull of this species in a manner that seemed to at once remind the intruder that he had better seek his proper pelagian territory; the decisive action of the rook was sufficient for the gull, as he at once took wing, and sought his homestead amid the cliffs. With the herring, common, and kittiwake gulls there is considerable similarity in their habits. More sociable than the other two species, these birds unite in flocks and fly to and from their nests together, fish in company, and are unanimous in the one outcry when disturbed. Of the three species, the herring-gull appears to possess the most acute sense of hearing, as I have seen a few birds rise from their nests and fly steadily seaward; by degrees the numbers increase, until the nests are completely deserted, and then, as it were, supposing, from the absence of their larger brethren, that they were more profitably engaged elsewhere, the other species fly off to join the flock. During the breeding season the herring-gull possesses a habit very similar to the rook—diving or falling through the air, and turning over several times in its descent. This is frequently performed by several birds at the one time, and is accompanied by their peculiar laughing cry. The presence of raptorial birds does not seem to occasion these birds the terror that we see manifested by others, as the peregrine falcon (Falco peregrinus) will frequently glide past a flock without disturbing them from their avocation, or the least outcry being raised against him. To one not versed in their habits, the appearance of the peregrine at times would suggest different conclusions, as this falcon chooses some commanding position along the precipice as a perching place, where, for hours, he will maintain the same position, with the head inclined towards the rocks, as if appearing to take an exceeding interest in the movements of the gulls drifting upon the wind below him like so many snow-white feathers. This habit of the peregrine is, however, the mere listlessness of repose, and is generally indulged in after repletion. A single common gull or kittiwake, flying along the face of the precipice, invariably stoops downwards, or otherwise avoids the vicinity of its suspicious foe. Familiar as ornithologists may be with the appearance of the breeding haunts of the Laridæ, as observed in the full glare of sunshine, there is yet another view possessing the most engrossing interest—the same haunts observed at night-time, when we see the gulls appear like so many snow-white ribbons wound round the rocks. The gigantic masses of shade flung by the rock during moonlight, and the spectral forms of the gulls wheeling upward from their nests and again settling with their usual clamour. At times the cormorants join their hoarse guttural croaking, whilst the booming of the sea appears more audible and more solemn in the silence of the night. Fearing that I am occupying too much of your valuable evening, I will hastily conclude with a few observations respecting the probability of the masked gull (Larus capistratus) and Bonaparte's gull (Larus Bonapartii) being confounded with varieties of the black-headed gull (L. ridibundus). Without presuming upon a subject which is difficult to decide without a large number of specimens, it is to be remembered what confusion the Laridæ were the subject of until the last few years, when critical examination and

practical observation proved the wagel (Larus nævius) to be the Larus marinus in its first plumage, the gray gull (La Mouette grise) of Brisson to be the lesser black-backed gull in young plumage, the winter gull to be Larus canus in its seasonal change, and the tarrock (Larus tridactylus) to be the immature kittiwake (Larus rissa). It is also to be recollected that there is no infallibility in classifying species, as we find authorities as grave as Brisson and Storr agree upon the claims of Larus nævius to be a distinct species from the adult bird. One claim advanced for Larus Bonapartii being a distinct species appears to be its diminutive size, length of wings in exceeding the tail some two inches, and the peculiar colour of the tarsi. If such be the case, the specimen now before you is a just candidate for the honour, as this veritable black-headed gull possesses, in an eminent degree, the necessary qualifications, so much so, that the wings give it the peculiar tern shape, and actually exceed the tail by three inches and a half. A bird, in the first year's plumage, also before you, you will find to be much larger in size and to possess more of the acknowledged character of ridibundus. It might be supposed that the increase of age might have a corresponding increase of size; but, as your honorary secretary justly observed, in his paper, that "the examinations of numerous specimens of ridibundus have shown such differences in their relative proportions and size that it would seem much dependence could not be placed on measurements." If a standard is to be erected, and all birds adjudged specific distinction on account of a difference in size, it is impossible to say how many more species may be discovered in our fauna. The colouring of the wing-feathers is also laid down as a characteristic of Larus Bonapartii; but in the specimens of ridibundus now before you, you will find all of them without difficulty. I have not seen the specimen of Bonaparte's gull in the Belfast Museum, but this much, I hope to make the present specimen of ridibundus coincide in every particular with the description taken by the late lamented Mr. Thompson.

Mr. Watters then read the description given by Mr. Thompson, in "The Birds of Ireland," of Larus Bonapartii, and which agreed in all its markings, proportions, and distinctions (which have been so fully given by that author), with the specimens of Larus ridibundus, submitted by Mr. Watters, and which he had verified to be a bird obtained from among that species of gull on this coast, and with which species, with the exception of its smaller proportions, it was identical in every respect. Mr. Watters also compared his bird with the accurate drawing made by Mr. Du Noyer of the bird shot by Captain Watkins, and read from the report of the last proceedings the distinctive characters drawn by Mr. Andrews, the details of which were of precisely similar features to Mr. Watters's specimen. Respecting Larus capistratus, I believe that there is no adult black-headed gull but, before attaining the complete hood, was a perfect specimen of capistratus. Were it not that on many occasions I have examined these birds in their seasonal changes, I would feel much more diffident in advancing my views; but, as it is, I believe you will be inclined to admit the great probability of the Larus Bonapartii, described by Mr. Thompson, agreeing, in every particular, with a variety of ridibundus, and the late specimen exhibited at your last meeting, and shot by Captain Watkins, to have been nothing more than a variety of the same species. If a further proof were required, I place before you the eggs of the Larus ridibundus and argentatus, and you will, in both instances, perceive the disparity of size of the same species; and, as we might reasonably suppose, the bird produced from the small eggs would not have equalled in size those produced from the larger.

The Chairman said that the examination of the species appeared to have been very carefully investigated, and he was glad that Mr. Watters brought forward the information he possessed of the subject, and which his practical observations and excellent collection enabled him to do with some degree of confidence. He would be glad to hear the opinions of any of the members.

Mr. Andrews observed that when he expressed his views at the last meeting, he was not at the time aware that any discussion on the subject had taken place elsewhere. He saw no reason, however, to change the opinions he had given. The markings and size of Mr. Watters's specimen were identical with the one shot by Captain Watkins, and one character, in particular, was identical—the size of the tarsi. Other characters were still more striking in Mr. Watters's bird—the more

slender or tern-like form of the bill, and the wings being of greater length, extending beyond the tail an inch more than the wings in Captain Watkins's specimen. Mr. Andrews said he could advance numerous instances of opposite views assumed by ornithologists. Some years since he had obtained, on the high cliffs of Sybil Head, county of Kerry, a very beautiful variety of the rock pigeon, two specimens of which are in the collection of the Society. He had shot five specimens out of the flock, and it was singular, although much sought after, similar birds had not since been obtained in the country. Mr. Blyth, curator of the Asiatic Museum at Calcutta, who obtained similar specimens in England, maintains it to be a distinct species from Columba livia, and names it as Columba affinis, stating that the wild rock pigeons of the south of England are mostly of this kind, whilst those of North Britain, and of Europe generally, are the true Columba livia. Mr. H. E. Strickland, however, asserts them only to be immature birds of C. livia.

Mr. Saunders's absence prevented his paper "On Algæ" being given until the next meeting.

After the ballot, the Chairman announced that George Halpin, Esq., superintendent of Irish light-houses, and Edward Mathews, Esq., of Lower Gardiner-street, were elected members.

The meeting was then adjourned to the month of May.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

APRIL 21, 1855.

R. Ball, Esq., LL.D., President, in the Chair.

The following donations to the library were acknowledged by the librarian, and thanks ordered to be given to the donors:—

The London Entomological Society's Transactions, Vol. II., Part VII., and Sowerby's British Ferns, Parts I. and II., and J. J. Watters's History of Irish Birds, by E. Percival Wright, Esq.

Ray's Synopsis, by Dr. Ball.

The Transactions of the Literary and Scientific Society of Queen's College, Belfast, by the Secretary.

The Natural History Review, Nos. V. and VI., by the Editors.

E. Newman, Esq.'s Address to the Entomological Society of London, by the Author.

Dr. Harvey's Account of the Marine Flora of Western Australia, by the Author.

A beautifully-coloured Plate, illustrative of a Paper read before the Association, by A. H. Haliday, Esq., by the Author of the paper.

Journal of the Geological Society of Dublin, Part I., Vol. VI., from the Society.

The Hon. G. S. Gough was unanimously elected as Corresponding Member; and the following gentlemen, being balloted for, were elected ordinary members of the Association:—W. D. Butler, Esq., T.C.D., and H. B. Armstrong, Esq., T.C.D.

Mr. A. R. Hogan read the following paper, by J. W. Lea, Esq.,

NOTES ON THE DIURNAL LEPIDOPTERA AND ON THE SPHINGIDÆ OF SOME PORTION OF WORCESTERSHIRE (CONCLUDED).

In sending the concluding portion of these notes, I must express my regret that various circumstances have so long prevented me from completing them. I hope, however, that though very late, they may not be unacceptable. My original intention was to confine myself to the Diurnal Lepidoptera; but I have added notices of the Hawk-moths, as being, as to their number, very manageable, and as having pretty well rewarded my search within the district under consideration. My former paper left off with the Limenitis camilla; I resume, therefore, with the next genus and species, according to the same classification that I adopted before.

Arge galathea. Occasionally to be found pretty plentifully; but I found it very uncertain, and nowhere very common.
Lasiommata ægeria. In great profusion.
,, megæra. Also very common.
Hipparchia semele. Very scarce.
,, briseis. Not found.
,, tithonus. Very common.
,, janira. Do.
,, hyperanthus. Do.
Cænonympha davus. Not found.
,, typhon. Do.
,, ascanius. Do.
,, hero. Do.
,, pamphilus. Very common.
Oreina ligea. } None of them found.
,, blandina. }
,, cassiope. }
Hamearis lucina. To be found occasionally.
Thecla betulæ. In the neighbourhood of Astley; but very rarely, and not, so far as I know, in other parts of this district. I believe, however, it has been found near Bewdley Forest.
,, quercus. Pretty common in certain portions of the district, on the right bank of the Severn; I have not found it on the left bank. But, considering that it is a common insect, I have found it less frequently than I should have expected in such a locality.
,, pruni. Not found.
,, W. album. One specimen only, near Maldon.
,, spini. Not found.
,, ilicis. Do.
,, rubi. Very sparingly, and not in all seasons.
Chrysophanus phlæas. Very abundant. I have found very large specimens, exceeding by a third the ordinary expanse of the finest specimens, and others presenting interesting variations in the markings—*e.g.*, one specimen in which the black spots on the anterior wings were confluent; another, in which the copper band on the posterior wings was very pale, *approaching* towards the appearance of the variety in which it is replaced by milk-white, though in this case it was decidedly coppery, and *glossy* rather than *fiery*, while the deficiency in brilliancy on the under wings seemed to have been balanced by increased splendour in the colouring of the upper, which, I think, exceeded in brilliancy those of any other specimen of this species that I have ever captured. Other minor variations I have found, but none so notable as these two; though, on the whole, I should say I have found it a rather variable insect.
,, chryseis. Not found.
,, dispar. Do.
,, hippothoe. Do.
,, virgaureæ. Do.
Polyommatus alsus. One specimen, near Kidderminster.
,, argiolus. Rarely; in the neighbourhood of Hartlebury.
,, acis. Not found. It has, however, been found in Worcestershire, though I do not know whether in this district. It is also found in the adjoining counties.
,, alcon. Not found.
,, arion. Do.
,, corydon. A single specimen, near Woodbury.
,, adonis. Not found.
,, alexis. In great profusion, and very variable.

Polyommatus argus. Not found; but I quite expect it might be, as the district is eminently favourable; and I am rather disappointed at not having met with it there.
,, eros. Not found.
,, dorylas. Do.
,, icarius. Do.
,, agestis. Not found in any abundance, but occasionally met with.
,, salmacis. Not found.
,, artaxerxes. Do.
Pyrgus malvæ. Not very uncommon in some seasons; but apparently fitful.
,, oileus. Not found.
Nisoniades tages. Do.
Cyclopides paniscus. Do.
,, sylvius. Do.
Pamphila bucephalus. Do.
,, sylvanus. Very common.
,, comma. Not found.
,, actæon. Do.
,, linea. Very abundant.

Such is a general abstract of the success that I have had in this limited district; and it must be called pretty fair, I think. I am nearly sure, however, that more systematic and vigorous search would be rewarded with still greater success, and the capture of several species which I have not myself met with in the locality in question. The Apatura iris, Vanessa antiopa, one or two of the Argynnides, and of the other fritillaries, besides some species in the genus Thecla, which I have either not found at all, or only very sparingly, might, I suspect, be either discovered, or more abundantly captured, if any one would take the pains to investigate the district thoroughly. I have taken no notice of the Anthocaris belia in this abstract, because I have had the honour of submitting a separate communication respecting it to the Dublin University Zoological Association; and I wish to take this opportunity to thank the Association for the courteous and favourable reception which my statement met with, and to express my perfect acquiescence in the important distinction conveyed in a remark of the Rev. J. Greene, that I did not assume the insect to be *indigenous*, "but merely asserted its *capture*"—the two positions being as wide asunder as the sunrise and sunset. At the same time, being myself of a temperament cautious almost to suspiciousness, I can make more than ordinary allowances for the extreme caution of others.

I will now proceed to a similar summary to the above respecting my success, in the same district, with the Hawk-moths.

Smerinthus ocellatus. Sufficiently plentiful about Kidderminster, Wolverley, and near Astley.
,, populi. Also pretty common.
,, tiliæ. Much scarcer than the preceding; but I have taken it occasionally about Hartlebury.
Acherontia atropos. I have several times had larvæ of this moth, taken near Kidderminster; but have experienced the usual difficulties in rearing them. I have never captured the imago in this district.
Sphinx convolvuli. Very rare.
,, ligustri. Very abundant.
,, pinastri. Not found.
Deilephila euphorbiæ. Do.
,, galii. Do. It has been taken near Worcester, however.
,, livornica. Not found.
Chœrocampa nerii. Do.
,, celerio. Do.; it may, however, probably occur, as I have taken it very near the borders of this district.
,, elpenor. Not very common. I have taken both larva and perfect insects between Wolverley and Kidderminster.
,, porcellus. Not found.

Macroglossa stellatarum. Sufficiently plentiful about Hartlebury and Astley, and occasionally at Kidderminster. I have found them sometimes taken for hornets!
Sesia fuciformis. Not found.
„ bombyliformis. Do.
Sphecia apiformis. Do.
„ bembeciformis. Do. It has, however, been taken near Dudley, which is in Worcestershire, but not quite within the district in question.
Trochilium vespiforme. Not found.
„ chrysidiforme. Do.
„ ichneumoniforme. Do.
„ cynipiforme. Very rare.
„ tipuliforme. Sufficiently common.
„ philanthiforme. Not found.
„ sphegiforme. Do.
„ andrenæforme. Do.
„ formicæforme. Do.
„ culiciforme. One specimen.
„ myopæforme. Not found.
„ stomoxyforme. Do.
Ino statices. Do.
Anthrocera filipendulæ. Very abundant. In profusion on "the round hills" near Astley, and on the Abberley and Woodbury hills; also not uncommon at Malvern.
„ trifolii. Extremely abundant on "the round hills" and at Abberley, where for some years I found it outnumbering the Filipendulæ; but, towards the end of my period of hunting in those parts, it became rather less common, though still sufficiently abundant. I found, also, almost endless variation in colour and minor characteristics, many specimens answering pretty accurately to the description given of Anthrocera loti and A. meliloti, and others shading off by almost imperceptible gradations from these to A. trifolii; so that, allowing A. loti and A. meliloti to be distinct species, as they unquestionably are admitted to be, both these species must have been by no means rare in this locality. I never took the larvæ of any but the Filipendulæ and the Trifolii. Between 1842 and 1848, these hills absolutely swarmed with these two species, and there were very many also answering to the other two; but, since 1848, I have not found so many of any of the species, and A. filipendulæ has attained a decided preponderance; but I do not recollect any locality which produced a quarter as many specimens, both typical and varieties, as these "round" and Abberley hills. I have not hunted there, however, since 1852, and do not know how far their character may have deteriorated since that time.
„ hippocrepidis. Not found.
„ minos. Do.

I have inserted this last species although it was not discovered in the kingdom till some years after I had brought my Worcestershire investigation to a close; still, as it is now established as a *British*, though I cannot quite say an *English*, species, I could not bring myself to ignore it altogether. It may be found yet in England, and even, for aught I know, in Worcestershire; so I hope its name may be allowed to stand, without rendering me obnoxious to a charge of presumption for inserting it.

The Entomological Secretary, on the part of Mr. Richard Shield, associate member, read the following paper

ON REARING LEPIDOPTERA FROM THE PUPA STATE, TOGETHER WITH NOTES ON THE MANAGEMENT OF THE LARVÆ AND PUPÆ OF MICROLEPIDOPTERA.

The Rev. Joseph Greene, in his admirable paper on "Digging for Pupæ," has given ample instructions for the collection of the pupæ of the Macrolepidoptera, so that little is left for explanation upon that subject; but there is one—and that one

of the most important, according to my idea—viz., the most sure method of rearing, when collected, these pupæ to perfection, which has been (comparatively speaking) left untouched. Upon this head I purpose, in the following brief notes, to give the results of my own experience, together with what I have been able to collect from others well conversant with the subject, in the hope that many young entomologists may not have to endure the chagrin and disappointment consequent upon repeated failures—failures not consequent upon carelessness or inattention, but, except in the cases of ichneumon and muscardine, arising from want of judgment, and a departure from the laws of nature.

To rear pupæ successfully three things are necessary—a moderate supply of moisture—an earth not liable to mould or mildew (but, at the same time, light and friable, and not liable, if accidentally allowed to become dry, to impact the pupæ)—and thorough ventilation. In order to obtain these results as far as possible, in a compact form, I have planned the following

BOX FOR REARING PUPÆ.

Obtain one or more boxes, of any convenient length or breadth, but not less than six inches in depth (either divided into compartments or not), and fitted with a lid, having a large space cut out of it, to within an inch of the margin; this open space to be covered with either close-wove wire or old calico, affixed with thin glue; in the bottom of the box, or of each compartment, bore, with a centre-bit, one or more holes, about two-thirds of an inch in diameter; cover these with pieces of perforated zinc, tacked down; place on the bottom of each box, or compartment, moderately-large pebbles or sea gravel, to the depth of about half an inch, and on this again, to the depth of two inches, the earth on which to lay the pupæ, composed of equal parts of garden mould, silver-sand, and thoroughly-rotten wood from the heart of an old tree; on this, after being made smooth, distribute your pupæ in such a manner, according to their size, that, when covered, none are more than half an inch below the surface; and cover the surface of the mould with a layer of moss, about half an inch thick. The inside of the box should be rough, and be raised on pieces of wood, or have pieces of wood fixed to the bottom in such a manner that it may stand clearly above the floor.

By this arrangement you may damp your pupæ with impunity, as it is impossible for them to become saturated with stagnant water, owing to the bottom drainage; and the moss at the top prevents undue evaporation, by absorbing a certain quantity of moisture, and thus striking a medium between the two extremes of wet and drought. Thus far respecting pupæ that bury themselves.

Our attention next directs itself to pupæ that lie concealed under moss; and here it may be as well to mention a locality not mentioned by Mr. Greene in his paper, but one which, I feel convinced, will be productive, especially in the pupæ of those larvæ that feed on low-growing plants, upon heaths, mountains, and upon the coasts—viz., *under the thick moss growing upon and around large stones and boulders, and upon the old stumps of felled trees.* The pupæ of the eupitheciæ and all the small geometræ are best kept in wide-mouthed bottles, tightly corked. The anti-absorbent properties of the glass and cork prevent their drying up in the small quantity of air enclosed in the bottle, while the glass, being a slow conductor, maintains it at an equal temperature. There will be no difficulty experienced in getting the insect out of the bottle, as it will almost always be found hanging, back downwards, from the cork; so that, on carefully reversing the cork, without jarring it, the insect may be boxed without injury. The larger pupæ may be placed on the moss in the pupæ box.

ON REARING THE LARVÆ OF MICROLEPIDOPTERA.

Larvæ inhabiting the stems of plants—such as pastinaca, cirsium, arctium, &c.—require no attention beyond keeping them away from heat, in order that the pith on which they feed may not become dry. I keep mine in tin boxes, about eight inches high, by three inches in diameter; and, thus packed together, they suffer no injury, except in the case of thistles, which are apt to ferment. In this case, they require to be taken out of the tins, and exposed to the air, until

moderately dry, when they may be returned to the tins, until about a month of the time of the appearance of the insects; they ought then to be placed in a box, with a hole cut in the lid, and covered with wire or gauze.

Larvæ that feed in leaves—such as nepticulæ—require the leaves to rolled in soft paper; when the larvæ are full-fed, they will quit the leaves, and make their cocoons either among them or upon the paper; the latter require to be cut out (attached to portions of either leaf or paper), and kept in small, tightly-corked bottles.

Of Lithocolletis, the portion of leaf containing the pupæ requires to be cut out, and the pupæ (still in the mined portion of the leaf) enclosed in a tightly-corked bottle. In this manner they may be kept the whole winter, without drying up, provided the bottle is kept constantly moist.

The extremely-interesting genus Coleophora require, to insure success, open-air feeding. The plan I adopt is the following:—I obtain several round tin cases, about nine inches deep, by five in diameter, with lids whose rims slip on outside the cases; I then cut out the whole circumference of the lid, to within about half an inch of its edge, and, procuring a piece of calico or linen, I place it flat over the mouth of the tin case; I put on the lid, pressing it down, which, necessarily, draws the calico tight, and your Coleophora breeding-cage is then complete. When wanted for use, put about two inches of earth in the bottom of the tin; in the centre of this put a small tumbler, or wide-mouthed bottle, containing the food, placed in water; put the larvæ on the top of their food; cover them (as before explained); put the whole out into the open air, in a cool place, out of the reach of the sun, and you will have no reason to complain of want of success, if they are supplied with sufficient food.

LARVÆ THAT FEED IN BUDS OR SHOOTS OF PLANTS.

Place the buds or shoots containing the larvæ upon the bottoms of one or more tumblers; tie them tightly over with a piece of old calico or linen, and place them out in the air, away from the sun. As the larvæ devour the shoots or buds they originally inhabited, they will begin to crawl about in search of food; place some fresh food upon the top of the old; and, as they leave the old, they will enter the fresh shoots, which they must be supplied with, until full fed, in the same manner.

Larvæ in the roots of plants require the food-plant to be replanted, either in the open ground or in large garden-pots, until the end of spring, when they must be taken out of the ground, and placed, with moist earth, in a deep breeding-cage; or, if planted in pots, both pot and plant can be conveniently set standing in a large breeding-cage, until the perfect insects have been bred. The best time for collecting larvæ in roots is in January and February. Larvæ that feed in the folded leaves of plants (such as the larvæ of Peronea hastiana upon sallow) require somewhat different treatment.

The method adopted by the London entomologists in rearing the larvæ of Peronea hastiana is as follows:—

Procure a large box, say of the following dimensions:—two feet long, eighteen inches wide, and one foot deep, fitted with a frame about one inch and a half wide, dropping into a rabbet in the edge of the box, in the same manner as the glass frame fits into the rabbet of a cabinet drawer; the open space of this frame must be covered with a large piece of old calico, fixed to the bottom with glue; both ends of the box must also be bored with two or three large holes, two or three inches in diameter, covered with calico or gauze. Into this box throw all your leaves containing Peronea larvæ, as collected (I have had as much as a bushel of sallow leaves in one box, at one time); and place upon the top of the picked leaves small branches of sallow, in order that the larvæ, when they leave the picked leaves, may find fresh food as they rise to the surface; moisten the leaves in the box if they appear to get too dry, and stir them up, with both hands, two or three times a week, in order that those leaves which lie at the bottom of the box may be brought to the top; and, to prevent fermentation taking place in such a mass of leaves, when you think they have attained the pupa state (which may be known by examining a few of the leaves), turn a portion of the leaves out of the large box into

a tray, and carefully examine the rolled leaves for the enclosed pupæ; place the pupæ thus found in small boxes, covered with a frame and calico; and continue this process until you have examined all the leaves contained in the box; then, keeping the pupæ you have found in your small breeding-cages, return the whole mass of leaves into your large box, as there will be scores of pupæ among them which have escaped your search; keep this mass of leaves frequently stirred, but do not wet them any more, nor moisten again the pupæ in your small cases, as the perfect insects will begin to make their appearance in about a month after attaining the pupa state, and will continue coming out throughout the autumn.

The leaves in the large box ought to be kept until the following May, as the larvæ of many other insects will have fed up along with the Peroneæ—such as Dasystoma, Salicella, small geometræ, &c., which lie in the pupa state all the winter.

I have endeavoured in the foregoing notes to give, as briefly as possible, some practical information respecting the management of the larvæ and pupæ of the microlepidoptera; but much—very much—is left to the judgment of the collector in this matter; and, at the same time, he must always bear in mind, that the nearer he assimilates his treatment to the laws of nature, the greater will be the chances of success; while the further he recedes from them, and adopts an artificial system of treatment, the greater will be his failures.

If these notes should have the effect of adding one more student to our ranks, or shall in any degree advance or promote the study of entomology in Ireland, I shall sincerely rejoice, and shall be happy to aid with my advice any young entomologist who may be in need of information upon the subject. A note addressed to me, at No. 6, Fleet-street, Dublin, will meet with prompt and cheerful attention; and, I much doubt, whether he who asks for information will be more pleased at receiving it than I shall be at giving it; as I may thus help him to elucidate, in some measure, the economy of these little gem-like atoms of God's creation, which, however insignificant and trifling they may appear to some superficial minds, are fulfilling the purpose for which they were created—each, in its appointed sphere—to draw forth our wonder, our admiration, and our praise; for "he who wondereth at nothing, hath no capabilities of bliss; but he that scrutinizeth trifles, hath a store of pleasure to his hand; and happy and wise is the man to whose mind a trifle existeth not."

After some conversation, in which the Rev. J. Greene said that he had had much pleasure in listening to Mr. Shield's paper, which was not only ably written, but extremely interesting, the meeting adjourned.

MAY 12, 1855.

R. Ball, Esq., LL.D., President, in the Chair.

The receipt of the following donations to the Library of the Association were acknowledged, and thanks ordered to be given to the donors:—

The Proceedings of the London Entomological Society, 1854, from the Society.

The Journal of the Geological Society of Dublin, Part II., Vol. VI., from the Society.

J. C. Dale, Esq., F.L.S., was elected a corresponding member.

The President gave his demonstration of the family Psittacidæ.

Mr. Hogan read the following

CATALOGUE OF IRISH MICROLEPIDOPTERA.

In submitting to your attention the following catalogue of the species of microlepidoptera known as yet to have been found in Ireland, my desire is simply to form a supplement to the more complete summary of the larger species, the macros, given you by the Rev. Mr. Greene; at the same time, by forming a basis upon which others may build an easy superstructure of additional records, to facilitate the progress of inquiry into this hitherto little-studied branch of entomology, and to encourage Irish collectors to pursue their researches with more assiduity in proportion to the large number of desiderata they see as yet unfilled.

The nomenclature adopted has been, as far as it could be made available —namely, to the end of the Tortrices—that of H. Doubleday, the same employed by Mr. Greene; in the larger group of Tineina, I follow Mr. Stainton, the latest authority on that portion, and I also adopt his names for the Crambidæ, those luckless "snouts" that have been tossed to and fro from one group to another, as alike anomalous, perplexing, and uninteresting to all nomenclators and compilers of systematic divisions.

Common and unattractive as some of the Crambidæ undoubtedly are, others of them rejoice in varied and beautiful markings, while the broad silvery streaks that adorn some of the rarer species ought quite to inspire admiration enough to redeem them from the strange dislike into which their anomalous position with respect to the other moths has brought them into.

In a very few instances, when *very* recent discoveries have broken into the last arrangements, I have been compelled to deviate from prescribed authority; however, no mistake can arise as to these, since I have appended to any dubious names those of the authors from whom they are taken.

All objections to the study which may be raised from the minuteness of the objects, should, I think, be at once silenced by a consideration of the mighty influences that have at all times affected the world from the agency of small and overlooked creatures; it is the weak and fragile things that have been chosen to confound the powerful, and this has been done to teach us that we should not glory in His presence who created them. Nor can the effects produced by the micros be easily passed by without the eye meeting, though it may not willingly observe them; the tortuous mines in the leaves of so many plants, strangely varied in form, and yet, at times, seemingly symmetrical—the drooping shoot, whose internal parts are slowly devoured by the fattening larva—the tenderly-united leaves of the sallow and the rose—the cankered bud that blights the cherished hopes of the anxious florist—the decaying forms which startle the eye of the entomologist whose attention to his perishable collections has been turned away for a period of unwonted length—all bear a testimony that will not, cannot, be set aside.

One of the greatest points of attraction to the study of the Tineina, says Mr. Stainton, is afforded by the endless variety in the habits of the species; this his own books abundantly demonstrate; and not less do they point out the rich field of discovery that lies open to future investigators.

But other difficulties will occur to the minds of those who are willing and desirous to take up the study; they will naturally anticipate great trouble both in the identification and in the manipulation (capturing, setting, &c.) of micros. Now, in regard to the former, I gladly quote our best authority on the subject, Mr. Stainton, who says—"It has been the remark of every writer, that the smaller the species, the more splendid the colouring, and the more sharply-defined the markings; it is precisely amongst the smallest species that we find the characters of the families most strongly defined; and, whereas among the larger species it is extremely difficult to arrange them in families with good distinctive characters, in the smaller species no such difficulty exists." In regard to the second obstacle, though the micros undoubtedly need delicacy of touch and steadiness of hand, yet the little experience I have myself had convinces me that the danger of injury is not nearly so great as one might suppose, and that, in most instances, it is much easier to set *their* wings than those of the macros. The list is as follows:—

TORTRICES.

Halias prasinana. Wicklow, &c.
,, quercana (?). Ditto. Tardy's list; but introduced, I suspect, by some confusion, for Phibalocera quercana.
Tortrix pyrastrana. Dublin, &c. Pupæ in leaves of apricots, &c., at end of May.
,, xylosteana. Do.
,, rosana. Do. Pupæ in rose leaves, at end of May.
,, heparana. Mr. Clear.
,, ribeana. Belfast.
,, unifasciana. Mr. Haliday's list.

Tortrix viburnana. Killarney.
,, icterana. Howth; not uncommon in the larva state; the male larvæ appearing in June and the female larvæ in July, on Plantago lanceolata, Centaurea nigra, &c. This is a curious circumstance, as the female is much rarer than the male in the imago state. The latter emerges in July; the former, in August.
,, viridana. Dublin, &c.; common.
,, adjunctana. Common; larvæ to be found on honeysuckle and ivy, in April.
,, corylana. Mr. Clear.
,, ministrana. Newtownlimavady, Co. Derry.
Dichelia grotiana. Mr. Tardy.
Amphysa gerningana. Do.
Peronea favillaceana. Howth; larvæ, in July, on the under side of beech leaves, enclosed in a fine web.
,, rufana. Howth, &c.; on hedges, in September and October.
,, schallerana. Mr. Tardy; also *var.* latifasciana, *Hw.*
,, abilgaardana. Howth, &c.; larvæ on brambles, in June and July; common.
,, cristana. Belfast; also the varieties spadiceana, *Hw.*, desfontainiana, *F.*
,, umbrana. Mr. Tardy.
,, tristana. Belfast; also the *vars.* boscana, *F.*, and plumbosana, *Hw.*
Teras effractana. Do.; also at Blarney, Co. Cork.
,, caudana. (?) Belfast.
Dictyopteryx contaminana. (?) Same locality.
,, holmiana. Do.
,, bergmanniana. Common; pupæ to be found in rose leaves, at the end of May.
Argyrotoza conwayana. Mr. Tardy.
Penthina betuletana. Holywood, Co. Down.
,, pruniana. Common everywhere; larvæ on leaves of sloes, cherry trees, &c., in May.
,, cynosbana. Mr. Clear.
Spilonota roborana. Howth; larvæ common on sweetbriar, in May.
,, suffusana. Mr. Haliday's list.
Pardia tripunctana. Dublin, &c.
Notocelia udmanniana. Dublin; not uncommon; larvæ in shoots of bramble, in June.
Sericoris cespitana. In month of July; scarce near Dublin.
,, littorana. Howth; a single specimen.
,, lacunana. Dublin; very common.
,, urticana. (?) Mr. Haliday's list.
Mixodia schulziana. Mourne Mountains, Co. Down.
Roxana arcuana. Mr. Clear.
Cnephasia musculana. Enniskerry, Co. Wicklow; larvæ between united bramble leaves, in September, about which time they cease feeding, and form a slight cocoon between two leaves. In the middle of November, the larva, having wasted to about half its former size, and contracted a withered appearance, changes to the pupa state.
Sciaphila virgaureana. Near Dublin; larvæ to be met on Veronica beccabunga, in June.
,, alternana. Mr. Tardy.
,, passivana. Not uncommon near Dublin.
,, hybridana. Do.
Bactra lanceolana. Do.
Phoxopteryx uncana. Belfast.
,, myrtillana. Do.
,, lundana. Near Dublin, on slopes of Drogheda Railway; flies freely from five to half-past six o'clock, a.m.; plentiful in May.
,, mitterbacheriana. Roebuck, near Dublin; and at Belfast.

Grapholita nigromaculana. Mr. Tardy.
,, trimaculana. Do.
,, penkleriana. Belfast.
,, nævana. Do.
Phlæodes frutetana. Howth; larvæ on alders, in August.
Pædisca corticana. Do.; among heather, in July.
Ephippiphora dissimilana. (?) Mr. Haliday's list.
,, cirsiana. Dublin; not uncommon.
,, scutulana. Do.; do.
,, brunnichiana. Near Dingle, Co. Kerry.
Semasia spiniana. Howth, in August.
,, janthinana. Mr. Clear and Mr. Tardy.
,, wæberiana. Belfast.
Coccyx vacciniana. Dublin; larvæ on vaccinium, in June, July, and August; imago, in April and May.
Retinia pinivorana. Holywood, Co. Down.
Carpocapsa pomonana. Mr. Clear.
Endopisa nebritana. Mr. Tardy.
Stigmonota perlepidana. Raheny, Co. Dublin; one specimen, on the wing, June 9.
,, trauniana. Roebuck, near Dublin.
Dicrorampha petiverana. Mr. Clear.
,, ulicana. Near Dublin, Drogheda Railway slopes, in June.
,, plumbagana. Along with D. ulicana.
Pyrodes rheediana. Holywood, Co. Down.
Catoptria ulicetana. Dublin; very common.
,, hypericana. Enniskerry, in July.
Trycheris mediana. Generally distributed.
Choreutes scintillulana. Holywood, Co. Down.
Simæthis fabriciana. Common.
Eupœcilia atricapitana, *Steph.* Clontarf, near Dublin; one specimen, June 16.
,, angustana, *Hüb.* Near Belfast.
Xanthosetia zœgana. Killiney, Co. Dublin, end of July; also at Belfast.
,, hamana. Mr. Tardy.
Argyrolepia baumanniana. (?) Belfast.
,, badiana. Howth, in July.
Cochylis dilucidana, *Steph.* Do., do.
,, stramineana. Belfast.

CRAMBIDÆ.

Crambus pratellus. Belfast.
,, pascuellus. Dublin; common.
,, hortuellus. Do.; do.
,, pinetellus. Blarney, Co. Cork.
,, culmellus. Abundant.
,, tristellus. Generally distributed.
,, selasellus. Belfast.
Eudorea pyralella. Dublin; abundant.
,, frequentella. In gardens; generally distributed.
,, murana. (?) Belfast.
,, lineola. Scarce; larvæ feeding under lichen on old blackthorns.
Aphonia colonella. Co. Dublin, Roebuck, &c.; on stone walls, in July. It is remarkable that the soil of this neighbourhood is rich, and by no means dry or sandy, like that in which this species has usually been found to occur.
Homœosoma nimbella. Common near Dublin; larvæ in unripe seeds of Matricaria chamomilla, in September.

TINEINA.

Chimabacche Fagella. Mr. Haliday's list.
Ochsenheimeria Birdella. Holywood, Co. Down; Portmarnock, Co. Dublin; Dingle Bay, Co. Kerry, &c.

Euplocamus Boleti. Mr. Haliday; among the mould of a hollow oak tree, at Holywood.
Tinea rusticella. Howth, &c.
,, tapetzella. Belfast.
,, arcella. Do.
,, corticella. Dublin; in houses.
,, Granella. Belfast.
,, cloacella. Do., and Dublin.
,, fuscipunctella. Common near Dublin.
,, pellionella. Belfast, and near Dublin.
,, biselliella. Dublin; in abundance.
Lampronia Rubiella. Holywood, Co. Down; in raspberries.
Incurvaria muscalella. Mr. Haliday.
,, capitella. Do.
Micropteryx Calthella. Enniskerry, Co. Wicklow.
,, Seppella. Howth, &c.; common everywhere.
,, Allionella. Lough Bray, Co. Dublin; Blackstones, Co. Kerry.
Nemophora Metaxella. Belfast.
,, Schwarziella. Lough Bray; on heath.
Swammerdamia apicella. Mr. Clear.
,, cæsiella. Clontarf, Co. Dublin; in August.
,, Pyrella. Near Dublin; bred from larvæ in leaves of apple.
Scythropia Cratægella. Mr. Clear.
Hyponomeuta Padellus. Belfast.
,, Evonymellus. Holywood; a large nest on evonymus, reared; and at Blarney, on flowers of Sambucus ebulus; and at Dublin.
,, Padi. Belfast.
Prays Curtisellus. Do.
Plutella Cruciferarum. Near Dublin; not uncommon.
Cerostoma Xylostella. Mr. Haliday's list.
Phibalocera Quercana. Near Dublin, also at Blackstones, Co. Kerry, and at Blarney, Co. Cork; larvæ on the under side of the leaves of the arbutus, in June.
Depressaria costosa. Howth, &c., Co. Dublin.
,, liturella. Do., and Co. Kerry.
,, assimilella. Howth.
,, atomella. Do.
,, arenella. Do., &c.
,, subpropinquella. Raheny, Co. Dublin; larvæ enclosed in a light web, under leaves of thistles, in June.
,, Alstræmeriana. Dollymount, Co. Dublin, in August.
,, purpurea. Clonmel, &c., in September.
,, ocellana. Belfast.
,, applana. Dublin, &c.
,, nervosa. Mr. Clear.
,, badiella. Near Dingle, Co. Kerry.
,, Heracliana. Dublin, &c.; not uncommon.
Gelechia rufescens. Clontarf, Co. Dublin; larvæ in rolled-up leaves of grass, in spring and autumn.
,, ericetella. Howth, Co. Dublin.
,, terrella. Belfast.
,, proximella. Mr. Haliday's list.
,, tricolorella. Howth; larvæ in shoots of Stellaria holostea, in April, 1855.
,, fraternella. Larvæ on Stellaria uliginosa, at Howth, and on Cerastium vulgatum, at Malahide; abundant in April and May.
,, vicinella. On the coast near Belfast.
,, marmorea. Sandy coasts, near Dingle, Co. Kerry; abundant.
,, tæniolella. Blarney, Co. Cork; one specimen, in August, 1854.
,, Anthyllidella. Near Dublin; larvæ mining the leaves of Anthyllis vulneraria in April.

Gelechia atrella. A single specimen, bred from larvæ taken on the coast, near Dingle, Co. Kerry.
,, næviferella. Old road, Howth; larvæ mining leaves of Atriplex in September.
,, Hermannella. Mr. Haliday's list.
Cleodora Cytisella. Killarney.
Dasycera sulphurella. Dublin, &c.; in abundance.
Æcophora oppositella, *Sta.* Holywood, Co. Down. (?)
,, minutella. Dublin; in June.
Endrosis fenestrella. Dublin, &c.; common.
Acrolepia granitella. Do.; do.
Glyphipteryx Fischeriella. Howth.
Argyresthia ephippella. Belfast.
,, nitidella. Mr. Haliday's list.
,, spiniella. Howth; mixed underwood, in August.
,, mendica. Mr. Haliday's list.
,, Gœdartella. Dublin, &c.; not uncommon.
,, Brockeella. Do.; do.
Ocnerostoma piniariella. Howth; among fir trees, in June and July.
Gracilaria Swederella. Common.
,, elongella. Dublin, Cork, and Holywood, on oaks; larvæ on alders at Howth, in June and October.
,, tringipennella. Dublin, &c.; larvæ mining the leaves of Plantago lanceolata, in April and July.
,, Syringella. Dublin, Holywood, &c., on syringa; very common.
,, auroguttella. Howth and Enniskerry; in April and July.
Ornix Anglicella. Common near Dublin; larvæ on hawthorn and sloe, in September and October.
Coleophora alcyonipennella. Howth; larvæ plentiful on Centaurea nigra, in May.
,, discordella. Howth, &c.; larvæ abundant on Lotus corniculatus, in April and May.
,, annulatella. Howth, old road; larvæ on seeds of Atriplex, in September and October.
,, nigricella. Near Dublin; not uncommon.
,, fuscedinella. Dublin, &c.
,, gryphipennella. Do.
Laverna lacteella. (?) Mr. Haliday.
,, Epilobiella. Near Dublin.
Chrysoclista Linneella. Holywood, Co. Down.
,, flavicaput. Near Dublin.
Asychna modestella. Do.
Chrysocorys festaliella. Killarney.
Elachista Megerlella. Howth; in May.
,, triseriatella.* A single specimen, at Howth, 1st July, 1854. Five years had elapsed since the capture of the first specimen, on Durdham Downs, near Bristol, at the same period of the year (26th June).
,, rufocinerea. Near Dublin; very common.
,, cygnipennella. Dublin, &c.; abundant.
Tischeria complanella. (?) Mr. Haliday's list.
,, marginea. Howth; larvæ in brambles, in November.
Lithocolletis irradiella. One specimen, near Raheny, Co. Dublin, May 7, 1854. This species was previously unique.
,, pomifoliella. Near Dublin; not uncommon.
,, spinicolella. Do.; do.
,, Faginella. Do.; do.
,, quercifoliella. Dublin, Holywood, &c.; abundant, especially on evergreen oaks.
,, Messaniella. Holywood, Cork, &c.; in oak leaves.

* Figured, Pl. iv., Fig. 1.

Lithocolletis corylifoliella. Near Dublin; larvæ in the upper side of hawthorn leaves, in October; scarce.
" alnifoliella. Howth; larvæ abundant in October, in leaves of birch.
" Cramerella. Mr. Curtis.
" trifasciella. Howth, old road; larvæ in leaves of honeysuckle, in September and October.
Lyonetia Clerckella. Dunnycarney, Co. Dublin; larvæ in leaves of apple trees, in September; common at Holywood, Blarney, &c.
Cemiostoma spartifoliella. Common.
Nepticula Oxyacanthella. Coolock, Co. Dublin; larvæ in hawthorn leaves, in October.
" ignobilella. Do.; do.
" Acetosæ. Howth; larvæ in leaves of sorrel, in July, October, and November.
" plagicolella. Artane, Co. Dublin; larvæ in leaves of sloe, in October.
" gratiosella. Killester, Co. Dublin; one specimen, in April.
" marginicolella. Clontarf, Co. Dublin; larvæ in elm leaves, in October.
" aurella. Dublin; larvæ in bramble leaves, throughout the year, everywhere.
Pterophorus trigonodactylus. Clontarf, Co. Dublin; on common coltsfoot.
" Pilosellæ. (?) Belfast.
" bipunctidactylus. Do.
" pterodactylus. (?) Do.
" galactodactylus. Mr. Tardy.
" pentadactylus. Mr. Tardy and Mr. Clear.
Alucitina polydactyla. Roebuck, Co. Dublin; Blarney, Co. Cork; on windows.

In concluding the catalogue, I have with pleasure to acknowledge that all the records hitherto made by collectors of former days, have been rendered available to me through the kindness of Mr. Haliday; and that, for information on the food of the larvæ, &c., as well as notes of additional species, I am indebted to Mr. R. Shield, whose untiring industry promises to do much for the advancement of this department of science; also to Rev. J. Greene, J. Grainger, and E. P. Wright, Esqrs. My especial thanks are due to H. T. Stainton, Esq., for his assistance in disentangling the synonymic names of species. My own contributions have been but few, the only one of any importance being Elachista triseriatella, of which a figure, drawn by Mr. Haliday (see plate iv., fig. 1), accompanies this paper, it not having been before figured in any scientific work. It has been my endeavour, as far as possible, to give names of localities rather than of captors, as being more interesting to the public; of some of the less recently recorded species, however, I have been unable to obtain any other information than the *ipse dixit* of the captor. At the same time, I can assure any English reader into whose hands this may fall, that nothing is recorded, without an appended query, which I have the least reason to doubt.

Mr. Grainger exhibited some specimens of Irish Lepidoptera, which he had collected himself.

After some conversation, the meeting proceeded to ballot for new members, when Achilles Daunt, Esq., S.T.C.D., and Henry Crozier, Esq., T.C.D., were elected ordinary members.

The meeting then adjourned.

JUNE 2, 1855.

R. Ball, Esq., LL.D., President, in the Chair.

The President gave a demonstration of the family Cuculidæ.

The Entomological Secretary read the following extract of a letter from J. C. Dale, F.L.S.:—

"Glanville's Wootton, Sherborne, Dorset, May 8, 1855.

"Having been now 'in the field' very nearly 50 years, more practically than scientifically, I have been particular in making notes as to dates and

localities, &c., with a view to ascertain what are really and truly British captures, as far as possible. A great deal depends on the veracity of the narrator; and I have endeavoured to find out, pro and con, the respectability and dependence to be placed on them. Some are careless, and apt to make mistakes as to names, &c.; some are fond of notoriety, and of seeing their names in print, &c. The late Mr. Sparshall, of Norwich, had a dragon-fly, which he assured me he took himself near Norwich. The Baron De Selys tells me that must be a mistake, as it is not even European. And, again, of the Arcturus Sparshalli, figured by Mr. Curtis, he gave the date and locality, &c. M. Boisduval suspected it was American; but the British Museum now have a pair from Australia! Some are too credulous and others too sceptical, especially in London; and I know even there a little variance in opinion, especially when they happen to possess a specimen which before they rather doubted. The capture of A. Belia certainly surprised me; but Weaver assured me he is quite certain he made no mistake about M. Dia, and that at the time he took them he never had a foreign species. Sir Patrick Walker told me that he took the H. ligea (of which he had one specimen, and now belongs to Samuel Stevens, F.L.S., and two he gave to the late J. F. Stephens, and now in British Museum) near Brodick Castle, in the Isle of Arran, and also H. blandina, when there grouse-shooting. This is now doubted by some, and one person has written to me saying, that 'if Sir P. Walker was now alive, and told him so, he would contradict him to his face!' I had hopes entomologists, in general, were a more respectable body. P. Hampstediensis of Petiver is evidently a mistake! Petiver himself must have misunderstood the statement respecting it; which is easy to suppose arose from Dr. Solander living at Hampstead after his return with Sir Joseph Banks, &c. I ventured a suggestion, that he might have shown his specimen to Albin and Petiver, and said he took it in the Isle of Amsterdam; and that from the similar names arose the mistake. It and many others that are well ascertained, like this, to be erroneous, should be expunged. I have V. Huntera which Captain Blomer took in Wales; Mrs. Blomer also told me she remembered his having taken it, and was nearly throwing it away as V. cardui. He has been doubted also by some! I have stated that I believed I once saw P. podalirius alive in Cambridgeshire, settled on some rushes, facing the rising sun, with 'its wings half expanded.' Some person has stated that I must be mistaken; for I could not have known P. podalirius from P. machaon, with 'its wings *closed*.' I fancy, however, on the contrary, that I should know it even with 'its wings closed' from Machaon, which is a very old acquaintance of mine, both in this part and also in other parts of England. There are other authorities, two of which I have, written by their captors. But some deny the whole, and say that one is P. Feisthamilii, a native of Spain, &c. Now, *that* is given in the Stettin Catalogue as a variety of P. alexanor, and not of Podalirius, although I am aware Boisduval, &c., give it as the last. It would certainly be more satisfactory to have other evidence, though Sphinx nerii has been taken in several instances, and I heard of two at Sherborne, but have not seen either!

"J. C. Dale."

Mr. Haliday showed several Hemipterous insects, with parasites attached, of a compressed spheroidal or somewhat reniform figure, embossed with bands of zig-zag sculpture, and affixed by one of the lobes of the sinus, which he had observed to terminate in connivent valves, somewhat like the operculum of a Balanus. These bodies are usually attached to the under side, between the head and prothorax of the insect, if of moderate size, as the species of *Evacanthus*, one of which, the *craticula* of Curtis, common among rushes, is particularly infested by them. To smaller insects, as *Typhlocyba*, *Delphax*, &c., they are commonly affixed between the segments of the abdomen, under the elytra and wings in winged individuals. They appear to grow in size, and the larger ones have been observed to split open along the convex face, disclosing a naked apod grub, with horny head, furnished with jaws and jointed appendages. He had not succeeded in tracing their further development; but some observations made on their structure, led him to conjecture that they might be larvæ of Diptera, especially the circumstance that the four malpighian vessels were united, two and two, into a pair of common ducts before

the insertion. Bohemann, however, who had observed these parasites on *Typhlocyba*, and found that the grub enclosed itself in a cocoon, is of opinion that they are the larvæ of some of the *Chalcidæ* or *Proctotrupidæ*.* The matter was now brought before the Association, in the hope, that some of the members might be more successful in determining the question by direct observation.

He showed also some Coleoptera and Diptera taken in Ireland. Two of these, *Heterothops dissimilis* and *Agathidium marginatum*, had been found before in other parts of the country, but were additions to the Coleopterous fauna of the Dublin district, lately taken at Portmarnock. Also *Pelina ænescens*, new to the British Fauna, taken at Lough Bray on the 14th of the last month, when a number of the members of the Association visited the spot for the sake of collecting. This fly, belonging to the group *Ephydrini* of the family *Muscidæ*, was first observed in Lapland, but has since been found in other parts of Sweden. Of this group, 65 British species were enumerated in a brief sketch inserted in the "Annals of Natural History" in 1839. An excellent Monograph of the Swedish species has been given by Stenhammar in the volume of the "Transactions of the Royal Swedish Academy," published in 1844; and by the help of this and of Zetterstedt's "Diptera Scandinaviæ" some British species had been since discriminated, and the number increased by six; but of these only two were new discoveries—the fly in question and another which was also before the meeting, *Discomyza cimiciformis*.† At a former meeting of the Association Dr. Kinahan had recorded an interesting observation as to the economy of *Discomyza incurva*, the only species of the genus hitherto characterized. The second species is not, however, a new discovery, as Mr. Haliday had received, in 1847, specimens, named as above, from Mr. Curtis, who first found it in June, 1842, near Quar Abbey (Isle of Wight) and in a marsh at Ryde. Last September it was met with, not very scarce, on the banks of the creek of Owenbeg river, Cork Harbour, chiefly on *Beta maritima*. Like the other species, it takes long skips, probably with the help of the wings, but does not use them for a sustained flight. On the shore of the same creek, within a space of a few yards square, the following maritime Coleoptera occurred, besides others of less note:—*Bradycellus pubescens*, *Pogonus chalceus*, *Bembidium laterale*, *Aepys robinii*, *Micralymma marinum* (Strœm), *Heterocerus marshami*. It was remarkable that of this list only the first was known to Mr. Clear as a native of the County Cork. Mr. Haliday had never before found all of them associated. The *Aepys*, which occurred also near Passage, appears to be confined to those parts of the coast, below high-water mark, where clay comes to the surface. Specimens from Scotland of *Aepys robinii*, the gift of Mr. Javet, were shown, also *Aepys marinus* from Strangford. Mr. Haliday was disposed to doubt the importance of the distinctions assigned to the two alleged species. The difference in the armour of the feet led him to suspect that a sexual distinction may have been treated as specific. He quoted the remarks under *Ptilium pallidum* in the Faune Française of Fairmaire and Laboulbène—"Les angles posterieurs du corselet varient un peu, et il est facile, avec de la bonne volonté, de trouver des angles très obtus et des angles presque droits; mais, selon nous, ces deux termes sont fort exagérés." He had found at Blarney Lake, last summer, some specimens of *Phytobius velatus* (shown), of which he possessed before but one taken at Holywood (Down). These were partly taken out of the water, partly swept off the stems of *Equisetum*, when the sun was shining strong. Beck, the first discoverer of this species, has remarked that it swims fast and dives. The peculiar structure of the legs was shown, "natatorial," as Schönherr calls them, being thinly furnished with long hairs, the tarsi without the broad felt-like sole usual in this family, and with scarcely any enlargement or notch of the penultimate joint, but with long claws like those of *Elmis*, &c., by which it clings to the submerged plants (*Myriophyllum*, *Zannichellia*, &c.) among which it haunts. A second species, *Ph. leucogaster*, of which also specimens were shown, taken at Holywood, has the like structure in some degree, and the two have been separated from *Phytobius* by Redtenbacher as the genus *Litodactylus*, but as Suffrian has pointed out, in the Stettin Entomological Journal, there are considerable differences

* Proceedings of Swedish Academy for 1850, p. 213.

† See the description of both these species at the end of this paper.

between them, and *Ph. velatus* has the aquatic character much more decided. This species has been already given as Irish by Mr. Wollaston ("Zoologist," 1847, p. 1573); but it would appear from the "Entomologists' Annual," p. 105, that *Ph. velaris* was the insect intended, which belongs to another section of the genus, having the ordinary structure of tarsi, felted beneath, and with bilobed penultimate joint. Three other Irish species were shown, *canaliculatus* (taken at Blarney), *quadrituberculatus*, and *comari* (both at Holywood). The larvæ of two of this section have been described—viz., of *P. notula* by Perris in the "Memoirs of the Academy of Lyons," and of *P. velaris* by Dufour in the "Annals of the French Entom. Society;" but that of *Litodactylus* is as yet unknown. Another insect of the same family, not found by Mr. Clear, *Gymnetron beccabungæ*, was taken (a single specimen) in the glen of the Shournagh river. This and the neighbouring streams which swell the current of the Lea, afforded *Orectochilus villosus* more abundantly than it had been found elsewhere. But, in consequence of its nocturnal habits, it is only to be procured by day under stones, or by fishing along the shaded edges of the stream. At Blarney Lake *Gyrinus celox* (Schiœdte) occurred very sparingly. It is to be observed that this is reduced by Schaum (Catal. Hydradephaga Brit. Museum) to a synonym of *G. bicolor*, which last has been found by Mr. Furlong in Kerry. Of the genus *Cassida* the Irish list is very scanty, especially as regards the Dublin district, within which only *C. rubiginosa* is vouched for. The European list in the Stettin Catalogue amounts to 31, increased to 40 in Gaubil's, of which, however, two are properly Algirian, and two Caucasian. Even the British list in Curtis's Guide amounts to 18. Besides the species named, *C. equestris* is not uncommon in other parts, chiefly on *Menthæ* in watery places. *C. nobilis* has occurred on *Cochlearia* by the shore of Strangford Lough. Mr. Clear, by letter, had supplied the names of two more, *obsoleta* and *hemisphærica*, the correctness of which has been ascertained by a late reference to the relics of his collection; and of the former, Mr. Haliday procured two specimens in the neighbourhood of Cork. The genus *Colon* numbers five species in Ireland, none of which have been observed in the Dublin district, though *C. brunneus*, which has occurred in Cork, Galway, and Wicklow, as well as in the North of Ireland, may be looked for here also. The other species recorded are *serripes*, *appendiculatus*, *calcaratus*, and *dentipes* (Sahlberg). This last had been given as a new species (*C. spinipes*) by Mr. Haliday in the "Entomologist;" but Kraatz has since shown that the insect there described is the true *dentipes* of Sahlberg, and that Erichson has a different species under that name. It is not yet determined which of these two is the *dentipes* of Murray's Catalogue of Scotch Coleoptera. The enumeration of new species in the "Entomologists' Annual" suggests some notes on species already recorded as Irish. *Gymnusa brevicollis*, given as such by Mr. Haliday in the "Entomologist" (1841), should be *G. variegata*, Kiesenwetter, as Dr. Schaum subsequently showed him. *Boreaphilus brevicollis*, described in the same place, judging from the figure given by Spry, is probably identical with *Coryphium angusticolle*, Stephens; but the characters were entirely misapprehended by him, and Sahlberg's older generic name cannot justly be made to yield. The genus is now rich in synonyms, Heer having more lately characterized it as *Chevrieria*, and last of all the name *Macropalpus* has been given it in the "Annals of the French Entom. Society." Stephens's trivial name is unfortunately chosen; the thorax in this species being much *broader* in proportion than in the type *B. henningianus*, also shown. The only English specimen of the former is believed to be that in Mr. Kirby's collection. Three have been found at Holywood. One was taken on a rotten stump, the others off grass in sweeping. *Arpedium brachypterum* was first recorded as British in 1851 (Hardy and Bold's Catalogue of Coleoptera, &c.); but Irish specimens, with name and locality (Sliebh Donard), have been in the British Museum collection since 1847. These appear to agree very well with the form described by Kiesenwetter as *A. troglodytes*. It has not yet been found on any of the other mountains of Ireland. The other native species of the genus, *A. myops*, Hal., "Entomologist" (1841), has been definitely pronounced by Kraatz to be identical (as there queried) with *A. humile*, Erichson. The habitat given by him, Ural Mountains, and his having overlooked a character so singular in this tribe, as the want of ocelli, forbade its positive identification, before, with a

species so common in this island. However, an inspection of Stephens's collection has shown it to be identical also with his *Omalium subpubescens*, which is the oldest name of the three. Specimens were shown of a *Lesteva* with wings scarcely extending to the end of the abdomen, and with elytra apparently shorter than in *L. bicolor*. These were taken on the top of Lugnaquilla and Brandon. *L. bicolor*, as commonly found in the low grounds, has ample wings; but the two agree so nearly in most other respects that this was proposed only as a variety *collina*. *Corticaria cylindrica*, Mnhm, (?) reported at a previous meeting (Nat. Hist. Rev., vol. ii., proc. 53), having been sent to Mr. Curtis, he has pronounced it a species unknown to him. But in the "Zoologist" for May last, Mr. Wollaston has described as new (*C. borealis*) an insect apparently closely allied to this, and likewise found on the sea-coast. *Saprinus dimidiatus* (Nat. Hist. Rev., vol. i., p. 89) is, as Mr. Jansen has suggested (Ent. Annual, 1855, p. 94), intended for the species so named by Illiger and Payhull. It is doubtful, however, whether it should have a place in the Annual, as it was supposed, with us here, to be identical with *Hister maritimus*, Stephens. It is to be observed, however, that Fairmaire and Laboulbène make the latter a probable synonym of a different species, *S. sabulosus*, Fne. Fr. 280, 24. The *Heterocerus*, given as *femoralis* in the list of Dublin Coleoptera (Nat. Hist. Rev., vol. i., p. 34), was shown. Kiesenwetter has described it as a new species, *H. arenosus;* but with doubt expressed, having only two specimens before him. *Aphodius lapponum*, first recorded as British in 1847, by Mr. Hardy, as *A. subalpinus*, had been long before known to us, by its proper name, as a native of Ireland, which occurred on the hills both of Antrim and Wicklow. *Cercyon depressum*, lately characterized as a new species, *C. dorsostriatum*, by Thomson in the "Transactions of the Swedish Academy," 1854, occurs on most of our sea-coasts along with *C. littorale*, but more sparingly, under sea-weed drying on the sands. It was but lately that Mr. Haliday had observed its more peculiar habitat to be on open shingly shores, where it might be found abundantly on the *Laminariæ*, cast up by the sea, weltering in the briny moisture, unmixed with *C. littorale*.

In conclusion, some species of the family *Trichopterygidæ* were shown, with Sturm's plates illustrative of Gillmeister's Monograph. Some of the Irish species appeared to be undescribed, and none of the recorded British species were wanting here, except *Ptenidium levigatum*, found by the Rev. W. Little in *Dumfriesshire*, *Ptilium excavatum*, in Mr. Stephens's collection, and *Trichopteryx pumila*, if this species lurks under the *pusilla* of Stephens, which the posture of the specimens in his collection makes it difficult to determine.

Mr. Haliday remarked that Mr. Wollaston, in his accurate and splendid volume, "Insecta Maderensia," a copy of which the Association possesses through the liberality of the author, had substituted for *Trichopteryx* the name *Acrotrichis* proposed by Motschoulsky, on the ground that the former had been employed by Hübner ten years before Kirby applied it to this group of *Coleoptera*. With great deference for Mr. Wollaston's judgment on such a question, he would venture to put in a plea for the name imposed by the venerated Kirby, and embalmed in a work so well known and prized at home and abroad as the "Introduction to Entomology." The application of it in *Lepidoptera* was long since abandoned, and not the least likely to be revived. Indeed many of Hübner's "genera" had little more scientific value than the "Darts" and "Waves" and "Carpets" of English Aurelians. If the names proposed by such multiplying genus-makers as Hübner and Desvoidy, though rejected, were to be considered as prohibited for other uses, he feared that the mass of verbal materials thus used up would be found a heavy loss. Some of the misuse which Agassiz had apprehended and warned against, has already arisen out of his invaluable "Nomenclator," and some besides which he had probably thought it unnecessary to denounce. But if the principle on which *Trichopteryx* was set aside were admitted, all that would be needful, for an author fond of seeing *mihis* in print, would be to examine the bis lecta names marked in the index of the "Nomenclator," and rename all which bore later dates (dates not always accurate), without examination as to the application or permanent acceptance of the earlier one. Unfortunately Agassiz had lent the sanction of his name also to a sort of hypercritical purism liable to be abused. No doubt it was

desirable that writers, who composed or adapted generic names from the Greek, should have a knowledge of the letters of the Greek alphabet, beyond their similarity in shape to the Roman letters of the printer. It must be conceded that, for instance, *Spavius*, as the representative of Σπανιος, was open to criticism. Indeed a considerably greater degree of etymological attainments than this inferred might be expended on the construction of generic names, without inconvenience; but, perhaps, stiffness and monotony would be the chief result from an unbending application of the rules devised by grammarians, but from which the Greek as a living language admitted so many variations. Dr. Leach—of whom Kirby has said, *Nihil non tetigit, et omnia quæ tetigit ornavit*—had been a considerable maker of genera and generic names, which had found general acceptance. His ear had led him to introduce various compounds in which the more ordinary short *o*, for the close of the precedent member (a noun) in composition, was replaced by long *e*. These Agassiz has remodelled, for *Limnebius*, *Limnephilus*, &c., substituting *Limnobius*, *Limnophilus*, and the like. Yet Elaphēbolus, Stephanēphorus, Zöephorus, Pöephagus, Moerēgenes, and more of this class stand unchallenged in the Lexicon. Even *Physapus* (*Physapi*, *Physapoda*), sanctioned by the names of Degeer, Linnæus, Illiger, Latreille, &c., might be vindicated against Burmeister's newer candidate, *Physopoda*, while *Tala* and *Tana* imprinted the characteristic *a* on so many compounds. But Burmeister, in his critical sagacity (nasi emunctioris), has not withheld his castigating hands, in yet other instances, from the style of Linnæus, whose *Myrmeleon* has expanded, under the ferule, into *Myrmecoleon*, MIHI. Erichson upon this has remarked, that if the lengthened form be more accordant with the canons of grammarians, that chosen by Linnæus savours more of the idiom of the Greek. That he might not appear before this court as a merely gratuitous advocate, Mr. Haliday would instance a compound of his own fabrication, *Melanthrips*, which under Burmeister's reforming hands had shot up into the tetrasyllabic dignity of *Melanothrips*, MIHI. Then the critic would strip the spear of its garniture *melandeton;* the river must roll no more *melandines* in song; while in compensation *Melancholia* should hold no more sad victims in horrid chains! But to take defence on the very lowest grounds, there was an old legal maxim not inapplicable to any debatable cases—"Fieri non oportebat, facta valent." To go a step beyond generic names; Jussieu's plan of an uniform termination, as distinctive of the natural families, had been applied to the animal kingdom by Leach, deriving the family names from the typical genus, in the form of the patronymic in *idae*. The modern families are in great part equivalent to the genera of Linnæus, or of Fabricius, in entomology, and thus may rank among the most marked groups in the systematic scale. Hence there was an obvious advantage in discriminating them by some such device; and the method of Leach had been very generally adopted in England, as well as in France of late, and in Germany by Germar and probably by others. Burmeister has objected to this plan, that *idae* can properly be appended to Greek roots alone, and that if a few examples can be produced of Latin names so modified (e.gr., *Romulidae* of the Satirist, *Scipiadae* of Lucilius) they are only from the poets, while the language of zoology is simple prose. There is some reason in this; but we may add, that the vocabulary of the classics is necessarily insufficient for the extended wants of technical language, and that a form which, in virtue of these instances, is at least not foreign to the genius of the language, nor more obnoxious to criticism than other classes of modern derivatives and compounds, introduced of necessity, may claim some favour, as meeting an acknowledged want. The only other uniform termination which has been proposed instead, not liable to yet stronger exceptions, is *ina;* but this is also in use for subordinate divisions of the families, and for the higher group the substantive has some obvious advantages over the adjective form. Having ascended from the genera so far, a few remarks may be allowed upon the names of orders. Linnæus in the compounds of *ptera* found denominations for them, uniform and euphonious, while expressive of the characters to which he gave most weight in their discrimination. Fabricius, founding his system primarily on another set of organs, substituted names comparatively dissonant, uncouth, and etymologically corrupted. Even the signal benefits which he had conferred on science, by generic characters established on a surer base, as well as by a long

series of added genera and species, could not perpetuate names encumbered with such disadvantages; and if at the present day an able Danish entomologist has adopted them, reformed in orthography, we may be disposed to respect Schiœdte's patriotic predilections more than to commend his aesthetic judgment. The Linnean orders, and their names, with some necessary modification in the number and limits, seem destined to hold their place, as far as we can foresee from our present position. The very names of the orders seemed to presage a step, since accomplished, in the dissolution of the order *Aptera*, which rested on the want of the organs designated as the primary character in the arrangement of the class. Accordingly, all the Polypods, with *Cancer*, have been long severed as the class *Crustacea*, and the Octopods as *Arachnida*. Of the hexapod genera remaining, *Termes* found its place among the winged orders, even according to the judgment of the most obsequious followers of the Linnean method, as soon as the history of the race was known. Only *Pulex* and *Pediculus*, *Lepisma* and *Podura*, then were left; and these also have been since assigned respectively to their places (not yet undisputed) among the winged orders, which now embrace the whole class of insects under six great sections, with at most some small groups, whose position is intermediate, or yet undetermined, as some consider. These are, according to the nomenclature most generally received, *Coleoptera*, *Hemiptera*, *Lepidoptera*, *Neuroptera*, *Hymenoptera*, *Diptera*. For the fourth of these, as enlarged much beyond the Linnean sense, Burmeister has framed a new name, *Gymnognatha*. But this change seems needless, while it infringes on the consistent harmony of the whole. The order comprises the whole of the Linnean *Neuroptera*, increased only by some apterous forms, and by a group whose affinity Linneus himself confessed doubtful, by implication, when he referred them first to one and then to another order. On these grounds we retain the names *Coleoptera*, *Trichopterygidæ*, *Trichopteryx*, in our enumeration of the Irish species of the family.

The species marked with an asterisk before the number have been found in Britain, but not yet observed in Ireland.

Gen. 1. PTENIDIUM, Erichson; Redtenbacher; Wollaston; Faune Française; p., Motschoulsky—*Trichopteryx* p., Kirby; Heer; Gillmeister; Mannerheim; Mots.; Alibert.—*Anisarthria* p., Stephens.

1. *punctatum*, Gyllenhall; Woll.; Fn.Fr.—*alutaceum*, Gilm.—*littorale*, Mots.—Common about dunghills; also on fuci and zosteræ drying on the shore, the larva occurring with the perfect insect.

2. *apicale*, Sturm.; Er.; Gilm.; Redt.; Fn.Fr.; Woll.—*perpusillum*, *melas*, Marsham; Steph.—*nitidum*, Steph.—*evanescens*, Heer; Mots.—*punctatum*, *elongatulum*, *myrmecophilum*, Mots.—Var. *fuscicorne*, Er.—*obscuricorne*, Mots.—Common about dunghills, and among fallen leaves, &c.

*3. *lævigatum*, Er.—*punctula*, Steph. (?)

4. *pusillum*, Gyll.; Er.; Gilm.; Redt.; Fn.Fr.—*minutissimum*, Steph.—*nitidum*, Heer.—4-*foveolatum*, Alib.—Not rare, with the second.

Gen. 2. NOSSIDIUM, Er.; Fn.Fr.—*Anisarthria*, Mots.; p., Steph.—*Ptilium* p., Redt.

1. *pilosellum*, Marsh.; Steph.; Er.; Fn.Fr.—*nitidulum*, *brunneum*, Marsh.; Steph.—*ferrarii*, Redt.—Very rare, on rotten stumps.

Gen. 3. PTILIUM, Er.; Redt.; Fn.Fr.—p. Heer; Comolli.—*Trichopteryx* p., Steph.; Mots.; Alib.; Gilm.; Mann.—*Ptinella*, *Micrus*, *Ptenidium* p., Mots.

*1. *excavatum*, Er.; Gilm.; Redt.—*trisulcatum*, Steph.—*foveolatum*, Alib.—*gallicum*, *limbatum*, Mots.

2. *angustatum*, Er.; Fn.Fr.—*oblongum*, Gilm.; Redt.—*rugulosum*, Alib.—Rare.

3. *coarctatum*, n. sp.—*Lineare*, *subdepressum*, *capite thoraceque nigris scabriculis*, *elytris fuscis*, *antennis pedibusque flavis*, *prothorace transverso postice attenuato intra basim transversim obsolete impresso*. Long. $\frac{1}{4}$ lin.

Elongate linear, rather depressed. Head and thorax black, pubescent, the hairs seeming to spring from distinct granular dots. Head triangular with small eyes, as broad as the prothorax; mouth prominent; palpi and antennæ light yellow, the last joint of these globose-ovate, the first two joints ferruginous. Prothorax broader than long; truncated in front, the sides rounded, strongly attenuated behind, with the basal angles rounded off, faintly impressed within the hind margin. Elytra nearly linear, covering the abdomen, obtusely rounded in common at the tip; scarcely broader than the greatest breadth of prothorax, and singly more than three times so long as broad; intricately stippled and pubescent (as well as the scutellum), and hence rather opaque; blackish-brown, with the tip paler. Legs ferruginous, femora rather darker.

Narrower and not longer than *Trich. curta*. The very brief character given of *Tr. pulchella*, Alibert, contains nothing to distinguish it from our insect, but its size is considerably greater; and the *pulchellum* of Gillmeister and Faune Française is described as having two separate impressions at the base of prothorax, not observable in ours. Whether it be apterous, as stated of Alibert's insect, is uncertain.

Rare; in a farm-yard at Holywood.

4. *clandestinum*, n. sp.—*Sublineare depressum subtiliter pubescens fusco-testaceum*, *antennis pedibusque pallide flavis*, *prothorace obcordato basi media foveolato*. Long. $\frac{1}{5}$ lin.

Probably the smallest known Coleopterous insect, being smaller, but especially narrower, than *Pt. excavatum*. Nearly linear, depressed, finely pubescent, dusky testaceous. Head triangular, as broad as prothorax. Eyes black, coarsely granulated. Antennæ pale yellow, stout, the intermediate joints paler; those immediately preceding the club oblate; the 2nd, 9th, and 10th globose, the 10th twice as large as 9th; the 11th ovate, rather acute. Prothorax with the sides somewhat rounded before the middle, narrowed behind, with the basal angles a little obtuse, an oblong impression, or abbreviated channel, in the middle of the base. Elytra two and a-half times as long as prothorax, one-third broader than the base of it, and nearly of uniform breadth for two-thirds of their length, thenceforth rounded-attenuate, covering the abdomen. Wings perfect, fringed with blackish hairs. Legs pale yellow.

Taken at Holywood. Also in England, J. Curtis. Seems to be very rare, but from its extreme minuteness and pale colour may easily escape observation.

Compare the description of *Ptilium vittatum*, Mots., found in ants' nests at Charkow.

5. *kunzei*, Heer; Er.; Gilm.; Redt.; Fn.Fr.; Mots.—*longicorne*, Waltl.—*spinipenne*, Comolli.—*titan*, Newman (?)—Not rare about farm-yards.

Gen. 4. Trichopteryx, Er.; Redt; Fn.Fr.—p., Kirby; Heer; Gilm.; Alib.—*Ptilium*, Mots.—p., Waltl.—*Acrotrichis*, Mots.; Woll.

1. *curta*, Alib.; Gilm.—*abbreviatella*, (Heer?); Er.; Fn.Fr.—*nana*, Steph.—*minuta* p., Steph.—Not rare about farm-yards.

2. *sericans*, Heer; Er.; Fn.Fr.; Mots.—*depressa*, Gilm.; Redt.—*volans*, *bovina*, *brevis*, Mots.—Not rare, with the last.

*3. *pumila*, Er.; Fn.Fr.; *sericans*, Gilm.; Redt.—*pusilla*, Steph. (?)

4. *pygmæa*, Er.; Fn.Fr.—*parallelogramma*, Gilm.; Redt.—*chevrolatii*, Alib.—*minuta* p., Steph.—Rare.

5. *suffocata*, n. sp.—*Oblonga subdepressa nigra subtiliter pubescens, antennarum basi pedibusque rufescentibus, prothorace coleopterorum latitudine angulis posticis acutiusculis, abdominis segmentis tribus retectis.* Long. $\frac{2}{3}$ lin.

Much narrower than *Tr. fascicularis*, but as long; more than half the abdomen, or three segments, being uncovered by the elytra; the last segment large, nearly semicircular, with three points. Antennæ blackish, the first two joints piceous. Legs and coxæ obscure reddish. Elytra blackish to the end.

Found in October, the larva and perfect insect together, under damp fallen leaves on stones, in the bed of a dried-up brook (Glen-na-Chatta) of the Shournagh river (Cork). When alive, the elongated form, somewhat like a *Hypocyptus*, was very striking.

Obs. *Tr. abdominalis*, Fn.Fr. 333, 8, seems to differ from this species by the more produced angles of the base of prothorax, the lighter colour, and rather inferior size. The habitat also is different—viz., in the nests of *Formica rufa*.

6. *fascicularis*, (Herbst.); Heer; Er.; Fn.Fr.; Woll.—*minutissima*, Marsh.—*atomaria*, Steph.—*grandicollis*, Mann.—*intermedia*, Gilm.; Redt.—*lata* p., Mots.—Very abundant about dunghills and in pastures.

7. *atomaria*, (Degeer); Gyll.; Heer; Er.; Gilm.; Redt.; Fn.Fr.; Mots.—*minima*, Marsh.; Steph.—*flavicornis*, Waltl.—*marina*, Mots.—Rare, among lichens, Wicklow, Cork, &c.

8. *grandicollis*, Er.; Fn.Fr.—*fascicularis*, Gilm.; Redt.—*lata* p., Mots.—Still rarer than the preceding, Wicklow.

9. *Trichopteryx* (?) *mollis*, n. sp.—*Oblongo-ovata depressa nigra cano-sericea, antennis tibiis tarsisque ferrugineis, prothorace amplissimo angulis posticis productis acutis testaceis, elytris truncatis apice testaceo-limbatis.* Long. $\frac{1}{3}$ lin.

In outline not unlike *Tr. atomaria*, but much depressed, and thickly clothed with a fine silky whitish pubescence, without distinct punctures. Prothorax still wider than in that species, the sides much rounded, widest behind the middle, the base deeply sinuate-emarginate; the hinder angles being much produced back and pointed, coloured testaceous to a pretty large extent. Elytra at the base narrower than prothorax, and tapering a little to the tip, where they are abruptly truncated, with the inner angle sloped away, so that their joint extremity is a little notched at the suture; the narrow hind edge pale testaceous. Abdomen with three dorsal segments uncovered and deflected, edged with pale pubescence; *seven ventral segments*, the 1st large, the following four very short, the 7th triangular (sometimes ending in three points—a sexual distinction?). Mouth very prominent, the bilobed ligula and the mala exserted. Palpi pale. Antennæ dusky testaceous, long and slender, with the club indeterminate; the first two joints darker; *the third scarcely shorter than the fourth*. Eyes pubescent. Mesosternum, shorter than usual in *Trichopteryx*, with a short channeled keel, applied to the prosternum. Hind legs very remote, more so than in *Ptenidium* even. *Hind coxæ* large *triangular*, but not transversely dilated, covering only the base of the thigh with the trochanter. Legs testaceous, hind coxæ blackish, femora blackish-brown, except the tips of the anterior pairs.

Differs both from *Trichopteryx* and *Ptilium*, in having one ventral segment more (in this agreeing with *Ptenidium*), and is intermediate between them as to the size of the hind coxæ.

Inhabits sandy sea-coasts, rather rare.

Note.—*Trichopteryx fucicola*, Alibert, seems to agree with this in the form of the prothorax, in pubescence and colour (though according to the authors of the Faune Française the legs are entirely testaceous); but in the comparison made between it and *Tr. intermedia*, the depressed form, the figure of the antennæ and the coxæ, of our insect, could scarcely have passed unnoticed by their accurate and practised eyes. Alibert describes impressions of the prothorax, which may be inconstant, as *they* do not mention such. *Tr. umbricola*, Woll., seems also to differ from ours, and to come nearer to the species, described in Faune Française; but is superior in size to either, and the locality in which it occurred is different.

Ord. Diptera.—Fam. Muscidæ.—Trib. Ephydrini.

Discomyza cimiciformis (Ct. Mss.)—*Obscure ænea, antennarum basi tarsisque ferrugineis, halteribus fuscis, alarum venula discali oblique flexa.* Long. 1; alar. 2 lin.

Not one-fourth the size of *D. incurva*. Dark brassy. Head rugose, with smooth blackish frontal fillets. Second joint of antennæ ferruginous, dusky at the tip; third oblong, dusky. Thorax finely scratched transversely, and pubescent. Abdomen smooth and glossy, the 4th segment much enlarged in the male. Legs black; tarsi, except the last joint, ferruginous. Wings sooty, lighter behind. Veins strong, blackish; radial vein, from end of subcostal, almost contiguous to the costal, but distinct at the end, which is but little farther from the cubital than this from the subapical; last segment of pobrachial about as long as the discal veinlet, which is bent obliquely, making a very acute angle with the præbrachial vein.

Pelina ænescens, Stenh. Eph. 210, 13 (1844); Ztt. D. Sc.—*ænea*, Ztt. Ins. Lap. —*Nigro-ænea hypostomate albicante, venula discali et abscissa pobrachiali extrema æquilongis, tarsis nigricantibus.* Var. *tarsis flavicantibus.* Long. 1; al. $2\frac{1}{2}$ lin.

Smaller and more slender than *P. ænea*, darker and more glossy, without the coppery lines of the mesonotum, the face whiter, and the cheeks narrower. But the most obvious difference is the greater distance of the transverse discal veinlet from the margin, leaving the last segment of the pobrachial vein about as long as itself.

Mr. Hogan showed specimens of the (presumed) larvæ of *Diglossa mersa*, preserved in spirits.* These were found on the sea-coast, at Baldoyle and Dingle Bay, under stones, in company with the perfect insects, but are later than these in their yearly time of appearance, not having been observed earlier than the end of July. They resemble each other in their movements, quick and jerking; and there is an obvious analogy in the form of the mandibulæ, &c., as shown in the figures given in the present number.

The meeting then adjourned.

REFERENCES TO PLATE III.

Fig. 1. Ochthebius rufomarginatus, Erichson; Thomson.—*O. bicolor* var., Mulsant; Fn.Fr.

Fig. 2. Cercyon depressum, Stephens.—*C. dorso-striatum*, Thomson.—C. Head.—⊖.′ Lateral outline of Prothorax.—T.′ Fore Tibia with Tarsus.—K. Mesosternum and Metasternum.

Fig. 3. Ochthebius punctatus, Larva.—B. Antenna. M′ Mandibula.—M. Maxilla.—L.′ Labrum.—L. Labium.—P″ Labial Palpus.

Fig. 4. Diglossa mersa, Larva; like references.

Fig. 5. Ptilium coarctatum.

Fig. 6. Ptilium clandestinum.

Fig. 7. Trichopteryx mollis.—B. Antenna. g. Underside of Pterothorax with Abdomen.

* Figured, Pl. iii., fig. 4.

DUBLIN NATURAL HISTORY SOCIETY.

MAY 18, 1855.

Dr. Croker, M.R.I.A., in the Chair.

After the preliminary business, the Journal of the Geological Society of Dublin, vol. vi., part 2, presented by the Society, was recorded, with other donations.

The thanks of the Society having been given, Mr. Andrews stated that the paper on the list for this evening, "On the plants in the neighbourhood of Sligo, and on the effects of the severe frost," would be deferred until the next evening, as he had received a communication from the Right Hon. John Wynne, saying that he would be able to give a more accurate account of the effects of the frost by waiting a little, as some plants which, at present appear dead, may grow after the rain.

Mr. Gilbert Sanders then gave his paper

ON THE ADVANTAGE TO BOTANY OF LOCAL LISTS, AND NOTES WITH REFERENCE TO THE ALGÆ OF THE EAST COAST OF IRELAND.

As I have not seen a list of marine algæ which have been collected from time to time by various algologists in our bay and the neighbouring shores, I am induced to offer a contribution to the formation of a local list; and I propose that we consider Balbriggan as the northern limit, and Wicklow Head the southern boundary, of what I would beg leave to term the Dublin district of coast. I have selected these two extreme points, on account of their being favourable places for collecting and being so easily accessible by rail, as are also all the intermediate spots along the line of coast. The eastern shores of Ireland, bordering on the Irish Sea and St. George's Channel, have not been sufficiently explored. There is an impression that these shores are not prolific of species. One of our most eminent algologists said to me, about four years since, that the Dublin shores were not favourable for the study of algology, but I think that opinion was incorrect. My friend, Dr. Cocks, of Devonport, spent about two hours at Bray, and a similar time at Howth, in the summer of 1853, and in these two hasty visits he saw upwards of fifty species. Low water, at spring tides, is the most favourable for procuring the rarer species and most perfect specimens. The rock-pools, which are only uncovered at spring-tides, are the best spots for searching, these being the favourite habitats of many scarce algæ. To search these pools satisfactorily, we require considerable light, for without it we cannot see to any depth, or even the sides of the submerged rocks under the shelter of which the more delicate filamentous algæ grow. On the south-western shores of England, and the southern, western, and northern shores of Ireland, and all the shores of Scotland, the time of low water spring-tides is from three hours before noon to three hours after, during which there is sufficient light for collecting; but, unfortunately for algology, in our own immediate district, the same state of tide occurs at six or seven o'clock morning and evening; therefore, the examination of pools, at low water springs, can be conducted on our coast only for about three or four months—viz., the summer—and we are excluded from them altogether during the autumn, winter, and spring, seasons fully as interesting to the algologist as the summer months. The beautiful pencilled tufts of the sporochnaceæ are only visible in spring, and many algæ are not in perfection except in winter. Possibly it may be owing to the unsuitableness of the tides that the Dublin coast has the reputation of being unprolific. We can see, however, in the example before us, what may be done by assiduity, by carefully examining what the waves will bring us, especially after storms. When I was able to devote some time to the sea-shore, I found the second or third tide (high water), after the storm ceased, to be the best time for examining the rejectamenta. Marine botany will be much benefitted, if collectors will carefully note every circumstance connected with the abundance of certain plants in particular spots, or seasons, and likewise the changes they may perceive in the forms. The

sportive character of the algæ has led to much dispute—some botanists insisting that certain species of other authors are merely varieties. Doubts of this description will be more surely cleared up by the observations of many observers; and it must also be borne in mind by botanists who are not very familiar with algæ, that many of them put on such variable appearances, according to the season, as to lead to the belief that a summer specimen and a winter specimen of the same plant must be perfectly distinct species. Whilst speaking of the abundance or scarcity of some plants at the usual season of their appearance, I will read an extract from a letter I recently received from Dr. Cocks, which I regard as most interesting, and I look upon it as a very remarkable fact in algology. He says—"I have now had eleven years' experience in collecting, and have gained a certain amount of practical information, which, I confess, I had heretofore not sufficiently attended to. Observation and experience have taught me that there is not the same regularity in the time of appearance of the marine algæ as there is in plants growing on terra firma, and that the terms annual, biennial, and perennial, are not applicable to the former; and that their growth and time of appearance are governed by laws, or influenced by causes which the algologist, even of the present day, is unable to explain. It is quite true that, in certain localities where I had been in the habit of gathering certain species for two, three, and more years successively, when I have afterwards wanted to obtain more they had disappeared, and, in some instances, have never since been found. In other instances, some plants, which were previously considered to be extremely rare and scarce, only picked up at intervals, far and few between, have suddenly appeared in the greatest profusion. Dr. Budd told me that two years ago, having found out where it grew, he could have dredged thousands of specimens of Stenogramme interrupta. Last year I could myself have dredged a like quantity of Sporochnus pedunculatus and Haliseris polypodioides, neither of which species I ever took before to say plentifully. A few years ago the mud bank at Cremil Passage was strewed over at low water with quantities of Sphærococcus coronopifolius, since when I have only taken two specimens. You will, of course, remember when we gathered such a quantity of Dasya arbuscula at Firestone Bay. I have carefully hunted over the same ground every year since, and have never seen a single plant; even the very commonest plants sometimes disappear for two, three, or more years—such as Delesseria hypoglossum, D. ruscifolia, Nitophyllum punctatum, &c." Such is the experience of Dr. Cocks. It would be very desirable for other algologists to note the appearance and disappearance of plants from a locality, and then to endeavour to trace out the cause. With the view of promoting the object of this paper—viz., the preparation of a list of all recorded algæ found on the shores between Balbriggan and Wicklow Head—I suggest that other collectors will look over their collections and give our secretary lists of their gatherings on those shores, that we may have as large a catalogue as possible of the marine botany of the district. I hope soon to increase the list, which, for the present, is confined entirely to Mrs. Davy's collection; and before concluding I would beg to draw the attention of the members to the very beautiful and natural appearance of the specimens which were prepared after the method laid down in the "Seaweed Collector's Guide," by Dr. Cocks, of Devonport.

LIST OF MARINE ALGÆ COLLECTED AT SKERRIES, NEAR THE NORTHERN LIMIT OF THE PROPOSED DUBLIN DISTRICT, IN THE SUMMER OF 1854.

MELANASPERMEÆ.

Order.		Order.	
Fucaceæ.	Cystoseira ericoides.	Dictyotaceæ	Dictyosiphon fœniculaceus.
Sporochnaceæ.	Desmarestia ligulata.	Chordariaceæ.	Chordaria flagelliformis.
,,	,, aculeata.	,,	Mesogloia virescens.
,,	,, viridis.	,,	Leathesia tuberiformis.
Laminariaceæ.	Laminaria digitata.	,,	Elachista fucicola.
,,	,, saccharina.	,,	,, scutulata.
,,	Chorda filum.	Ectocarpaceæ.	Cladostephus verticillatus.
Dictyotaceæ.	Taonia atomaria.		
,,	Dictyota dichotoma.		
,,	Stilophora Lyngbyæi.		

Order.	
Ectocarpaceæ	Cladostephus spongiosus.
,,	Sphacelaria scoparia.
,,	,, cirrhosa.
,,	,, plumosa.

Order.	
Ectocarpaceæ	Ectocarpus tomentosus.
,,	,, littoralis.
,,	,, granulosus.

RHODOSPERMEÆ.

Rhodomelaceæ.	Rhodomela subfusca.
,,	Bostrychia scorpioides.
,,	Rytiphlæa thuyoides.
,,	,, fruticulosa.
,,	Polysiphonia urceolata.
,,	,, formosa.
,,	,, fibrata.
,,	,, elongata
,,	,, violacea.
,,	,, fibrillosa
,,	,, Brodiæi
,,	,, nigrescens.
,,	,, affinis.
,,	,, atrorubescens.
,,	,, fastigiata
,,	,, parasitica.
,,	,, byssoides
,,	Dasya coccinea.
Laurenciaceæ.	Bonnemaisonia asparagoides.
,,	Laurencia pinnatifida
,,	,, obtusa.
,,	,, dasyphylla
,,	Chrysymenia clavellosa.
,,	Chylocladia kaliformis.
Delesseriaceæ.	Delesseria sanguinea.
,,	,, sinuosa.
,,	,, alata.
,,	,, hypoglossum.
,,	Nitophyllum laceratum.
,,	Plocamium coccineum

Rhodymeniaceæ.	Rhodymenia jubata.
,,	Sphærococcus coronopifolius.
,,	Gracilaria confervoides.
,,	Hypnea purpurascens
Cryptonemiaceæ.	Gelidium corneum.
,,	Gigartina mamillosa.
,,	Chondrus crispus.
,,	Phyllophora rubens.
,,	,, Brodiæi.
,,	Gymnogongrus plicatus
,,	Halymenia ligulata.
,,	Ginannia furcellata.
,,	Iridæa edulis.
,,	Gloiosiphonia capillaris.
,,	Dudresnaia divaricata.
,,	Ptilota sericea.
Ceramiaceæ.	Ceramium rubrum.
,,	,, botryocarpum.
,,	,, Deslongchampsii.
,,	,, diaphanum.
,,	,, echionotum
,,	Griffithsia setacea.
,,	Wrangelia multifida.
,,	Callithamnion plumula.
,,	,, cruciatum.
,,	,, Turneri.
,,	,, tetragonum.
,,	,, tetricum.
,,	,, roseum.
,,	,, polyspermum
,,	,, corymbosum.
,,	,, spongiosum.
,,	,, floridulum.
,,	,, virgatulum.

CHLOROSPERMEÆ.

Siphonaceæ.	Bryopsis plumosa.
Confervaceæ.	Cladophora rupestris.
,,	,, lætevirens
,,	,, albida.
,,	,, uncialis.
,,	,, glaucescens.

Confervaceæ.	Conferva melagonium.
Ulvaceæ.	Enteromorpha intestinalis.
,,	,, compressa.
,,	,, clathrata.
,,	Ulva latissima.

Mr. Andrews said, that the views that had been given by Mr. Sanders were most valuable and interesting, and the reasons were clearly shown why an apparent

dearth of algæ was on the east coast, in comparison with the west or south-west. Zealous local investigators, like what had been shown this evening, would still add much to the list. Mr. Andrews then enumerated many rare specimens that he had obtained on the west coast, which were, at present, completely local there. He had collected very large specimens of Taonia atomaria, which he had given, with many others, to his friend, Dr. Harvey—the Taonia unfortunately, too late for insertion in his valuable work. Taonia is by no means uncommon as a southern plant. Polysiphonia violacea is abundantly met at Ferriter's Cove, county Kerry, and specimens of Dasya ocellata are found there. Conferva rectangularis was found in quantities in Killarney Bay, in the Great Arran Island, and which plant was previously discovered in great abundance on the coast of Connemara, by the indefatigable investigator, the late William M'Calla. Mr. Andrews also mentioned that some years since he had obtained Microcladia glandulosa, thrown ashore in the neighbourhood of Dalkey. It was singular, yet true, that seasons much affected the appearance and disappearance of aquatic plants among the algæ and confervæ. In noticing such, in his correspondence with Mr. John Ralfs, of Penzance, author of the "British Desmidiæ," and whose communications were always most pleasing, he observes—"I have watched for the last three years many stations of Mongeotia cærulescens, Zygnema curvatum, various species of Desmidiæ and Vesiculiferæ, and have never found the same species two years in the same pool, nor, indeed, have I seen any of the above plants I found a few years since in the same water. This should teach us to gather a good supply of specimens when we have an opportunity, lest we should not meet with them again."

JUNE 15, 1855.

GILBERT SANDERS, Esq., M.R.I.A., in the Chair.

After the preliminary business, the Secretary said that the donations that had been received would not be submitted until the next meeting of the members, as the rooms were undergoing some improvements, and other arrangements completing.

The Chairman then called for the paper, by the Right Hon. John Wynne,

ON THE EFFECTS OF THE SEVERE FROST ON PLANTS IN THE NEIGHBOURHOOD OF SLIGO.

Mr. Andrews said that he had received a communication from Mr. Wynne, who was unable to attend. Mr. Wynne had forwarded a brief outline of his observations, and mentioned that his avocations left him but little time for natural history. Mr. Andrews then read the following:—

"Having seen an interesting paper, read by Mr. Moore at a meeting of the Dublin Society, on the effects of the late severe frost on the outdoor plants in the Botanic Gardens, at Glasnevin, it struck me that it might interest the members of the Natural History Society to have some information on the effect produced by that frost in the west of Ireland, where the severity of frost is generally so much tempered by the vicinity of the Atlantic Ocean. I, unfortunately, did not possess a self-registering thermometer, so as to give the exact amount of frost here, but I may give some facts which indicated its severity. First—The adjoining lake was frozen across, so as to bear skating for about one-third of its length for about a fortnight—a circumstance which never occurred in my recollection, and I believe only once during the lifetime of my father, who lived to be 85, and spoke of his having once skated across the lake, which we did several times this last season. Secondly—The number of birds killed by it was very great, especially sea birds—curlews and seagulls. After the thaw, the sea-shore was covered with dead sea fowl. However, we can arrive at a tolerable degree of accuracy, as the thermometer, at Markree Observatory, only six miles from this, and equally near the sea, on the 12th of February, stood at 18.2 Fahrenheit, and on the 13th, 17.6; on the 17th, 17.2; on the 18th, 15. There was no snow here during the continuance of of the frost—only about two inches fell on the first day of the thaw—so that the plants were exposed to its full severity. Some days after its commencement I had the

roots of most of the plants, upon which I feared its effects, covered with sawdust, but by no means soon enough. In the following list the selection I have made to remark upon as uninjured will probably appear arbitrary, but I made it for the purpose of comparison with those which were mentioned by Mr. Moore as having suffered :—

"Plants killed—Erica arborea, Erica cilliaris, growing in bog ; same, very slightly injured in garden ; Menziesia cærulea, Rhododendron altaclarense, (Rhod. altaclarense, which I thought was killed, is now pushing out vigorously.) Adiantum C. veneris, from Arran ; this has been for years in the rockery, covered during frost with a piece of calico. Davalliaca nariensis—all the plants have recovered, even one which had no covering except a fir branch.

"Plants much injured—Edwardsia tetraptera, old plants on west wall; E. microphylla, old plants on north wall; Laurus nobilis, §Myrtus communis, on wall, both narrow and broad leaved ; Ulex Europæus, in some places, not the least in others ; Calluna vulgaris, in bog ; §Abutilon striatum, on east wall. out four or five years ; §Menziesia polifolia, Verbena tryphilla, §Aspidum longifolium, covered with calico.

"Slightly injured as to the leaves—Arbutus unedo, much injured a few miles off; Photinia serrulata, both on wall and stand, and very slightly ; Viburnum tinus, some plants, close to bays which were much injured, received no injury ; §Ceno-thus azureus, on south wall.

"Uninjured—Fuschia globosa major, on east wall; Magnolia grandiflora, on south wall; M. Tripetala, standard ; Rhododendron Arboreum, R. chamœustus, Arbutus Andrachne, Olea excelsa, Standard, sheltered ; Daphne pontica, Pæonia montana, Paulonia imperialis, Erica Mediterranea, E. ditto, Irish variety ; Cedrus deodara, Auraucaria imbricata, Cupressus tomentosa, Taxodium sempervirens, Pinus Canariensis, Abies Webbiana, A. Cephalonica, Crytomeria Japonica, Quercus coccifera, Juniperus Bermudiana, Buddlœa globosa, Cistus ladaniferus, Garrya eliptica, Woodwardia radicans (S), covered with calico, as it has been for some years ; Trichomanes brivesetum, Pinguicula grandiflora, Anemotheca cruenta, Mimulus moschatus. I forgot Aponogeton distachgium, which I only got last summer, and which is quite uninjured, though the water in the reservoir in the garden in which it was placed was entirely frozen."

Mr. Andrews said that he was sure the members would feel much indebted to Mr. Wynne for this communication, which was valuable for the notices of those trees, shrubs, and plants that withstood the severity of such a winter, and especially as the plants had been completely unprotected by the sheltering covering of snow. The comparison was also of interest with the records of those effects on the east coast, as shown in the paper given by Mr. Moore. The grounds of Hazlewood are among the most beautiful in the country, and many parts of Mr. Wynne's extensive demesne bear striking evidence of the complete success of the planting and of the beautifying of apparently most unproductive wastes, and prove what judgment and perseverance can effect. Bordering the demesne was once a wild tract of bog, covered only with the common heaths, coarse grasses, and with juncaceæ and cyperaceæ peculiar to the wet and spongy soil of such uncultivated wastes. Subsequently the growth of belts of pines skirted numerous enclosures, drains, broad paths, and vistas were formed, and this paradise bloomed with the most beautiful heaths, azalea, and rhododendra. Binding the embankments thrown up from the deeply-cut drains, the varieties of berberry, holly, Mahonia aquifolium, repens, and fascicularis grew with rapidity and luxuriance, throwing out innumerable suckers, and which, gaining strength of growth, again sent out their branchlets in all directions. Among the Rosaceæ, Rosa arvensis and many of the ornamental briars grew on the sunny slopes of the peat embankment with great beauty. The sides of the once desolate valley of Glen Car, and which were exposed to the furious and sweeping gusts of the north-west gales, are now clothed and tinged with the fine growth and the varied hues of the larch, the pinaster, black Austrian pine, and the stone pine. The judicious planting of the Austrian pine has proved a sheltering screen to the fair growth of the rest. The Pinus Austriacus,

Those marked § were covered with sawdust.

peculiar to the Briema Forest, in the Austrian States, is a valuable tree, serving as a shelter, and enduring exposure to the storms of the coast better than the pinaster or sycamore, and of all the pines it bears transplanting with the least injury to its growth. These improvements have been carried on extensively on each side of Lough Gill—a lake five miles in length, and, in parts, nearly two in breadth, and, with its islands, beautiful in its scenery. This lake, Mr. Wynne observes, was frozen over during the severity of the past winter; its waters are only twenty feet above the sea. The silver firs are among the finest in the kingdom, excceding 90 feet in height, and, at a few feet from the ground, eleven and twelve in girth. Sixty to seventy of these fine trees were blown down in the storm of the 6th of January, 1839; one of the trees, thirteen feet in girth, boarded a loft 40 feet by 20. The Chichester elm grows well, and becomes a fine tree, and the Turkey oak has a most rapid growth, and bears the wind well, but the white American spruce appears the best suited for high grounds, and to stand exposure to storms. The rockery in the gardens exhibits, in all their vigour of growth, some of the choicest plants and ferns of the mountains of Switzerland, and there also Pteris longifolia, a West Indian plant; Trichomanes radicans, and Adiantum capillus veneris bear the open ground throughout the seasons. Mr. Wynne informs me that the Trichomanes flourishes luxuriantly in his Wardian case, but does not bear involucra; on the rockery it fruits most freely. The Pinguicula grandiflora blooms there with surprising beauty and profusion. The influence of temperature has always affected the phenomena of vegetation, and we find plants, natives of opposite spheres, enduring, in many instances, degrees of temperature, either of heat or of cold, if that temperature be even, and not subject to sudden changes or transitions. Those plants, trees, or shrubs that suspend their powers during the winter, bear, without injury, the utmost rigour of that season, whilst those, like the sweet-bay (Laurus nobilis), Laurustinuses, and shrubs of similar habits, that have greater or less vitality during the winter months, suffer most extensively. At Glazenwood nursery, when remarking on the extensive ravages caused by the frost of 1837-38, Mr. Curtis says, "I have never known a more mischievous winter. Amongst standard roses I observe that a great many that were moved in the months of October and November survived, whilst those unmoved, of the same kinds, perished from the fulness of their sap-vessels." In looking over Mr. Wynne's list, I find that amongst the plants that were altogether killed, or much injured, were heaths, myrtles, old plants of the species of Edwardsia and the Laurus nobilis; while, among those that were uninjured, where Pæonia montana, Cedrus deodara, Araucaria imbricata, Trichomanes radicans, and the Rhododendra, and pines generally. In my own fernery, which is enclosed in a small greenhouse, the Trichomanes did not in the least suffer, although the fronds were coated with ice the greater part of the period the frost lasted—neither did Adiantum capillus veneris, nor the species of Hymenophylla. I have particularly noticed, in Mr. Wynne's list, the Cedrus deodara and Araucaria; for, in reviewing the records of the severe frost of the winter of 1837-38, those plants were invariably found to stand the severity of the season, while, in all instances, the destruction to the Laurus nobilis, or sweet bay tree, appeared to be general. These notices are from the principal gardens in England and Scotland. The manager of the gardens and Pinetum at Dropmore states—"Araucaria imbricata—plants of this species, though not protected, and growing in exposed situations, have scarcely suffered, and the whole of the trees are growing vigorously. Cedrus deodara proves to be quite hardy. The Laurustinuses, bay trees, and the heaths, Erica Mediterranea, australis, arborea, and vagans were killed to the ground, but are now growing freely. I fully expected all were dead, as they were very late before they broke—Dropmore, 12th September, 1838. Time should be given to valuable plants, apparently dead. The most severe frost of the winter was the middle of January, 1838." In the island of Jersey the coldest day was on the 19th, when Fahrenheit's thermometer, at five o'clock, p.m., was 18; on the 17th of the same month, it was noted, at the Nursery in Kilkenny, that Fahrenheit's thermometer fell to 20. The magnolia, both in England and on the Continent, suffered but little injury; while the pines, heaths, and rhododendra, extensively perished. A friend informs me that, at the gardens at Cronstadt, St. Petersburg, and Moscow, at the approach of winter, all

plants and vegetables are packed away, stored, and sheltered, and throughout the winter the gardens present dreary scenes of desolation. At the end of April the thaw hurries all into arrangement; and, with the vigour of the sun, vegetation bursts forth like a thought; and, during the few months of summer, the gardens are as gay as those in the neighbourhood of London. The severity of a winter influences a corresponding heat in the ensuing summer, and from the observations made by Mr. Erman (Humboldt, Asie centrale), such severe winters are followed by warm and dry summers. M. L. C. Seitz, Royal Court and Botanic Gardener at Munich, remarks in the "Garten Zeitung," for August, 1838, with reference to the severity of the winter of 1837-38—"We experienced an almost insupportable heat during the months of June and July, when the thermometer continually varied between 23 degs. and 25 degs. of Reamur (80 degs. to 85 degs. Fahrenheit). On the 15th of July, at two o'clock in the afternoon, it was 26—25 degs. Reamur (90 degs. Fahrenheit)."

Mr. Callwell observed that in his large fernery he had noted, within the house, the thermometer to fall to 18 degs. Neither Trichomanes nor Adiantum capillus veneris suffered in the least. He attributed this to the temperature being in some degree uniform, and to the stillness of the atmosphere.

Observations followed from the Chairman, Mr. Bain, and other members.

Mr. Andrews exhibited specimens of the Natterjack toad (Bufo calamita), in a lively and healthy state. They had buried themselves throughout the winter under some saxifrages in his garden, and appeared early in May. They were brought from the County of Kerry last summer.

The Chairman remarked that as Mr. Ffennell was not present to give his paper "On the Salmon, and on peculiarities with regard to the Young State," he wished to know if the members had any other subject to discuss?

Mr. Andrews said that Mr. Ffennell had recently mentioned to him that his paper was prepared, and that he had some important facts to communicate relative to the descent of the salmon fry to the sea, at a very early period of this year.

As Mr. Ffennell was absent, probably upon public business, Mr. Williams had requested Mr. Andrews to make some remarks on specimens of the Parr, which he had that morning received from the Bandon River.

Mr. Andrews then said, that a statement, made more than five years since in this Society, by Mr. Williams, may be in the recollection of several of the members, on the distinctive habits of the little fish known as the Parr (Salmo salmulus) from that of the true salmon fry, and with regard to the rivers and localities where that little fish existed. Discussions upon this subject were at several subsequent sessions of the Society continued. These led to the paper that I gave upon the subject, at the meeting of the 16th of June last year, 1854. I should premise, Mr. Chairman, by stating, that the majority of opinions were in opposition to the views given in that paper, those opinions being in support of the presumed successful experiments made by Mr. John Shaw, of Drumlanrig, and published in 1840, the results of his several communications read before the Royal Society of Edinburgh. Mr. Shaw and his numerous adherents maintained, until very recently, that the fry, the produce of the ova of the salmon, remained two years in the fresh water, in the state called the parr, before it assumed the smolt transition, and descended to the sea. There were other points advanced by him, such as the early breeding development of the male parr. Having formerly been resident for several years in the western parts of Ireland, and in all seasons practically fishing some of the best salmon and trout rivers in that country, and in companionship with some of the most experienced salmon fishers, and latterly having turned my observations to the science of the subject, I felt that I might, with some confidence, detail the views that I had formed in the paper given by me twelve months since. The principal points were, that the salmon fry assumed the smolt or migratory state, and descended to the sea, from eleven to fourteen months after extrication from the ova—that is, the young fish hatched and liberated from the ova in the month of April, 1854, would assume the smolt state at the same period, or a month later, and descend to the sea, in 1855. That fish, described as the parr, would be found in rivers, throughout the seasons, of good size, and after the salmon-fry, as smolts had descended to the sea. There were parr similar in markings to the salmon-fry,

but distinct in habits. At the time I advanced these views, I was not aware of the extent to which Mr. Andrew Young, of Invershin, manager of the Duke of Sutherland's salmon fisheries, had carried his experiments, nor of the writings of "Ephemera," of *Bell's Life*. I have read their works, and in which sound practical observations and masterly judgment of the subject appear throughout. Fortunately for practical knowledge and for science, a well-organized series of experiments were arranged, and the grounds adopted for the operations were the Stormontfield ponds, on the banks of the Tay, and these were skilfully managed by Mr. Buist and others, of Perth. A rather early investigation into the subject this year, led Mr. Wilson, a naturalist, of Edinburgh, and backed by several savans, to at once adopt and laud Mr. Shaw's theories, and to promulgate such decision, to the vast importance of the national fisheries. These were published by the Perthshire papers and the excellent editor of the *Scotsman*, in support of Messrs. Shaw, Wilson, &c. But, lo! in a little time, the ponds glittered with silver, the little fish congregated, and an intelligent writer thus communicates to me the transition—"The fry in the Perth ponds are all liberated—they would not stop another year, but threw themselves by scores on the banks, to escape imprisonment. Thus has passed the glory of Shaw and his followers." And this I may say, has confirmed the sagacity of Andrew Young and "Ephemera."

Mr. Andrews then exhibited and made remarks on some fresh specimens of parr, taken two days since from the Bandon river, smolts taken from the Laune river, county Kerry, early in May, and the true salmon-fry, taken October last. The parr were of good size, and, from inquiries, not a single salmon-fry could be obtained this month from the Laune, the Caragh, or the Bandon rivers. They had all gone to the sea.

Mr. Andrews said that he had examined many of the smolts, or true salmon-fry, and could never detect the milt or the ova but in a rudimentary state. He would take another opportunity of making more full remarks upon the subject, and have a series of specimens present.

Mr. Williams said he wished to have recorded in the Society the occurrence of the turtle-dove (Columba turtur), seen in a potato field, between Howth and Baldoyle, on the 9th of July last.

Dr. Farran mentioned its occurrence in Carrick-on-Suir, in September last; Mr. Montgomery noticed its having been obtained in Donegal; and the Chairman observed that he had seen a recent specimen, which was yesterday shot in the neighbourhood of Castleknock.

Mr. Andrews recorded the breeding of the scaup-duck, the nest, eggs, and the old bird having been obtained in an inland lake, in the western parts of Kerry. Fine specimens of the red-breasted merganser were also obtained, which inclined him to believe that that bird also bred there.

Dr. Farran exhibited a beautiful specimen of the Larus ridibundus in its adult and most perfect plumage.

Mr. Andrews observed that this beautiful bird, which was shot at Edenderry, was in its fourth change, and most perfect state of plumage. The head had assumed the dark hood, the back and wing coverts had lost the markings, and were of an uniform pearl-gray colour, and the dark bar or band on the tail had disappeared, the tail having become pure white. At the approach of the breeding season the feathers of the head became of a dark colour, forming a kind of hood or mask; and this change was caused, not by a process of moulting, but by an alteration of colour. The autumnal moulting changed the colour of the plumage, the black hood disappeared, and the head was perfectly white through the winter months.

Dr. Carte made some excellent observations on the extravascular nature of feathers, and of the influences of vitality which affect the changes of colour. It is hoped that a paper upon that subject will be given by Dr. Carte.

The Secretary stated that as this meeting closed the session, it was the intention to hold the annual dinner of the Society as early as possible after it. Circulars, therefore, would be sent to the members, informing them of the time and place the annual dinner would be held.

The Chairman then adjourned the meeting to the second Friday in November next.

DESCRIPTIONS OF PLATES.

PLATE 1—VOL. II.

FIGURES OF SPHÆRIA ——? ILLUSTRATING MR. E. PERCIVAL WRIGHT'S PAPER ON FUNGI PARASITIC ON INSECTS.

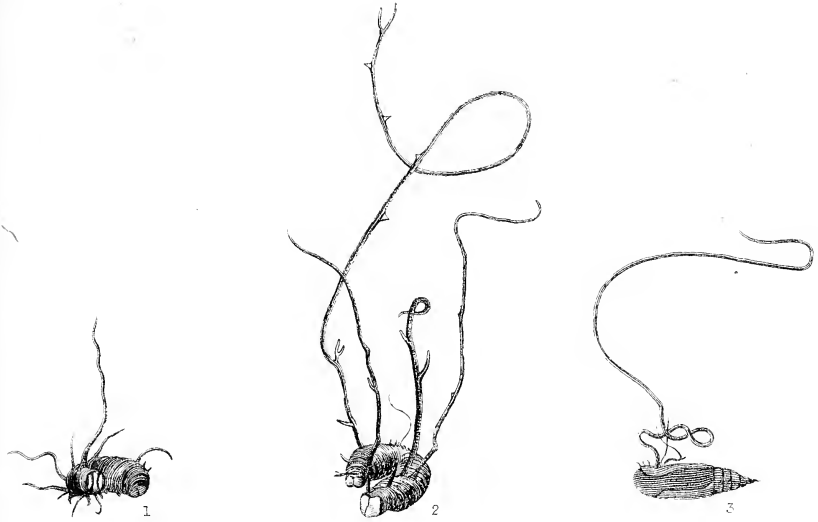
1. Sphæria ——? attached to Lepidopterous Larva, taken near Dublin, 1853; immature.

2. Sphæria ——? attached to Lepidopterous Larva; reared, but without fructification.

3. Sphæria ——? attached to Lepidopterous Pupa; also reared, but without fructification.

All the figures are of the natural size.

Vide Proceedings of Societies, page 55.



Sphæria ..... ?

1. Found dead, immature.
2 & 3. Reared, but also without fructification.

all nat. size.

PLATE 2—VOL. II.

PARTIAL FIGURES OF INSECTS, ILLUSTRATIVE OF A PAPER BY MR. HALIDAY ON THE FAUNA OF KERRY.

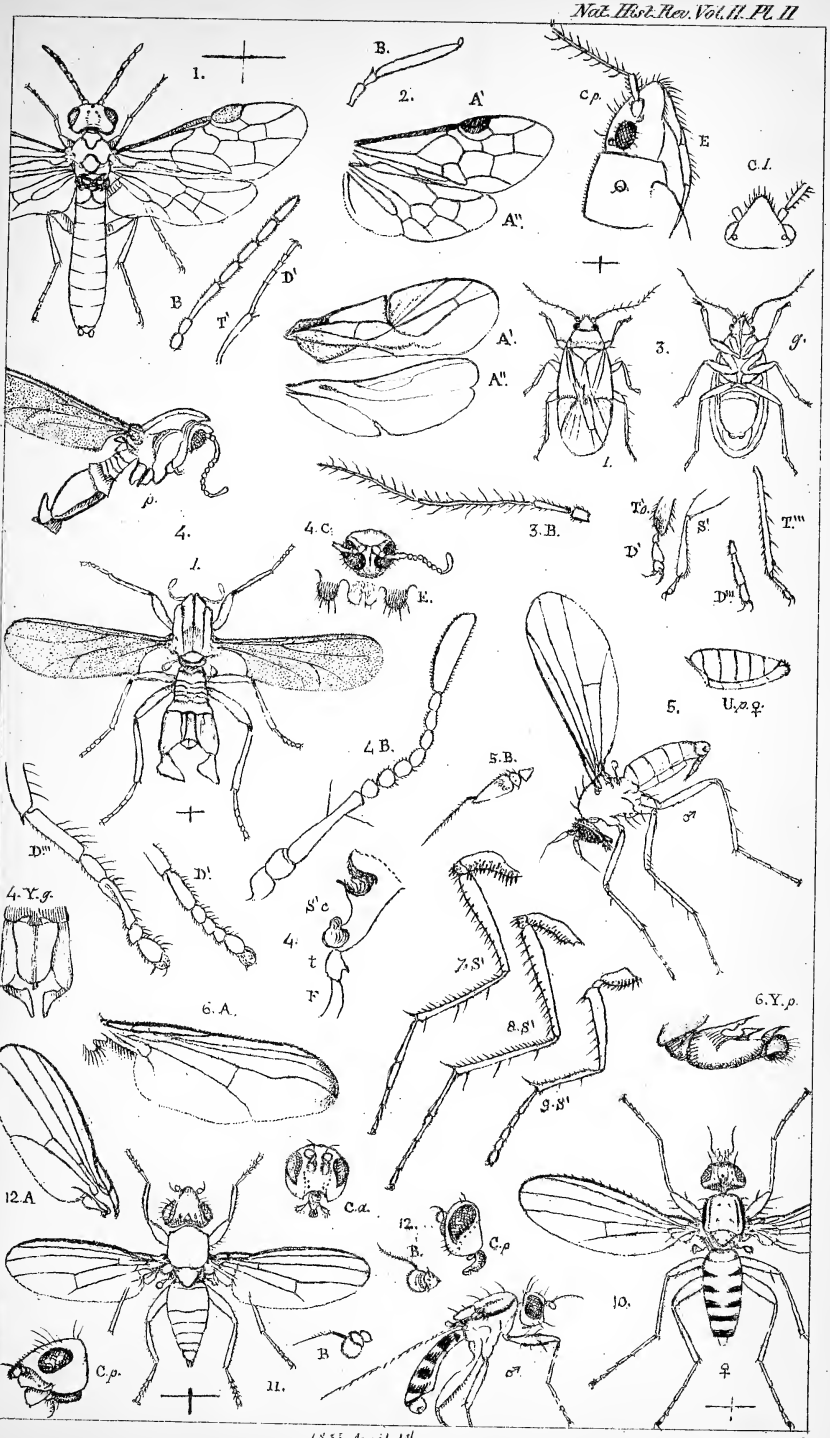
1. Heptamelus ochroleucus. *Steph.*
2. Blasticotoma filiceti. *Klug.*
3. Dipsocoris alienus. *H. Schaeff.*
4. Clunio marinus. *n. sp.*
5. Rhaphium flavicolle. *Mg.*
6. Dolichopus prætextatus. *n. sp.*
7. Aphrosylus celtiber. *n. sp.*
8. „ raptor. *Ins. Br.*
9. „ ferox. *Ins. Br.*
10. Geomyza cingulata. *n. sp.*
11. Canace nasica. *Hal.*
12. Glenanthe ripicola. *Hal.*

Vide Proceedings of Societies, page 59.

PLATE 2*—VOL. II.

POLYPRION CERNIUM, ILLUSTRATIVE OF MR. ANDREWS'S PAPER ON THE PERCIDÆ AND SERRANI.

Vide Proceedings of Societies, page 36.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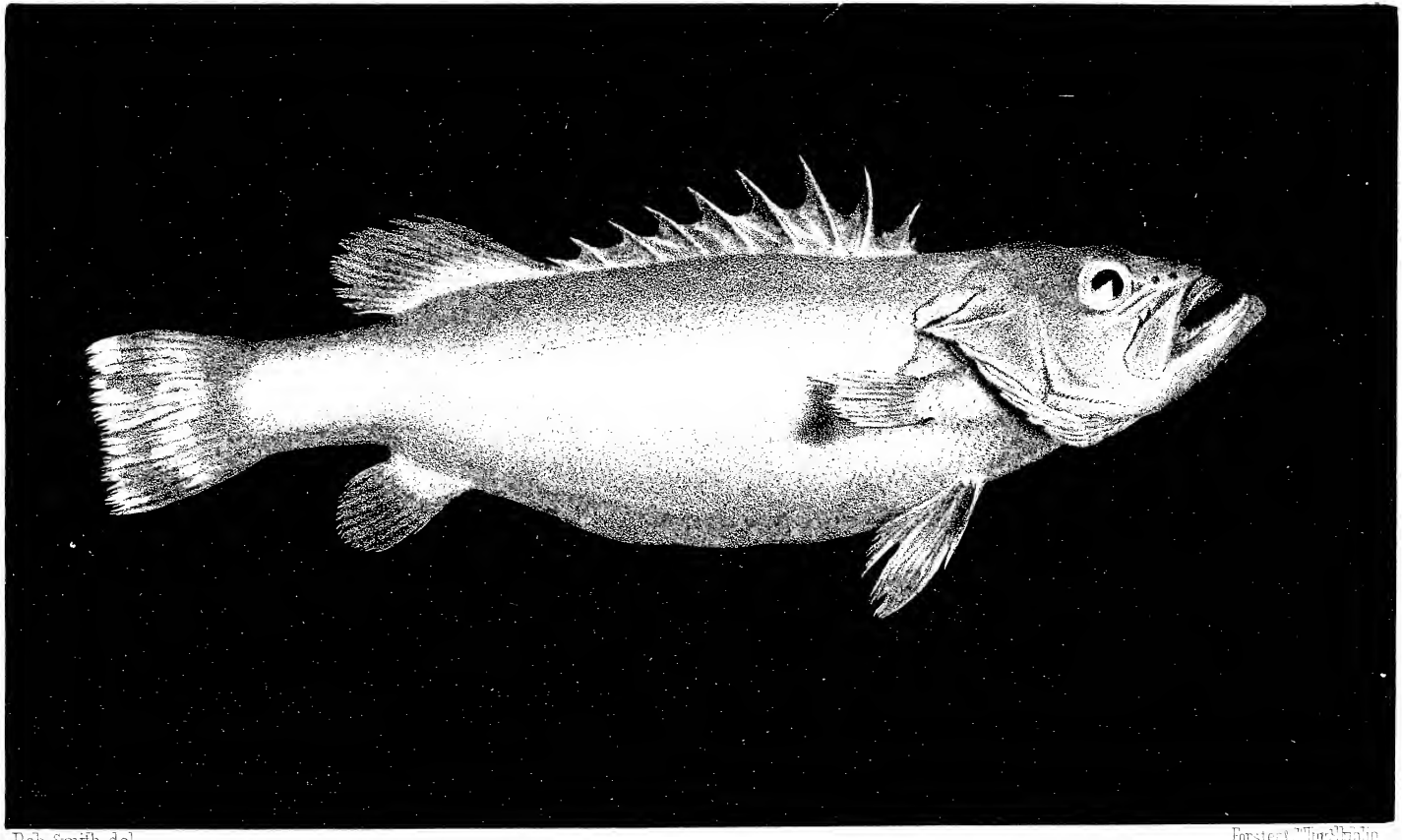


Rob. Smith del. Forster & Hart Lithin.

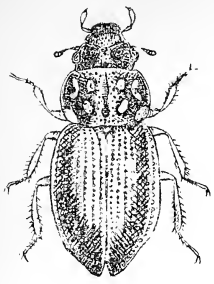
POLYPRION CERNIUM. Cuv.

PLATE 3—VOL. II.

FIGURES OF INSECTS, ILLUSTRATIVE OF MR. HALIDAY'S PAPER ON NEW OR LITTLE KNOWN INSECTS.

1. Ochthebius rufomarginatus.
2. Cercyon depressum.—C. Head.—⊖.` Lateral outline of Prothorax.—T.` Fore Tibia with tarsus.—K. Mesosternum and Metasternum.
3. Ochthebius punctatus, Larva.—B. Antenna.—M` Mandibula.—M. Maxilla.—L.` Labrum.—L. Labium.—P.`` Labian Palpus.
4. Diglossa mersa, Larva; like references.
5. Ptilium coarctatum.
6. Ptilium clandestinum.
7. Trichopteryx mollis.—B. Antenna. g. Underside of Prothorax with Abdomen.

Vide Proceedings of Societies, page 116.



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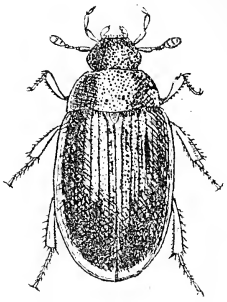

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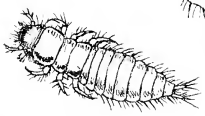

S.

3.

M

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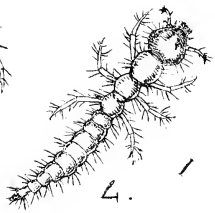

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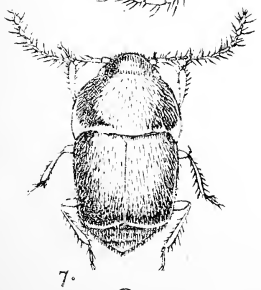

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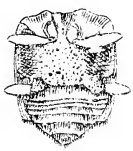

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PLATE 4—VOL. II.

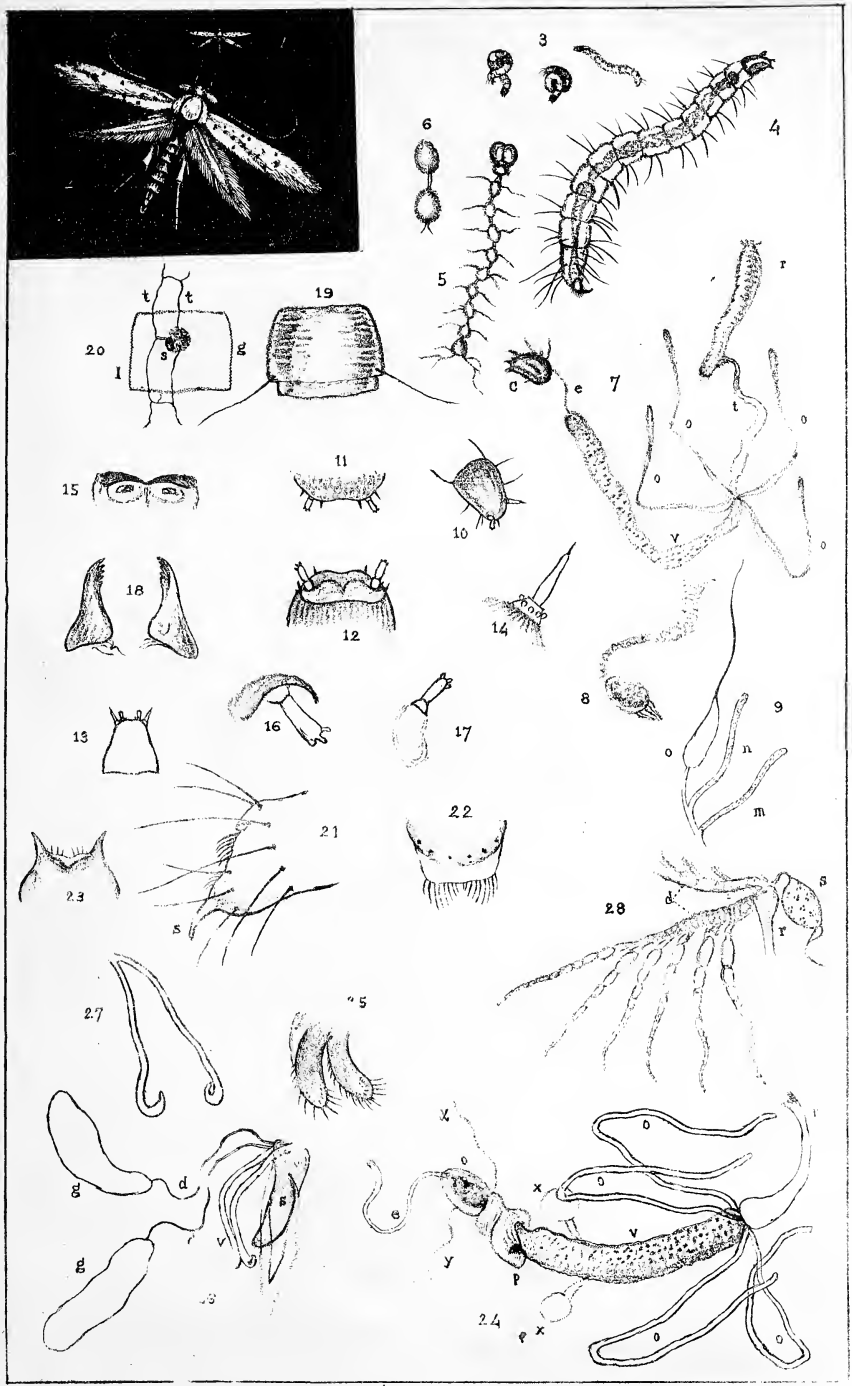
ELACHISTA TRISERIATELLA.

1. The natural size.
2. Magnified.

Vide Proceedings of Societies, pages 116–124, and pages 109–115.

The remaining figures to illustrate Mr. Haliday's paper on Pulex, not in time for the Proceedings of this No. ; see the No. for January, 1856.

3. Larva—slightly magnified.
4. Do.—more magnified.
5. Rachidian chain.
6. Two-niter mediate ganglia.
7. Intestinal canal, with head.
8-9. Rudiments of generative system.
10. Head—side view.
13. Do.—from above.
14. Antenna.
11. Epistoma—from above.
12. Fore part of head—from below.
15. Mandibles closed, &c.
16. Palpus under mandible.
17. Palpus detached.
18. Mandibles extracted.
19. Intermediate segment of above.
20. Do.—side view.
21. Hinder part of body.
22. Upper edge of anal declivity.
23. Terminal hooks from below.
24. Intestinal canal.
25. Grapplers of male.
26. Internal organs do.
27. Vesicles apart.
28. Ovident and ovary of female.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Appendix to the 'Phytologist' for 1851.

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