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THE

NATURAL HISTORY REVIEW.

THE

NATURAL HISTORY REVIEW:

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INDEX.

Reviews.

Serial Publications.

Proceedings of Societies.

Authors of Papers read at the several Meetings.

THE

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Reviews.

RAMBLES OF A NATURALIST ON THE DEVONSHIRE COAST. By Philip Henry Gosse, F.L.S., &c. London: John Van Voorst. Price 21s.

MORE than half a century has elapsed since Gilbert White was laid in the quiet little churchyard at Selborne, where a slight heave of the turf still marks the resting-place of the naturalist and the philosopher, and the remark of the learned Warden of Merton College, respecting his "Natural History of Selborne," "*that the time will come when very few who buy books will be without it*," has been amply verified. Few have read it without feeling a deep sympathy with the pursuits of its pure-minded and gentle author; and, as might have been expected, its frequent publication has exercised a strong influence on the minds of those who wish to discover the good and beautiful in all that meet and surround them. With the lapse of years a great change has taken place in the estimation in which the naturalist is held; his pursuits are no longer looked on as eccentric or visionary, but he finds himself surrounded by "a galaxy of congenial spirits, engaged in the same or congenerous studies, and, so far from having to bear up against the ridicule which, at no late period, might have been the lot of his predecessors, he will find, at least, a tacit acquiescence in the becomingness of his studies, and a forbearance from all censure that might fray the most sensitive." This change of feeling has operated most favourably in drawing forth a crowd of *observers*—men who keenly feel all the beauties of nature and love to describe them, who invest the objects of their study with an individuality calculated to interest even the most indifferent. We would not wish even *to appear* to undervalue the labours of the systematic naturalist. We entertain a very high estimate of the powers of

mind and the close application required by those who study to separate genus from genus, and species from species, to arrange the too often disjointed and chaotic mass presented to them by the *mere* observer; but we confess our sympathies are with those who prefer to make acquaintance with the *living* and not the *dead*—who draw their descriptions, not from the distorted caricatures which disgrace our museums, but who love to woo nature in her wildest retreats, and who present portraits which bear stamped upon them the impress of the originals. To this class of observers belongs the author of the "*Rambles of a Naturalist on the Devonshire Coast.*" Mr. Gosse has long since won a high name as an acute observer, and his reputation as a most agreeable writer is already so well established, that a work from his pen need only be announced to be gladly welcomed by a large circle of admirers; and the present will ably support the previous character of its talented author. It contains much curious information respecting the lower forms of animal life, derived from close observation, and the investigations recorded in its pages are of the highest interest to the naturalist, particularly those connected with the development and embryology of the zoophytes, and the varied forms and curious properties of the Thread-capsules in the Polypes and Medusæ. Many of these are accompanied by illustrations, of which the volume contains twenty-eight, twelve of which are printed in colours, and very accurately depict some of the rarer organisms described in its pages. Among the animals figured is one of more than ordinary elegance of form, which Mr. Gosse, believing to be undescribed, named *Johnstonella-Catharina*, in honour of Mrs. Johnston, whose skilful pencil has so ably depicted many of our native zoophytes. We regret to rob Mrs. Johnston of so graceful a compliment; but the animal figured has long been known as *Tomopteris onisciformis*, and a very able memoir has appeared of its structure, by Grube, in Muller's Archiv. for 1848. It is an animal very widely distributed, having been frequently captured in the Southern Pacific.

The circumstances under which this work was penned render it peculiarly interesting; it is a record of how an invalid passed his forced leisure—

"A mirror of the thoughts and feelings which occupied the mind of the writer during a nine months' residence on the charming shores of North and South Devon! Pursuing an occupation which always possesses new delight—the study of the curious forms, and still more curious instincts of animated beings."

When obliged to leave London, by the recommendation of his medical attendants, the instincts of a true naturalist led Mr. Gosse to seek renewed health and strength "among the shells and nudibranches, the sea anemones and corallines of fair Devonshire." By the advice of a friend, the village

of Marychurch was selected for his temporary residence, where, with his favourite text-books and microscope, our author soon prepared to make acquaintance with its coves and inlets, their dark pools and hollows, their sea-weeds and zoophytes. But we must give a description of a "Devonshire Lane," as it appeared in the end of January, 1852:—

"No frosts had as yet sullied the verdure of the hedge banks, or nipped the shrubs in the sweet cottage gardens. Indeed, frost seems here almost unknown, if we may judge by the myrtles, dressed in their glossy foliage of deepest green, reaching up to the eaves of the houses, and the fuchsias, not always of the most common varieties, whose thick, roughened trunks have evidently braved the open air through many winters. The high, sloping banks were everywhere fringed with the long, pendent fronds of the hartstongue fern, the broad, arrowy leaves of the wake-robin, glossy and black spotted, and great tufts of the fetid iris, a rare plant elsewhere, were springing up from all the ditches. Strange, warm, damp lanes, winding and turning about, ever opening into some other lane, that again presenting into another, and all apparently leading *no where*, with the little birds hopping fearlessly about the hedge-tops and trees overhead, the robin sweetly singing, the tiny gold crest peeping into crevices of the ivy, the yellowhammer and the chaffinch in their gay plumage twittering almost within reach of your hand! And ever and anon we pass some thatched cottage in the sheltered bottom, its little garden in front trimly kept, and still bright with the blossoms of the chrysanthemums, the trailing roses over the porch, displaying a lingering flower or two, and the indispensable myrtle peeping in at the chamber lattice * * * * *. Early violets were beginning to peep from their lowly retreats, and very soon we found them in plenty, and the delicate, pale, yellow primroses bespangled every bank."

Such a description we would gladly linger over; but, in justice to our readers, we must pass on to some more of those living pictures, lovely alike to the eye and heart, with which Mr. Gosse's pages overflow. It is not only when describing the lovely lane scenery that Mr. Gosse waxes eloquent—there flows all through his book the same keen appreciation of the beautiful—the same power of, as it were, identifying his own feelings with those of his readers, and transporting them to the visions of beauty he loves to describe.

Look, what a picture for the naturalist, this description of the Rock-pool, at Oddicombe, presents:—

"It is a deep, oval, cup-like cavity, about a yard wide in the longest diameter, and of the same depth, hewn out, as it were, from the solid limestone, with as clean a surface as if a stone mason had been at work there. It is always full of water, and, except when a heavy sea is rolling in, of brilliant clearness. All round the margin are growing tufts of the common coralline, forming a whitish, bushy fringe, reaching from the edge to about six inches down; a few plants of the bladder *Fucus* are scattered around and above the brim, and the arching fronds of the sweet *Laminaria* hang down nearly to the bottom, closely resembling, except in their deep, brown hue, the hartstongue fern, that so profusely adorns the sides of our green lanes. Below the coralline level are a few small, red sea-weeds, as *Rhodymenia palmata;* and the dark, purple *Chondrus crispus* growing in rich tufts, reflecting a steel-blue irridescence. But all the lower parts of the sides and bottom are almost quite free from sea-weeds, with the exception of a small *Ulva* or two, and a few encrusting patches of the coralline not yet shot up into branches, but resembling smooth pink lichens. The smooth surface of the rock in these lower parts is quite clean, so that there is nothing to intercept the sight of the *Actiniæ* that project from the hollows, and spread out

their broad circular disks like flat blossoms adhering to the face of the interior. There are many of these, all of the species *A. bellis*, and all of the dark chocolate variety, streaked with scarlet; and they are fine in the ratio of the depth at which they live. One at the very bottom is fully three inches in diameter.

"There is something exceedingly charming in such a natural vivarium as this. When I go down on my knees upon the rocky margin, and bring my face nearly close to the water, the whole interior is distinctly visible. The various forms and beautiful tints of the sea-weeds, especially the purple flush of the *Chondrus*, are well worthy of admiration; and I can see the little shrimps and other *Crustacea* busily swimming from weed to weed, or pursuing their instinctive occupations among the fronds and branches—an ample forest to them. Tiny fishes of the Blenny genus are also hiding under the shadows of the tufts, and occasionally darting out with quivering tail; and one or two brittle stars are deliberately crawling about, by means of their five long and flexible arms, in a manner that seems a ludicrous caricature of a man climbing up by his hands and feet—only you must suppose an additional arm growing from the top of his head. The variety of their colours, and the singular, but always elegant patterns in which they are arranged, render these little star-fishes attractive."

During his stay at Marychurch our author did not derive as much benefit from change of scene as had been hoped for, and at the latter end of April he determined to remove to the more bracing climate of the northern coast. Infirm health, we are informed, joined to the frequent prevalence of a heavy surf upon the shore, prevented so full a use of a three months' residence on the coast, as might have been wished; and *yet*, how *much* was observed in that time—how much that hundreds of idle pleasure-seekers daily passed by without a thought. We hope the record may be of use to some who annually frequent our watering-places, and that on their next visit they may be induced to *bring their eyes* with them, and *to use them*.

Ilfracombe was selected as Mr. Gosse's next head-quarters, the scenery of which appears to have greatly charmed him. Here his first search was after the *Caryophyllia Smithii*, which Mr. Ralfs had stated was to be found at Watermouth and Smallmouth, and which, after some difficulty, he was fortunate enough to find at an intermediate station. Some specimens were brought home and closely watched. We would gladly condense the observations made upon this very interesting coral, but that we feel a mutilated extract would be doing a great injustice to the subject. We will, however, mention one important part which they appear clearly to prove—"that the surface of the tentacles is delicately ciliated." This interesting peculiarity Mr. Gosse was led to conjecture from observing a current of water over the tentacles when examining them with a rather low microscopic power: this he then changed for a power of 140 diameters, the highest which the nature of the vessel in which the specimens were kept would admit of being used. With this, however, our author unmistakeably saw minute atoms slowly moving in the water, come into proximity to a tentacle, then immediately whirled along with rapidity in the direction of the point; the same thing was seen on both sides of the tentacle, and, in fact, all over its sur-

face, the direction being in all cases the same, from the base towards the point. The cilia themselves, however, could not be detected by the closest manipulation. We hope that his observations on this point will be quickly followed up by other microscopists, and that we will soon have to report that the cilia themselves have been detected. Other extracts from this most fascinating book we would gladly give, but that we feel how difficult it is to select where all is beautiful. The ardent lover of nature will find in it much to gratify his tastes, even though he should not be a professed naturalist; in it he will be led, with a goodly companion, "over field, and down, in the fresh, dewy morn—he will in fancy listen to the carol of the lark and the hum of the wild bee—he will stand at the edge of the precipice, and mark the glories of the setting sun—he will watch the mantling tide as it rolls inward, and roars among the hollow caves;" and, we trust, that he will be led to share, with its author, those delightful emotions which the contemplation of the works of the Almighty must ever cause in the mind of the Christian naturalist. Beautiful as we have thought the present work in many of its descriptions, our chief attraction in it has been the bold and manly avowal of Christian principles and Christian privileges which its pages bear witness to; and we feel assured, that few will rise from its perusal without a more lasting feeling of pleasure and profit than could be produced if such an avowal were absent.

In these days of almost infidel speculation, it is pleasant to meet with a work which a thoroughly wholesome tone pervades; and on this account, even were its other merits less, we would gladly hail "*The Rambles of a Naturalist on the Devonshire Coast*" as a most pleasing addition to our literature.

A Flora and Fauna within Living Animals. By Joseph Leidy, M.D., Philadelphia. Published in the Smithsonian Contributions to Knowledge. 4to. Washington, 1853.

The title of this pleasing memoir is of itself sufficiently explicit to state its purport; and though, perhaps, the fastidious may be disposed to turn from its pages, to the naturalist they will be found, in a comparatively small compass, to present much original and deeply-suggestive materials of thought and research.

It may be stated that the recent labours of others in this field of research have rendered the publication of the present memoir almost superfluous. To this objection our author, in his introduction, modestly answers, by stating, that he but professes to give "the result of observations,

commenced several years ago, upon associated entozoa and entophyta, constituting a flora and a fauna within animals;" and though, perhaps, to the over-fastidious such a record may reveal unwelcome truths as to the presence of some fellow-lodgers, whose existence they would gladly ignore—and though these may rank among the lowest form of organization we are acquainted with—they still surpass the loftiest efforts of man, and place all his wonted skill at nought, forcing him to confess that, insignificant as they are, they can never be imitated successfully by him—that they bear about with them *that* which is God's prerogative to give—life; and in their examination "he will be led to understand a little of the meaning of God's glorious title—*maximus in minimis.*"

Dr. Leidy's able memoir opens with an introduction, in which the leading facts connected with the entozoa—or animals living within other species; and entophyta—or vegetable parasites within animals—are skillfully reviewed. The former of these have, from the most remote time, attracted attention on account of the peculiarity of their position, the unpleasant ideas associated with them, the sufferings they frequently induce, and the difficulty of explaining their mode of origin. The existence of entophyta, on the contrary, from their minute character, long remained unknown, until the microscope of Leuwenhoek detected the algoid filaments of the human mouth; and it is only within a comparatively recent period that any large number have been discovered. In the year 1847, a very interesting monograph of these appeared at Paris, by Robin, under the title of "*Des Vegetaux qui croissant sur l'homme et sur les animaux vivant.*" In tracing the history of these curious parasites, modern observations would indicate that both entozoa and entophyta are produced from germs derived from parents having a cyclical development. The difficulty of tracing the progress of this development is very great, "particularly in the case of the entozoa, whose various stages of existence are passed under totally different circumstances; sometimes within one organ and then another of the same animal; sometimes in several animals; and at other times quite independent of, and external to, the animals they infest. If, however, an entzoon preserved the same form throughout its migrations, the difficulty just mentioned would be easily overcome; but such is not the case, for the alteration of form is frequently and probably always so great, that two successive conditions cannot be always recognised as the same." As a familiar example of this, we may mention the case of the *Gordius*, or hairworm, vulgarly supposed to be a transformed horse hair.

"This animal, says our author, is rather common in brooks and creeks in the latter part of summer and autumn, occurring from a few inches to a foot in

length. Its colour passes through all the shades of brown to black, and is perfectly hair-like in its form, except that in the male the tail-end is bifurcated, in the female, trifurcated (American species). No one has yet been able to trace the animal to its origin! The female deposits in the water, in which is found millions of its eggs, deposited in long chords. In the course of three weeks the embryos escape from the eggs, of a totally different form and construction from the parents. Their body is only the 1-450th of an inch long, and consists of two portions; the posterior cylindrical, slightly dilated and rounded at the free extremity, where it is furnished with two short spines; and the anterior broader, cylindrical, and annulated, having the mouth furnished with two circlets of retractile tentaculæ and a club-shaped proboscis. No one has yet been able to determine what becomes of the embryo in its normal cyclical course. Those which I observed always died a few days after escaping from the egg.

"The grasshoppers in the meadows below the city of Philadelphia are very much infested with a species of *Gordius*, probably the same as the former, but in a different stage of development. More than half the grasshoppers in the locality mentioned contain them; but those in drier places, as in the fields west and north of Philadelphia, are rarely infested. The number of Gordii in each insect varies from one to five; their length from three inches to a foot; they occupy a position in the visceral cavity, where they lie coiled among the viscera, and often extend from the end of the abdomen, forward through the thorax, even into the head; their bulk and weight are frequently greater than all the soft parts, including the muscles, of their living habitation. Nevertheless, with this relatively immense mass of parasites, the insects jump about almost as freely as those not infested.

"The worms are milk white in colour, and undivided at the extremities. The females are distended with ova, but I have never seen them extruded.

"When the bodies of grasshoppers, containing those entozoa, are broken and laid upon moist earth, the worms gradually creep out and pass below its surface. Some specimens which crawled out of the bodies of grasshoppers, last August, have undergone no change, and are alive at the present time (November, 1852).

"In the natural condition, when the grasshoppers die, the worms creep from the body and enter the earth. Some of the worms, put in water, lived for about four weeks, and then died from the growth of *Achlya prolifera*. What is their cyclical development?"

The facts presented in this note serve well to show the developmental history of entozoa.

After some preliminary inquiries into the nature of life in general, Dr. Leidy proceeds to the consideration of the topics more immediately bearing upon the nature and origin of entozoa, and into phytic life. Interesting as these topics are, and important, as bearing upon a class of questions which, at the present period, closely occupy the attention of the naturalist, we must pass them by, merely directing our reader's attention to their consideration in the pages of the present memoir, recording the result of some of the interesting researches of our author.

Entozoa may and do penetrate through the living tissues; but it is entirely by the mechanical process of boring.

The intestinal canal of animals is most frequented by ento-parasites, on account of the ease with which the germs enter with the food.

Aquatic animals are more troubled with entozoa than those which are terrestrial, because the water gives a better medium of access than the air.

Terrestrial animals are more infested with ecto-parasites, because their

covering, in hair, wool, and feathers, is more favourable to their production and development. A low degree of organic activity, and slowly-digestible food, favour the development of ecto-parasites; and hence they are more frequent in the carnivora.

Animals subsisting upon the endosmosed juices of the tissues of other animals and plants, are rarely infected with parasites, as hemipterous insects, aphides, &c. Entozoa themselves are not infested.

In the list of "man's fellow-lodgers" are enumerated 26 Entozoa, 13 Ectozoa, and 10 Entophyta.

The most extensive associated flora and fauna, discovered by Dr. Leidy within animals, exist with wonderful uniformity within the intestinal canal of the Myriapod, Julus marginatus (Say), and the Coleopterous insect, Passalus cormitus (Fabricius). But we must refer our readers to the valuable pages of the work itself for the history of these wonders, and to Dr. Leidy's beautiful plates, illustrative of them; and we are sure that their perusal will amply repay those who are interested in the study of these curious forms; and we hope will incite others to follow in his footsteps, and add somewhat to the list already furnished by those who have turned their attention to it.

THE NATURAL HISTORY OF THE BIRDS OF IRELAND, INDIGENOUS AND MIGRATORY, CONTAINING DESCRIPTIONS OF THE HABITS, MIGRATIONS, OCCURRENCE, AND ECONOMY OF THE TWO HUNDRED AND SIXTY-ONE SPECIES COMPRISED IN THE FAUNA. By John J. Watters, Associate Member of the University Zoological Association. Dublin: James M^cGlashan. London: W. S. Orr & Co. 1853. 300 pages, 12mo. Price 5s.

To the late Mr. Thompson, of Belfast, we are indebted for what may be appropriately termed the *first* Irish Ornithology, as, strange to say, though Ireland abounds in naturalists, comparatively little has yet been done towards the publication of a regular fauna. Within the last few years, however, considerable advances have been made in the right direction. In most of the larger towns, as well as in the metropolis, Natural History Societies have sprung up, and those whose efforts were, previously, at best but desultory, have been brought together; fresh energy has been infused, and the *materials* are being rapidly quarried from which we may soon hope to see future explorers amply provided with text-books, recording what has been observed throughout the land.

The preparation of local lists has long and deservedly been acknowledged as a most important step towards attaining any just idea of the natural

history of a country; to their value the pages of Mr. Thompson's "Birds of Ireland" bear ample testimony, and the skilful manner in which he has moulded into shape the observations of others, joined to his own deep practical experience as a naturalist, will long render his work a pleasing standard of reference, and allure many to tread the paths it has so ably marked out. With all its advantages, however, it still left unsupplied the want of a *cheap*, popular hand-book, suited to the requirements of the *many*. To supply this deficiency is the aim of Mr. Watters, in his "History of Irish Birds;" and we feel confident that it will be gladly hailed by many who, from its size and expense, were prevented purchasing Mr. Thompson's work. We own that it is no easy task to prepare, in a popular form, any great amount of scientific details, and much of this is necessarily absent from Mr. Watters's—omitted, as we learn, "for the better economy of space, and consequent saving of expense."

The volume itself contains the result of the observations of the author, who is no mere closet naturalist, and contains an abstract of the history and habits of two hundred and sixty-one species of birds already observed. It is more than probable that the number already recorded falls short of the truth; and we sincerely hope that the present little volume may be the means of infusing a spirit of still further research among our out-of-door naturalists—a tribe, we hope, rapidly increasing both in number and powers of observation. As a specimen of Mr. Watters's style and powers of description, we append the following history of the curlew (Numenius arquata):—

"The curlew is one of our most common and widely-distributed birds frequenting the sea-shore in large flocks, and feeding on marine insects, mollusca, crustacea, and larvæ, for which it probes the soft, muddy ooze with its long and admirably-adapted bill.

"In Dublin Bay the immense flocks of curlew afford considerable attraction to the shore sportsman, both from their changefnl evolutions when on the wing, and the fine, bold, spirited call-note of the species. Watchful and vigilant, we see no other shore bird exhibit the same suspicious habits as the curlew, and, what annoys the sportsman is, that, not content with its own safety, it extends its protection over all the flocks feeding in its vicinity. Possessing the loudest call-note of all our grallatorial birds, no flock is so adventurous as to remain feeding after the shrill, startling whaup of the curlew has echoed along the shore.

"Of great interest in its habits, the curlew enlivens and makes cheerful whatever coast it frequents, no matter how desolate may have been its previous appearance. Thus do we see it in our own bay during autumn and winter, occurring along the entire range from Clontarf to Malahide, in flocks of the greatest abundance. Feeding together, they present the most diversified appearance in their attitudes upon the mud or ooze. But yet so easily alarmed are they, that the sportive leap of a wanton fish, the rustling of a leaf blown past upon the strand, or, when feeding during night-time, the snapping of a gun in their neighbourhood, serves to alarm the entire flock, which at once rises with that peculiar lightness and ease so eminently possessed by the curlew, and wing rapidly their flight from the way of danger, each bird uttering the loud prolonged 'courlieu,' or the harsh and guttural 'whaup,' so indicative of danger, and which is heard so beautifully modulated both by sound

and distance. Never to be approached upon an open shore, the only chance possessed by the shooter is by concealment in the vicinity of their flight, or when observed waiting the falling of the tide in fields bordering the shore, the proximity of the hedgerow allows an approach to some portion of the flock.

"Much as we admire the wild beauty of its call-note, it is never heard to more advantage than when passing to its feeding stations along the shore at night-time, uttered singly in long-echoing whistles, with another occasional call-note more hurried, which serves to bring in stragglers to the main flock. They impart one of the most beautiful of the many attractions which nature has so profusely scattered for our enjoyment. Sometimes, also, we hear, amid the deep silence of the night, some old veteran curlew, which has become a very Nestor in its precautions for safety, and its voice a deep bass, from years of constant whauping, utter a long-drawn whistle, so intense in expression, loudness, and solemnity, that even coast-guards stationed in the vicinity have left their domiciles to observe if the sea was burdened with a wreck. Even in our own vicinity, at Rob's Wall, near Malahide, the guard in custody of the Martello Tower represented to us having at times started from his bed to ascertain the cause of such an unearthly whistle:—

'Soothed by the murmurs of the sea-beat shore,
His dun-grey plumage floating to the gale,
The curlew blends his melancholy wail
With those hoarse sounds the rushing waters pour.'

"Feeding upon the shore in winter, during autumn the curlew lives for a short time upon seeds and berries, so much so that we have had the pleasure of examining, with Mr. Glennon, the stomachs of curlews, on two different occasions, which were entirely filled with blackberries, the action of which had not only discoloured the intestines, but changed the natural colour of the bones to a light purplish hue.

"Towards the approach of spring, the great flocks which we had seen during winter, apparently thinned and diminished in number, separate into detached bodies, and depart inland to seek a suitable place for nidification.

"On some barren and desolate moor, tenanted by the grouse, the moor harrier, and lizard, the curlew prepares an artless nest on the ground, in a dry tuft of grass or rushes, lined with withered herbage. Sometimes it is formed in a natural hollow or depression, smoothed by the bird, and lined with leaves, where the eggs are deposited, four in number, of a pale green, blotched with brown. During the breeding season these solitary tracts, frequented by the curlew, appear replete with animation. From early dawn to the last hour of twilight, their incessant screaming and repeated motion afford a relief to the otherwise changeless and dull monotony of the scene; on the nest being approached, the male and female assail the obnoxious intruder with noisy screams, beating at him with quivering wings, and, that failing, run and skulk before, in hopes of decoying and deluding him.

"The male curlew in spring has a habit analogous to the bleating of the snipe, which is usually performed at early dawn. Rising slowly in the air, and sailing in easy flight, and at times rapidly descending, the amorous curlew utters at intervals the loud, shrill, quivering whistle peculiar to the breeding season; and at daybreak the moving forms of curlew, rendered large and indistinct by the fog, the oft-repeated whistles of many birds on the wing at the same time, the challenging of the mountain grouse, and the hoarse croak of welcome from the raven sailing to its foray in the valley, form one of those little episodes intrinsically so trifling in appearance, but yet replete with such interest, to greet the observer of nature."

As we think that the history of the "Grallatores" and "Natatores" contains more original matter than perhaps that of the other three orders, we annex the following extracts from the latter one, of the roseate tern (Sterna Dougallii), and the razor-bill (Alca torda):—

"Discernible at once from the elegance of its frail form, we require no history of the roseate tern to inform us of its inability to abide the rough blasts of autumn and winter, but that, like our summer migratants on the land, its appearance is

limited to the time when the islets and surrounding seas are prepared for its reception. To the fisherman its grating cry is as welcome as the craking of the land-rail to the farmer, and its buoyant form is hailed with the same gratification upon the sea as the swallow upon the land.

"To most ornithologists, few birds have conferred more pleasure in observing their habits than the roseate tern. Congregated in small flocks, they form in a manner similar to the gulls 'a play' upon the water, wherever a 'school' of fish is swimming near the surface, each bird, attractive from its changing and varying appearance—

> 'Now poising o'er ocean thy delicate form,
> Now breasting the surge with thy bosom so warm;
> Now sweeping the billow, now floating on high,
> Now bathing thy plumes in the light of the sky.'

"Yet beautiful as are these birds, they are too often ruthlessly condemned to suffer for those very attractions which should preserve them—instances frequently occurring where a breeding haunt is invaded by persons whose propensities for slaughter find an outlet in the destruction of these unoffending birds. Equally unfortunate in its habits at this time, the roseate tern forgets its usual timidity; and when a bird, after being shot, falls slowly through the air from its buoyant lightness, the entire flock congregate and fly down towards it, as if wondering why it had left their joyous troop. Flying in its vicinity, they scream notes of compassion, which are changed into a requiem for themselves, for the class who commit such an atrocity consider each pitiable trait exhibited by the bird as at least a tribute to the skill which they evince in destroying them.

"The razor-bill nearly equals the guillemot in its numbers and distribution around the shores of the island, and closely resembles that bird in habits, amicably frequenting the same ledge on the face of the rock, where it deposits its single egg, enormously disproportionate to the size of the bird, and often in situations at an immense altitude over the ocean. Interesting in its habits from the associations connected with it, the razor-bill is an attendant upon the lofty precipices which occur around our island, and is equally abundant about the basaltic columns of the north as the granite ranges of the western coast. Observed and studied in their solitary breeding haunts, few can form the most remote idea of the magnificence which greets the observer in the neighbourhood of a breeding station. Flocks of various species, flying in long strings close to the water, and rising on the wing as they approach the cliffs, all settle without the slightest noise; bending over, we observe them ranged in lines along each flat, tabular projection, preening their feathers, and sitting upright hatching their single egg. The outer rocks at the base we observe, white and spotless, covered with hundreds of sea-gulls, in such contrast with the black side of the rock, as it were overspread with snow, outrivalling the white foam of the waves which surround it; lines of cormorants stoop forward, in their peculiar manner of standing, like so many projecting ornaments on a balustrade. There is no alarm or disturbance to intrude upon this carnival of the breeding season; but let a gun be discharged, and instantly the entire precipice seems alive: hundreds of guillemots, razor-bills, and puffins glancing downwards to the water, flocks of cormorants, with their long necks outstretched, fly off close to the water's edge, and settling down when sufficiently remote from danger; whilst at the same instant, like ten thousand snowflakes, kittiwakes (viewed from the distance above) wheel round in circles, their confused screaming scarcely distinguishable from the seething of the ocean. Overhead some patriarchal raven croaks hoarsely and angrily at our intrusion, whilst four or five kestrels appear on their motionless wings like so many fixed objects against the sky; each pinnacle of the rock is surmounted by a troop of jackdaws, their sidelong looks directed upon us, and chattering loudly, as if to silence the harsh grating cry of the starlings beside them.

"Beautiful as such a sight must be, however imperfect in its description, it is pitiable when we reflect upon those solitudes invaded by boats full of persons, who form parties to destroy those birds, offering neither an opportunity to display the skill of the shooter, nor, when shot, of the slightest value as an article of food. Unfortunately, never glutted by destroying, they cover the sea with their quivering

forms, causing, at the same time, the loss of the lives of young depending upon the parent birds. Much as writers may object to the *battue* of game in an overstocked preserve, yet there is a possible excuse to plead in one case, as game birds are shot at a time when the young are not dependent upon them, and when shot are of value as an article of food.

"Even were the habits of these birds otherwise than harmless, their wanton destruction is pitiable, and if a particle of the strictness extended over the care of a few game were used in the prevention of these excesses, all might be remedied, of which, as remarked in a correspondence with Mr. Thompson, the owners of rocky islets and headlands, where those birds frequent to breed, are highly culpable in permitting such slaughter upon their property, places where, in a few years, whole species will be extirpated, and known only as occasional visitants to the island. Having, in many instances, mentioned Lambay as a breeding haunt for sea-fowl, it may not be uninteresting to enumerate the different species which tenant the precipitous eastern side of the island during the season of incubation:—The common and green cormorants, the common and black guillemots, razor-bill, puffin, shearwater, great and lesser black-backed gulls, herring and common gulls, and kittiwakes.

"Amongst the land-birds which frequent the same face of the rocks, we find the peregrine (rarely of late years), the kestrel, raven, hooded crow, jackdaw, and stare (the chough is also said to nidify in rare instances), the wheatear, window martin, swift, and rock pigeon."

This last extract is interesting from the fact, that were it not for the murderous attacks made in Lambay and other islands upon the feathered tribe, while preparing their nests, and engaged with the care of their young, we might have a second Bass rock on our Irish coast, and even exceeding it in the variety of its inhabitants. Although we do not wish to be too censorious in our review of this pleasing work, yet we would advise the author to study theology better before hazarding such opinions as those contained in the 64th page. On the whole, we think this volume deserves to be widely circulated, and we heartily recommend it to our readers. It abounds with anecdote, and is written in a popular style. They will find it to be an accurate history of our Irish birds—detailing most of their interesting features. The author has availed himself of the continental writers, as well as those of his own country, and has added the synonyms of Temminck to those of Linnæus and others. The typography and paper are of the best description, reflecting great credit on the publishers.

NEREIS BOREALI AMERICANA; OR, CONTRIBUTIONS TO A HISTORY OF THE MARINE ALGÆ OF NORTH AMERICA. By William Henry Harvey, M.D., M.R.I.A., Keeper of the Herbarium of the University of Dublin, and Professor of Botany to the Royal Dublin Society. Part I.—Melanospermeæ. Part II.—Rhodospermeæ. Published by the Smithsonian Institution, Washington; and London, Van Voorst.

THESE memoirs, from the pen of Dr. Harvey, already so well known to British algologists, by his *Manual of British Algæ* and *Phycologia Britannica*, will be welcomed by all who are engaged in the study of the

botany of our coasts. They are issued as part of the "*Smithsonian Contributions to Knowledge.*" But before we proceed to speak of the memoirs themselves, we will take a glance at the noble institution, in connection with which they are issued. They form part of the general plan adopted for carrying into effect the intentions of James Smithson, of England. This gentleman left his property in trust to the United States, "to found at Washington, under the name of the Smithsonian Institution, an establishment for the *increase* and *diffusion* of knowledge among men;" and these words of the testator were the only guide given for the adoption of a plan to carry out the benevolent intentions of the testator. This trust was accepted by the Government of the United States, and an Act of Congress was passed, August 10th, 1846, constituting the President and the other principal executive officers of the General Government, the Chief Justice of the Supreme Court, the Mayor of Washington, and such honorary members as they might elect, an establishment under the title of the "SMITHSONIAN INSTITUTION FOR THE INCREASE AND DIFFUSION OF KNOWLEDGE AMONG MEN." In carrying out this plan two objects had to be steadily kept in view—the one, the *increase* of knowledge—the other, the *diffusion* of the knowledge thus increased. For these purposes the *annual* income of the institution has been wisely divided into two equal parts—the one part being devoted to purposes of original research and publication—the other to the gradual formation of a library, a museum, and a gallery of art, in accordance with the terms of the Act of Congress. The memoirs already published by the "Board of Regents of the Smithsonian Institution" embrace (besides various reports in octavo), five quarto volumes, displaying considerable originality of thought and laborious research; and we are glad to see one from *the old country* engaging in such honourable rivalry, and taking his stand among his transatlantic brethren; we are much better pleased to recognize the truly friendly spirit which pervades the report of the Smithsonian institution, when speaking of the acceptance of the present memoirs, and which we cannot forbear from quoting as alike honourable to the body from which it issues, and the talented Professor whose name it refers to. "This memoir *(The Nereis Boreali-Americani)* consists of a description of the marine plants or Algæ, which are found along the eastern and southern coasts of the United States, and which are deserving of attention, not only on account of their beauty, variety, and the illustrations they present of the growth and development of vegetable forms, but also on account of their economical value with reference to agriculture and the chemical arts. This volume is in the course of preparation by Professor Harvey, of the University of Dublin, *a gentleman who is recognized as the*

first authority in this branch of Botany. He was induced to visit this country by an invitation to lecture on the Algæ, before the Lowell Institute, and by the opportunity thus afforded him of studying his favourite branch of science in a new region. After completing his lectures, he made a collection of the marine plants of our coast, and offered to furnish drawings of the genera and species of them, with detailed descriptions, *free of all cost*, provided the institution would bear the expense of publication. Upon the warm recommendation of some of the principal botanists of this country, the liberal offer of Professor Harvey was accepted, and he is now (Jan. 1, 1851) engaged in making with his own hand the drawings upon stone. The whole work, besides the time expended in collecting the specimens, will occupy more than a year. This voluntary contribution to knowledge, from a man of science, may surprise those whose minds are not liberalized by philosophical pursuits, and who cannot conceive any object in labour unconnected with pecuniary gain" (*Fifth Report*, 1851). We have transcribed this paragraph entire, as it tells officially the circumstances under which the present memoirs were composed. For the task thus gratuitously undertaken, Dr. Harvey was peculiarly fitted; for many years he had turned his attention to the study of those lowest and simplest forms of vegetable organization—the Algæ; and in addition, as the keeper of an extensive herbarium, he had constant access to specimens collected in every quarter of the globe, and was thus enabled to compare the almost inconceivable varieties of form so often calculated to mislead the unwary. The memoirs before us are the two first portions of this work, and are issued by the Smithsonian Institution, in a style fully equal to any work on the Algæ already published. For the accuracy of the details, we need only again state that the plates are all drawn on stone by Dr. Harvey himself. The portions already published embrace the Melanosperms and Rhodosperms, and will be followed by a third part, descriptive of the Chlorosperms, with an appendix of such species as may have been forwarded to the author since the publication of the previous parts. When speaking of the operations of the Smithsonian Institution, we omitted to state, that memoirs submitted to the "Board of Regents" for publication, are by them referred to competent judges before acceptance. In the case of the present, the judges were Professor J. W. Bailey, and Dr. Asa Gray.

Before entering on the subject of the Algæ, found on the northern shores of North America, Dr. Harvey has prefixed an introduction, in which the peculiarities of this class of plants are ably considered, under the heads of root, frond, colour, fructification, movements of Algæ, habitat, geographical distribution, directions for collecting and preserving specimens, and uses of

the Algæ; from all these heads we would gladly extract, did our space permit; we must, however, confine ourselves to a brief notice of the "*Four regions of distribution*" into which it is proposed to divide (for the present) the eastern and western shores of the United States.

1st. *The Coast of Cape Cod, extending probably to Greenland.* Among the characteristic forms are, *Laminaria Longicruris* (one of the largest on the coast), *Agarum Turneri*, and *pertusum*, *Rhodymenia cristata*, *Ptilota plumosa*, and *Dumontea ramentacea.* All the species mentioned are northern forms, and confined, in European waters, to very high latitudes, and all appear to vegetate south nearly, as far as Cape Cod, to which limits they are almost all confined. The marine flora of this region, as a whole, bears a resemblance to the shores of Iceland, Norway, Scotland, and the north and north-west of Ireland.

2nd. *Long Island Sound, including under this head, New York Harbour, and the sands of New Jersey.* In comparing the plants of the Sound with those of the first region, a marked difference is observable. We lose the Arctic forms, and their place is supplied by *Sargassum*, two species, by various beautiful *Callithamnia* and *Polysiphoniæ*, and by abundance of *Delesseria Americana*, and *Dasya elegans*, *Seirosiphora Griffithsiana* is not uncommon, *Rhabdonia Baileyi*, *Gracilaria multipartita* (narrow varieties), *Chrysemenia divaricata and C. Rosea* are also characteristic forms. *Delesseria Leprieurii* also belong to this region, but it is a tropical form, at its utmost limit of northern distribution.

3rd. *Cape Hatteras to Cape Florida.* Many species found within these limits are common to those found in the second region; others are here met with for the first time, as *Arthrocladia villosa* and a *Nitophyllum*, found at Wilmington; a noble *Grateloupia*, probably new (*G. Gibbesii*, MS.), and *Delesseria hypoglossum.* I have seen no *Fucoid* plant from this region; but if there were a suitable locality here, we ought to have *Sargassa;* all the estuaries of the district produce *Grateloupia Gibbesii*, and a *Bostrychia*, either *B. radicans* Mont., or a closely allied species. These last are tropical forms, first observed at Cayenne.

4th. *Florida Keys and Shores of the Mexican Gulf.*—Here we have a very strongly marked province, strikingly contrasted in vegetation with the east coast, mentioned in the three regions already noticed. Of 130 species collected at the east coast in February, 1850, scarcely one-eighth are common to the east coast, seven-eighths being unknown to the American coast north of Cape Florida. With this remarkable difference

between the Algæ of the Keys and those of the east coast, there is a marked affinity between the former and those of the south of Europe. The marine vegetation of the Gulf of Mexico has a very strong resemblance to that of the Mediterranean Sea; nearly one-third of the species collected are common to the Mediterranean. Several of them straggle onwards towards the coasts of Spain and France, and even reach the south of England; but scarcely any of those are seen on the east coast of America. From this we may infer that they are not conveyed by the Gulf stream. Those collected at Key-West included 10 Melanosperms, 5 of which are common to the Mediterranean; 82 Rhodesperms, 25 of which are Mediterranean; and 38 Chlorosperms, of which 10 are Mediterranean. Besides these identical species, there are many *representative*, closely allied to the Mediterranean types. This resemblance is clearly shown in the genus *Dasya*, of which *seven* out of *eleven* European species are found in the Mediterranean. At Key-West eight species of this beautiful genus were collected. Among those, *seven* were new, and the *eighth (D. Elgans)* was found along the whole coast of North America. Three-fourths, perhaps, of the masses of sea-weed cast ashore at Key-West, belong to *Laicreucia*, of which genus several species, and innumerable puzzling varieties, are profusely common. A fine *Hypnea*, (described afterwards as *Euchennia isiforme*, J. A. S.), *H. Wardemanni* MS.), one of the most striking species of the genus is also abundant. *Alsidium triangulare*, *Digenia simplex*, *Acanthophora*, *Amarisia multifida*, and other West Indian Rhodosperms, are abundantly cast ashore. *Sargassum Vulgare* and *bacciferum Padnia Pavonia*, *Zonaria lobata* and sundry *Dictyotæ*, are characteristic Melanosperms. But this region is especially remarkable for the abundance and beauty of its Chlorosperms, of the groups Siphonaceæ and Caulerpaceæ; 10 species of Caulespa were collected, some of which are of common occurrence, and serve for food to the turtles, which, in their turn, are the staple diet of the islanders. *Pencellus*, at least three species, *Udotea*, *Halimeda*, *Acetabularia*, *Anadyomene*, *Dictyosphæria*, *Chamædris*, *Dasycladus*, *Cymopolia*, and others, some of which are West Indian, some Mediterranean, are evidence of the high temperature of the sea round the Keys. Many of the plants obtained at Key-West were cast up from deeper water when the south wind blew strongly, and were not seen at any other time. A visitor, therefore, in the *hurricane* months would procure many which escaped me. Among the species, two new *Delesseriæ*, *(D. involvens* and *D. tenuifolia)* are specially worth notice. These were very plentiful in the beginning of February, but soon disappeared.

Two *Bostrychia (B. montagnei* and *B. filicula*, MS.), and a Catenella, were found on the stems of mangroves, near high-water mark.

Such is Dr. Harvey's outline of the distribution of the leading types found in each of the four regions into which he proposes to divide the localities, the result of whose examination is contained in the present Nereis. We have presented it to our readers, as we feel assured that it will be read with interest by all who wish to form some idea of the characteristic vegetation of the North American shores. The parts which we have extracted are prefaced by a few brief observations on the general causes that appear to affect the geographical distribution of the Algæ. These will be read with confidence and interest by all, as affording, in an able summary, the results of observations made by some of the best algologists, grouped together by one who is himself more capable of appreciating the importance of such generalizations than, perhaps, any of his fellow-labourers in this line of research. We would gladly transfer them to our pages; but we feel that, however unwilling, want of space compels us to draw our present notice to an end. When comparing the genera recorded in these volumes with the same genera as found described by our author in his Phycologia Britannica, we are often surprised with meeting old friends under new names, and sometimes names that we were familiarized with, from the pages of Phycologia, unceremoniously transferred to new faces. We fear that in this respect some of the Algæ could make out a very clear case against the learned Professor and some of his brethren—as for example, the *Ralfsia deusta* (Berk and Phyc. Brit.), which, after having passed through six different genera, hoped to have found its true name in the pages of the *Phycologia Britannica;* and yet, on the appearance of the *Nerei's Boreali-Americana*, finds that his fair name has been pilfered by an American stranger, patronized by J. Aghard, and, after all his previous sufferings, the poor Alga is again left in quest of a name. We are sure the learned professor "did it all for the best," and, therefore, will not say a word more than to warn our readers, that the American plant is not the British plant described under the same name.

In the introduction prefixed to the sub-class Rhodospermeæ, Dr. Harvey, after briefly stating the general characteristics of the Algæ included in it, proceeds to an examination of the *double system* of fructification, which forms their most remarkable and distinctive character; "two descriptions of spore-producing organs being found on almost all these plants, and always being developed on different individuals of each species. Thus, then, Algæ are strictly *diœcious*, though in a different manner from other diœcious plants; for here it is not stamens and pistils (or their analogues) which are

borne on different roots; but *some* individuals produce only one kind of pistil, or sporiferous organ; and *others*, of the same species, produce constantly a sporiferous organ of a different kind. The *spores* developed in either system are equally capable of reproducing the species; and as the two kinds are always formed on different individual fronds, the *idea* of each species includes two individuals, and is not complete unless both are known. Hence the necessity, in forming our generic groups, to found them on the characters taken from both fronds. Perhaps the natural explanation of this double fructification is, to regard one form of the reproductive body as a true *spore*, supposed to be fertilized through the agency of an *antheridium*, and to consider the other as merely a gemmule or bud, here reduced to a single cell, cast off by the parent plant, and capable of continuing an independent existence. If this be the true explanation of the phenomena, we have still to decide (and from analogy only, for evidence of fertilization is wanting) to which of these bodies we shall give the name of *spore*, and which we shall call *gemmule*. And here different botanists take different views, the positive evidence, as it seems to me, being nearly equal in favour of either. Having no new facts to bring forward, I shall not argue this question here, but adopt the name *spores* and *tetraspores*, for these reproductive cells respectively." We regret that space will not allow us to follow Dr. Harvey through the rest of this most interesting portion of his memoir. In it he has adopted a classification, based on the structure of the *sporiferous nuclei*, similar to that followed by Professor J. G. Agardh, whose "*Species genera et ordines Algarum*" (Lund., 1848, 1852) is highly and deservedly praised for accurate analysis, careful description, and original conception. We must now take our leave, for the present, of these contributions to the algology of the American coasts, which ably sustain the high character for scientific zeal and laborious research long awarded by his fellow-students to Professor Harvey.

We understand that a similar devotion to science, as that which produced these volumes, has led their gifted author to explore other regions in search of his favourites; and that, probably, while these pages are passing through the press, he is *algologising* on the coasts of Australia. We most cordially wish every success to his labours, and hope that, on his return to his native land, their fruits may equal, if not surpass, those which are presented in the volumes we have been considering, as the result of his American trip.

THE PHYTOLOGIST AND ZOOLOGIST: POPULAR MONTHLY MISCELLANIES OF NATURAL HISTORY. Edited by E. Newman, F.L.S., Member Imp. L.C. Acad., President of the Entomological Society, London. Monthly parts, 1s. each; 8vo. London: John Van Voorst.

THE above periodicals are issued monthly in a separate form, under the same able editorship, to enable those whose studies are confined either to Zoological or Botanical research, to provide themselves, at a trifling expense, with a journal giving accurately the most recent information in their favourite branches of study. The importance of periodicals such as these are, in controlling and directing the researches of independent observers, who, from circumstances, are removed from personal intercourse with their fellow-naturalists, is difficult to appreciate. Some estimate of it may be formed by observing how deeply our best writers are indebted to the records preserved in them for the riches that adorn their pages. A modern work of any standing on British natural history, can scarce be opened without finding in it frequent reference to the Zoologist or Phytologist as sources on the authority of which statements are with confidence made; while a glance at the contents of *even* a single number will amply convince how useful such a periodical must be to all who love to woo nature for her own sake. Their pages contain local lists, carefully and accurately compiled, thus enabling the student to compare the flora or fauna of his own immediate locality with others, which probably he would never be able to visit; notes of the occurrence of rare species, both in the animal and vegetable kingdom, are recorded; correspondence between naturalists, often of a most interesting character, and always such as is calculated to promote those friendly feelings which should always characterize the lovers and seekers after truth. Proceedings of societies are noted, thus providing the student with a notice of whatever is doing in the natural-history world. To these are added Notices of New Books, which last, owing to the pressure of important original matter, are by no means either frequent or full. We hope this hurried review of the contents and objects of these valued periodicals may help to induce some of our readers to enlist themselves among their subscribers for the coming year, as we fear that they are not as well supported on *this side of the Channel* as their merits deserve. If a guarantee were wanting for the able management of these two works, we need only mention E. Newman, Esq., the able and esteemed president of the Entomological Society, as their editor, whose experience and judgment are acknowledged by all those who would be likely to read, or able to judge of their merits.

Proceedings of Societies.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

OCTOBER 26, 1853.

A MEETING of the above Society, for the session of 1853-4, was held at the Museum,

ROBERT PATTERSON, Esq., President, in the chair,

when a paper was read by Dr. Dickie on the

RELATIONS OF FORM AND COLOUR IN THE VEGETABLE KINGDOM.

A specimen of a candle, made from paraffine, was shown to the meeting, and a letter read from Sir J. Emerson Tennent, stating that the paraffine had been procured at Bonn, on the Rhine, from the brown coal or lignite of that neighbourhood; and he suggested that the like might be obtained from the lignite which is found in some quantity in the county of Antrim. He also mentioned that oil, that burns resembling camphine, had also been obtained from the German lignite.

NOVEMBER 16, 1853.

The second meeting of the Society was held, when a paper was read by Mr. Robert Young, C. E., on

THE DRAINAGE OF TOWNS, IN ITS SANITARY AND ECONOMIC ASPECTS.

After the paper was read, there was an interesting conversation on the topics contained in it. Dr. Browne pointed out the distinction between the sewerage and drainage of a town; and dwelt on the importance of the subject in a sanitary point of view.

Dr. Stronge conceived that the breathing of the noxious vapours, arising from accumulations of animal filth, did not immediately produce cholera, but that by inhaling the like, the human constitution became disposed to receive epidemic contagion.

Mr. MacAdam drew the attention of the meeting to a statement of the Registrar-General, in which it was mentioned that, formerly, Newcastle-on-Tyne was healthier than at present; but in consequence of the sewerage of the town being permitted to become mixed with the river, and the water, of late years, being sent back to the inhabitants to be used for domestic purposes, there was a marked difference in their sanitary state, as exemplified in the late ravages of cholera; also, that at Exeter, that disease made great ravages in 1832, at the first visitation of the epidemic, but that subsequently a new supply of pure water having been procured for the inhabitants, the city suffered comparatively little in 1849, when the second visitation took place.

NOVEMBER 30, 1853.

A meeting of the above Society was held, at the Museum, on the 30th November, ROBERT PATTERSON, ESQ., President, in the chair,

when a paper was read by the Rev. J. Scott Porter,

ON THE STATE OF SOCIETY, ARTS, AND MANNERS AMONG THE PRIMEVAL INHABITANTS OF IRELAND.

The sources from which most of the facts embodied in the paper are derived, are the county, the parochial, and the ordnance surveys; the works of Harris, Stewart, Petrie, Dr. D. Wilson, Wakeman, Shirley, and Wilde; the writers of various articles in the "Archæologia," the "Transactions of the Royal Irish Academy," the "Ulster Journal of Archæology," the Newry and Belfast Magazines, and the "Dublin Penny Journal." Many objects which would have illustrated the antiquities of Ireland, have unfortunately been destroyed, of which no account that can be relied upon had been preserved. This invests the subject with peculiar difficulties; but it is also in itself obscure, because it relates to a period of which no written records exist; so that it may appear to some to have no other foundation than conjecture. This, however, may be said to be the case with geology; yet the main conclusions reached by that science are now admitted by every person who has examined and understood the facts on which it rests. There is often a blending together of the facts relating to the more recent changes of the earth's surface, and the primeval history of man. Thus, the remains of an ancient canoe were found embedded in the earth, on the banks of the river Carron, in Scotland; and in the same stratum, but deeper down, those of an elephant, of a species which has been for many centuries extinct. In the same district was found, in 1824, the skeleton of a whale, and beside it the rude harpoon, tipped with deer's horn, from which it had probably received its death wound. Both lay far above the level of the tide; and it is the province of geology to determine the limits of time, within, or beyond which that region had been the bottom of a frith, in which the whale once sported, and the primeval mariner pursued the monsters of the deep. Mr. Porter was not aware of any recorded instances of the discovery of boats, &c., in the alluvial soil of the valley of the Lagan; but such remains have been found in that which borders Lough Foyle, and are frequent in many of the bogs and inland lakes. But, although the first inhabitants of Ireland were necessarily acquainted with the rudiments of the nautical art, they were quite ignorant of the industrial use of metals; many of their weapons and tools, which would have been made of metal if they had been made acquainted with the mode of working such substances, were made of bone, flint, and other kinds of stone. Stone knives, chisels, hammers, axes, alts, &c., are common, of which specimens were exhibited, illustrated by comparison with others brought from various places in which society is yet in a rude state. Not only the finished weapons are found, but, in some cases, the material rudely blocked out in stone; and several flint arrow-heads were exhibited, found in Dunmurry, which appear to have been rejected before they were completely formed, on account of flaws and imperfections. Dr. Hart thinks it highly probable that a deer of the extinct species, *Cervus Megacerus*, a part of whose skeleton is in the Royal Irish Academy's collection, had been wounded by an arrow in one of the ribs; but Professor Owen disputes this conclusion. Another art in which the primeval inhabitants of Ireland had made some progress was that of pottery: several drawings and specimens of urns, from the sepulchres of the most ancient period, were exhibited; and it was mentioned, that sometimes the pattern had been impressed by tying down on the soft clay a piece of knitted woollen cloth. This shows that they had sheep, and were able to apply their fleeces to account as clothing; indeed, implements have been discovered, made of the bones of the sheep, the ox, and the deer; and the bones of the hog and the dog have also been found, both in their habitations and their sepulchres. They must, therefore, have had property and the rudiments of law; and were advanced beyond the fishing and hunting state, in which some modern

archæologists are disposed to place them. Their clothing, of course, included the knitted woollen fabric of which the impression is sometimes found on the pottery; and also, doubtless, the skins of beasts. An account was given of the remains of a young man, so clothed, whose body was found in a bog at Mount Bellew, as described by Mr. Petrie. Mr. Porter stated that, in his opinion, the singular golden ornaments, resembling collars, and double cups connected by a curved bar, belonged to this primeval period in the history of man. Gold, being found native, is often gathered and wrought by people who are quite unacquainted with any other metal. Perhaps the division of the world's duration into the ages of gold, of silver, of brass and iron, might originally have had an historical reference to the successive inventions in the arts of life, as well as that moral application to which the poets have restricted it. In reference to the habitations of the people, an account was given of the wooden house found, under sixteen feet of bog, in the county of Donegal, and described by Captain Mudge, which, though skilfully framed, mortised, and grooved, was manifestly made by people who had no metal tools, and who subsisted largely on hazel nuts for food; but it was stated that the more common dwelling-places were circular, generally depressed in the ground, surrounded with a low wall of uncemented stone, and probably thatched with heather, reeds, or bent. Mr. Porter did not conceive it to be proved, that the use of corn was then known, or agriculture practised. The low wall of their common habitations may have given rise to the circular stone forts, consisting of large stones, uncemented, but wedged tightly together, such as Staigue Fort, in Kerry; Greenan, in the neighbourhood of Londonderry; and Dun Aengus, in Arran Isle, off the coast of Galway. The different modes of burying practised by this ancient people were enumerated:—simple interment in shallow graves; in kist-vaens or rude stone coffins; under cromlechs, cairns, and raths; of which several kinds were described, and illustrated by drawings; as also funereal urns found beside the unburnt bones under raths and cromlechs, showing that inhumation and concremation were both in use at the same time. Pillar-stones belonging to this period were described. No idols, nor any object apparently designed for idolatrous use, has yet been discovered in the remains of this primeval race; while the arrows, weapons, utensils, &c., found in the urns and sepulchres, manifestly show a rude anticipation of a future state. On the whole, it was concluded, that the state of society and manners among the people who, at an unknown era, first occupied the soil of Ireland, was much farther advanced than some recent inquirers seemed disposed to admit: although no historical reliance can be placed on the tales of bards and seannachies, or the chronicles complied by uncritical annalists, thousands of years after the date to which they profess to carry back their narratives. Mr. Porter concluded by expressing his belief, grounded on the evidence afforded by the primitive burying-places, that the people who first inhabited Ireland, whoever they may have been, were not swept away or extirpated by a succeeding body of invaders, as has been contended by some archæologists. Skulls, which these inquirers look upon as characteristic of the two races, are often found in the same sepulchre, manifestly deposited there at, or very nearly at, the same time; showing that the two races, if they were really distinct, had dwelt amicably together, and were laid by survivors, side by side, to sleep peacefully in a common grave.

DUBLIN NATURAL HISTORY SOCIETY.

DECEMBER 9TH, 1853.

THE usual meeting of the members of the Society was held at their Rooms, 212, Great Brunswick-street, on Friday evening, the 9th instant,

CHARLES FARRAN, Esq., M.D., in the chair.

The minutes and introductory business being confirmed and disposed of,

Mr. Kinahan begged to present to the Society, from Doctor Corrigan, a fine specimen of the spiny-cross fish (Uraster Glacialis), also Muller's topknot (Rhombus

hirtus), both taken in Dalkey Sound; and from himself the reddish grey bat (Vespertilio Nattereri), captured in the county of Kildare.

Doctor Gordon begged to propose a vote of thanks to the donors, and in doing so he could not avoid remarking on the great value and practical importance of thoroughly examining and discussing in the Society every point of interest connected with such donations. It was in that manner that natural history was made a useful and an improving study, and such notes of inquiry being given at the time, made the records of any donations doubly valuable, and at the same time had the effect of greatly encouraging and interesting donors to seek further objects that might be equally attractive to the pursuits of the Society. The monthly numbers of the "Annals of Natural History" bore testimony to the labours of J. E. Gray, Esq., of the British Museum, who was indefatigable in his investigations to bring to light any new features of interest, or in forming more correct classifications in the zoological department of the museum. This being seconded and responded to,

Mr. Kinahan read the following paper on the occurrence of Nattereri's bat in the county Kildare:—Mr. Chairman and Gentlemen—The bats, particularly in Britain, have been long confessedly a little known, because an almost unstudied, family; and hence, every observation made concerning them or their habits has an interest for the naturalist. It is, therefore, with feelings of great pleasure that I rise to-night to lay before your Society some new, and, as I hope, though scanty, interesting observations made when, last summer, along with a friend, I had the good fortune to discover a new locality for the reddish-grey or fringe-winged bat (V. Nattereri). This bat, very local in England, in this country is to be numbered among the many new animals brought to light by the exertions of your Society and its members, as its first record as an Irish bat was owing to a specimen, killed by G. Mangan, Esq., at the Scalp, county Dublin, near Enniskerry, and by him presented to the Dublin Natural History Society, through F. M'Coy, Esq., by whom a paper on it was read at your meeting in February, 1845. Mr. M'Coy was unable to furnish any details concerning its habits. The specimens on the table were obtained in Levitstown, in the county Kildare, under the following circumstances:—For the first recent specimens of this bat I was indebted to Frederick Haughton, Esq., Levitstown, by whom they were shot on the river Barrow, on the 22d of June; they were handed to me, with the remark that they appeared to him lighter in colour than the bats he was accustomed to see about the place. On examination it was soon evident what they were; and having learnt from Mr. H. that he thought they had their nest in Tankardstown-bridge, as he had himself counted thirty-five and upwards flying out of a hole in it, and had been credibly informed that fifty-three were seen, I determined to examine the locality. The place pointed out was a set of small holes in one of the triangular abutments of the bridge, situated about four feet from the water at its ordinary height, and evidently containing a large colony, as the stones around its edge were polished and shining with the feet of the little animals running over them. On poking a switch into one of the holes, a loud chirping and clicking was immediately set up; but as nothing could be done, on account of the earliness of the hour, we let them alone till evening, when, armed with a guage butterfly net and an ordinary landing net, we again rowed to the place, where a loud chirping, squeaking, and clicking announced that our little friends were already on the alert—this was 8.30; it was, however, 9.30 before they made their appearance, though all this time a great scrambling and scuffling was audible from the hole. This evening we captured three, and counted (including captives) forty-one bats coming out, between 9.30 and 10.30, and when we left, there seemed as many more in the hole, at least the chirping and scrambling was as loud as ever. On arriving at home we examined our captives, which turned out to be two full-grown female specimens of Natterer's bat (V. Nattereri), and one female Pipistrelle (V. Pipistrellus). The next night we proceeded again to the hole, and the bats began to fly precisely to the minute at 9.30. We remarked, however, several bats coming up the river half an hour earlier, either from Levitstown mills, or from an old church which here overhangs the river. The evening was dark and cloudy, and the night growing gradually more tempestuous, Natterer's bat began to return to their nest at 10, flying about our heads, and almost mobbing us. The following day was wet and stormy, and though the evening cleared up,

yet it continued so cold that only one bat came out, and one stranger was seen on the river, and when left them, at 10.30, all was quiet in the hole. The next day we did not disturb them at all. The 27th was a wet day; it cleared up in the evening; though still cold, seventeen bats came out; they had, however, grown very wary and learned to dodge the net, and would not come out unless all was quiet—they also first took a peep out to see that all was clear, running back if the net was not held perfectly steady; so acute was their hearing, that every time the gunwale of the boat touched the pier of the bridge, no matter how gently, there was a loud cry of alarm from the hole, which I did not hear except then; and whenever a bat ran back from the net after this cry, all would grow quiet again for about five minutes, and then the scuffling, scrambling, and squealing would begin again, and in a few moments they would begin to come out. It was perfectly possible to distinguish the two, both on the wing and when coming out of the hole—V. Nattereri coming to its mouth, and thence flying straight out; whilst the Pipistrelle crept to the edge of the pier, and letting himself fall from thence, flew off. This, added to the latter's being more wary and active in dodging the net, rendered him more difficult to capture, and to retain when captured, as out of three, supposed to be of this species captured, I was only able to retain one. V. Nattereri does not fly as rapidly nor make such quick turns as the Pipistrelle, and when struck into the water, floundered in it so as to enable me to catch him, while the Pipistrelle, under similar circumstances, just touched it and was off. The cry of the Pipistrelle is much shriller than that of the other. There was also an unmistakeably fetid odour from the Pipistrelle, which I did not remark from Natterer's bat. I would say that of the bats counted each night the following were the proportions:—

June 23rd, Natterer's bat, twenty-seven; Pipistrelle, fourteen. 24th, Natterer's bat, twenty; Pipistrelle, nine. 25th, Natterer's bat, one. 27th, Natterer's bat, eleven; Pipistrelle, six. So that Natterer's bat appears to be the commoner of the two, though this might arise from the Pipistrelle not beginning to fly till half an hour later than the other. On confinement their manners are very different; the Pipistrelle being impatient, squealing, and biting like a little fury, and running up and down the sides of the net; while Natterer's bat was gentle, submitting to be handled, merely gaping with its mouth, and uttering a soft, low chirp; both species used the exserted tip of the tail as an additional foot. Out of the specimens of Natterer's bat captured or shot, the proportion of sexes were seven females and two males. One of Natterer's bats lived for two days with us, and fed on flies very readily, and on raw meat. I remarked, however, that when the fly was not moving before his eyes, the bat took no notice of it, although the fly was touching its nose, or walking over its ears and head. I attempted to keep the others alive; but though they fed well with me for some days, the journey up in the train killed them. I did not remark the great insensibility to the proximity of objects, which, according to Spallangani, is so well marked in some species, as one of them, which escaped from us in the house, struck himself repeatedly against the ceiling and corners of the room, in his efforts to elude recapture. I remarked, too, that several of them flew straight into the net when held perfectly steady before the hole. Save in a few particulars, the bats answered nearly to the description given in Bell's "British Quadrupeds." There was a well-marked sulcus between the nostrils; the sebaceous follicles not well-marked; exserted portion of tail, a line and a half in length; interfemoral, with from eight to fourteen bands. This character is, it would seem, of secondary importance, as the number of bands vary in my specimens. The male and the female differ slightly in dimensions, the female being the larger. The under surface of the latter, particularly the wings, was lighter than the former. The hind claws are thick and clumsy, and ciliated with stiff white hairs. The distribution of this bat is curious, as in England it has only occurred in the eastern counties, and in this country the only two counties it has hitherto been recorded—Dublin and Kildare—are to the east, though I am sure it will, if looked for, be found in other counties also. I regret I have not any more information to supply your Society with in regard to the bat presented last February by me, as, owing to want of specimens for comparison, I am still in doubt what species to refer it to, as in its characters it partakes of those of both V. Daubentonii and Mystacinus Bell. It also resembles in one respect the species under consideration (V. Nattereri)—viz.,

a slight fringe to the interfemoral; but it differs so much in other respects, that I do not think it can be this bat, being much darker in the membranes and back and ears, and lighter on the belly; the fur, too, is of a different texture; it is also slightly smaller, and the tragus differs. In conclusion, I beg to lay before you a local list of the distribution of the mammalia of part of Carlow, Kildare, and Queen's County, for which I am indebted to the kindness of the same gentleman who gave me the bats—F. Haughton, Esq. :—

Pipistrelle—common, one, captured in 1853, in company with the next, at Levitstown, county Kildare. Reddish-gray bat—nine, captured June, 1853, in Tankardstown-bridge, Levitstown, county Kildare—common, though, perhaps, local. Hedgehog—common. Badger—Kilmarony woods, Queen's County, rare. Otters, river Barrow—very common. Stoat—very common. Common fox—very common. Long-tailed field-mouse—common; Levitstown. Common mouse—very common. Black rat—Carlow; single specimen killed. Norway rat—common everywhere. Common marten—very rare; last seen about ten years since at Bestfield, Carlow. A skin obtained at Mount Leinster, county Carlow, eighteen years since, was sent to the late Mr. Vigors, by S. Haughton, Esq. Irish, or varying hare—rather rare; Oakpark. Rabbit—common. Common squirrel—very rare; existed formerly in Pollerton, county Carlow, and said still to be found in Burton Hall woods. This list, though containing but few rarities, is of importance, as all authentic local lists are valuable. It contains but four rare animals—the squirrel, concerning which many doubt its ever having been indigenous; it is said, in Rutty's "History of Dublin," to have been found in Luttrellstown woods, near this city; and there is a tradition that they used to be found near Clondalkin. The other three rarities are—the marten, the black rat, and the badger, all of which, from various causes, are becoming more and more rare in this country. There is one remarkable omission in the list, the long-eared bat, which we might have expected to find. I made myself particular inquiries about it, and could get no tidings of it; so I suppose it does not exist here.

Mr. Williams and Mr. Montgomery said, that they were of opinion that in the more remote districts these animals were still frequent. The badger, Mr. Williams observed, was constantly met with in parts of Kerry; and Mr. Montgomery stated that in Mayo and Donegal both the badger and marten were not scarce.

Mr. Andrews said he could confirm Mr. Williams's statement that the badger was not uncommon in parts of Kerry. In some of the lonely recesses of the natural woods, the marten was very frequent, and did much damage in destroying the young of the game-birds of the country. Mr. Andrews had every reason to believe that the true wild-cat was at one time well known in the Fiadhghleanna, or wild glens of the western parts of Kerry, for the description he got of it was totally different from that of the marten. The marten was called in Kerry "cat crann" (cat of the wood), and the wild cat known as the "cat fiadhachd" (hunting cat). The black rat, some years since, was very plentiful at a farm near Ballynunnery, County Carlow. Mr. Andrews then read a paper on the Malacorynchus membranaceus. This handsome species of duck was shot in the month of February last, on the east side of Inch Island, Dingle Bay, in Castlemaine harbour, by a person who was in the habit of looking for water-fowl. There had been previously severe gales from the south-west, and he had noticed some birds which he considered were teal, or the small brown widgeon. A flock of six birds were feeding in a muddy creek, and firing among them, the present specimen was the only one shot. He preserved the bird for Mr. Ross Townsend, who at once saw that it was a species perfectly new to him, and very kindly forwarded it to me in June last. Having submitted to you this addition to the ornithology of this country, I am not so much surprised at this instance, from the notices already, and but very recently, recorded, of many rare birds, such as the spotted eagle, Aquila nævia, of eastern Europe and of Africa; the bee-eater, Merops apiastur, &c.; and now, that the taste for the natural sciences is more widely diffusing, we may look forward to and expect in the several branches equally interesting additions to our fauna.

Doctor Farran, the chairman, observed that such an addition to the ornithology

of Great Britain had, indeed, an interest beyond any record of the kind he had heard of in their country, and he was much pleased at the manner in which Mr. Andrews had so concisely reviewed the interest of such a discovery, and had so appropriately applied referential causes.

Mr. Montgomery exhibited specimens of the great cinereous shrike (Lanius excubitor) and the black-capped warbler (Motacilla atracapilla), both shot by him in Beaulieu wood, County Louth.

J. E. Gray, Esq., of the British Museum, being proposed by Mr. Andrews, seconded by Dr. Gordon, was unanimously elected an honorary member.

The ballot having been announced, Walter Lyndsay, Esq., Rathmines, and William Compton Domville, Esq., of Santry House, were duly elected members.

The Society then adjourned to January.

JANUARY 13, 1854.

A MEETING of the members was held at their rooms, 212, Great Brunswick-street, on Friday evening, the 13th instant,

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

The minutes and preliminary business being disposed of, the following donations were announced:—

Presented by James R. Dombrain, Esq., two handsome specimens, male and female, of the red or common squirrel (Sciurus vulgaris), which were shot at Avonmore, county of Wicklow; and, by the same gentleman, a specimen of the godwit. Mr. Dombrain obtained this bird from a fisherman at the Pigeon-house, who found it nearly drowned, having taken one of the hooks.

Mr. Ffennell observed, that the squirrel was not uncommon in many parts of Ireland; at Lough Inagh, in Connemara, it was very numerous.

Mr. Kinahan presented two specimens of the wood-mouse, or long-tailed field-mouse (Mus sylvaticus), male and female; and Mr. R. P. Williams presented a specimen of the black scoter duck (Oidemia nigra), shot near Sallins.

Thanks having been passed to the donors,

Professor Allman described a remarkable condition which he had observed in some of the adventitious roots of a specimen of *Jussiæa grandiflora*, growing 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 at the bottom of the water in which the plant grows, assume an ascending direction and grow into the air, where they present a very singular appearance, looking like portions of rush-pith attached to the stem of the plant. When examined by the microscope, they are found to have a central, slightly-developed, woody axis, round which is a peculiar structure, formed of exceedingly delicate stellate cells, having between them large intercellular spaces, and constituting one of the most regular and beautiful examples of a system of air-chambers to be found, perhaps, in the whole vegetable kingdom. A singular fact connected with these air-chambers is, that they are not surrounded by any epidermal investment, but open directly into the external air. Professor Allman also mentioned his discovery of a remarkable peculiarity of the woody fibres of the same plant, namely, the fact of these fibres being filled with starch granules, a condition of prosenchymatous tissue almost unique in the vegetable kingdom.

Mr. Andrews then read the following

REMARKS ON HARBOUR FISH AND ON THE FORMATION OF PISCINÆ.

He said—I had some time since proposed to give a paper with reference to the harbour fish of the south-west coast of this country, viz.—of such as were permanent residenters in our harbours and estuaries, and of such that visited the harbours during the seasons of spawning. I found, however, from my notes, that it would be a subject of such magnitude, that the interest and importance would ill be conveyed within the limits of a paper which the rules of our evening meetings prescribe. In

this statement, I shall as briefly as possible remark on some of the peculiarities and habits of those fish that are easily obtainable in our harbours throughout the seasons, for the object not at the present of treating on their economical uses, but of creating an interest in a physiological point of view, by observing, in those large glass cisterns or tanks, which may be termed "piscinæ," the habits, the modes of progression, and the seeking of food which influence marine animals. Most are aware of the great pleasure generally afforded to the visitors during the last year at the Zoological Gardens, London, in the examination of the numerous marine and fresh water fishes, and of the Chelonia, or Tortoises, which were seen in the full beauty and spirit of life in the large crystal cisterns and troughs. In the following, I shall allude principally to the smaller kinds, chiefly marine, that would form objects of interest in their investigation: and in many instances, may lead to views entirely new, as the absence hitherto of such facilities have led to decisions, and put forward in ichthyological works, too, at variance with physiological facts. Mr. Andrews then went through the classifications of the several genera of our marine fish, and said that, among the Percidæ, or family of perches, the greater and lesser, weevers, (Trachinus draco, and T. vipera), were singular in their habits. The latter is most frequently met in sandy inlets; and I have, in several cases, witnessed the severe effects of its wound. It is well known in Kerry as the sting-fish; and it is surprising, that some works on ichthyology still represent the injury to be caused by the dorsal spine; but my friend, Dr. Allman, has clearly proved the action to be from the strong opercular spine. It is a pretty fish, streaked with brown and yellow, and with silvery abdomen; having its eyes fixed upwards, like the gobies, it settles in the sand watching the approach of its prey. A few specimens of T. draco have been met in Ventry Harbour. Of the same family, the striped red mullet (Mullus sarmuletus) is of most remarkable beauty in its living state, its scales being of a brilliant red, passing into a silvery pink on the belly. In confinement, it timidly moves about, waving its barbels to and fro, as organs of touch. It is frequently taken in the herring-nets, at the entrance of Ventry harbour, and is probably by no means uncommon there; and, when taken from the nets, exhibits great brilliancy of colouring. Its scales are easily rubbed from the body, so that those seen in the fish shops of London are rarely good specimens, the scales being all detached by the working of the trawl-net they are taken in. The Basse, or sea perch (Labrax lupus), is beautiful at seasons in Brandon Creek, and, like several of our marine fish, thrives well, kept permanently in fresh water. Under the head of the mailed cheeks, or Gurnard family, are the several species of bull-heads, such as Cottus scorpius, and C. bubalis, which are most amusing when captured. Some give a slight hissing sound, and make their formidable spines very prominent by the inflation of the head. Nothing can equal the extreme beauty of the Cottus Greenlandiæus, or Greenland bull-heads, fine specimens of which were taken in Dingle harbour—the richest tints of carmine and deep morone, with spots and barrings of most vivid brilliancy, characterise these beautiful fish in the state of life. The ova, or roe, is different from that of the other species, being of a fine scarlet, and which was remarkable in the species I dissected. The natives of Greenland are fond of this fish, and even eat the roe in a raw state. Of the sticklebacks, the ten-spined and fifteen-spined frequent the harbours, particularly the latter (Gasterostens spinachia) in great numbers in Dingle harbour. They are taken in the sean: and I have admired their playfulness and extreme beauty when placed in a tub of water. Except in anger or alarm, they do not exhibit their spines, but which lie closely adpressed to the dorsal ridge, in a sulcated groove. They are interesting in their movements in seeking and attacking their prey; and the tangled masses of Fucus serratus and confervæ, among which they form their nests and deposit their eggs, it unshyingly, almost immediately after capture, seizes the food offered. Passing over many species and families, which are altogether deep-water fish, the next presents the riband-shaped form (the Tænioidæ), in which is the beautiful cepola rubesceas, red-band fish, which assumes the richest carmine to a pale rose-tint. It has frequently been taken on the West Coast, and sometimes cast ashore among sea-weeds after a gale of wind. It is met at low spring-tides among the stems of laminaria and the stronger fuci. It would form a beautiful object in one of the crystal cisterns, and to observe its sinuously-gliding motions between the

stems of sea-plants, its eyes large in proportion to its head, directed in pursuit of the soft molluscous animals upon which it preys. Through the kindness of Dr. Farran, I obtained a specimen from the South Coast. Of the Mugilidæ, the mullets are among the most lively and playful of our harbour fish. The grey mullet Mugil capita) are in great numbers in Ventry harbour, and of large size. Every water seems suited to their growth—salt, brackish, and fresh—and they are easily fed. The atherine, or sand-smelt (Atherina presbyter) are in abundance in Dingle harbour, and frequent sandy inlets in the winter and spring months in great numbers, at which seasons they are in prime state for the table. They are in Dingle harbour all through the year, but in spring, approach the shore to spawn. The next contains a great many pretty species among the Gobiodiæ, or the gobies. The spotted gunnell (Gunnellus gullata) is very numerous in Dingle harbour, and called the butter-fish, from the unctious feel of the body. It is every tint of rich brown, yellow, and purple; and the large dark spots in some specimens are very conspicuous along the line of the dorsal fin. Young specimens of the sea-wolf Anarrhecus lupus) have been taken in Dingle harbour. The black gobie—Gobius niger—beautiful in the spawning seasons with the deeper shades it assumes, and the rich orange tints of its dorsal fins, are plentiful in Dingle harbour; and also the spotted, the one-spotted, and the double-spotted gobies have all been taken in Dingle and Ventry harbours. In Ventry harbour I met with a very beautiful species, presumed to be the Gobius reticulatus, peculiar to the Mediterranean, and distinguished by the rich rosy tints of its dorsal fins. In a calm and sunny day, in the month of August, and in a little sheltered inlet in Sneem harbour, I watched for some time the movements of multitudes of gobies. I was surprised at the number of black gobie, which occupied, with their young, a muddy recess between rocks, from which they occasionally darted, seizing and returning with their prey. The shanny (Pholis lævis) was more exposed, and in sandy grounds; they occasionally rose to the surface perpendicularly with the aid of the pectoral fins, and with the aid of the same movement appeared singularly to raise themselves, or creep up the face of any perpendicular rock or stone. Both these species had numerous young, which they seemed carefully to protect. The speckled gobies were in clear, sandy and sunny spots, and the two-spotted gobies remained near the surface, perfectly motionless. Of the dragonets I have only met in the harbour the Sordid dragonet (C. dracunculus), which possesses no beauty. The family of Wrasses, or Labridæ, vie with all others in the brilliancy and gaudiness of their colours. Of these I have obtained Labrus maculata, L. lineatus, and L. variegatus, and beautiful specimens of the three spotted wrasse L. trimaculatus, in Valencia harbour—its colour most brilliant rose and reddish orange. In the sean, in Dingle harbour, I have taken the Comber wrasse (L. Comber), and a beautiful little wrasse marked with a lateral band, similar to the Rainbow wrasse, but having the abdomen reddish, and the head marked with wavy orange lines. The Goldsinny, or Goldfinny (Crenilæbrus cornubrensis), I have taken in numbers; it is an extremely beautiful fish. I am certain that others of the Crenalabri will be met with on the coast of Kerry, and even some that are peculiar to the Mediterranean. There is no class of fishes that would be more beautiful in a vivarium, nor none that could be more easily fed, living as they do upon crustacea and the harder mollusca, which their jaws, armed with strong conical teeth, enable them to crush. The Esocidæ include the garfish (Esox vulgare), and which, in the young state, has afforded to me some degree of interest in the examination, particularly with reference to the supposed existence in our seas of a species of Hœmiramphus. However, the numerous opportunities I had of examining the different stages of growth, confirmed me in the opinion that the Hœmiramphus Europæus was no other than the young of the garfish, and that the young state of Esox alone presented an undeveloped form of the upper jaw, but which gradually extended in growth until maturity perfected its equal development with the lower jaw. In July, immense numbers enter the harbours of Dingle and Ventry, seeking the fry of other fish, and to spawn, and they are taken in numbers in the sean, little cared for as food, but are eagerly bought up by the fishermen for bait. In October and November, the young appear. There are multitudes of others I shall pass over, and some, although taken in the harbours, much longer continue in fresh water, as the Salmonide, and which merely frequent at periods the salt water

estuaries. The several species of Motella, the three, four, and five-bearded rocklings, are frequent in Dingle and Ventry harbours, and I have taken in a boat trawl in Ventry, the mackerel midge, the beautiful little Motella glauca. Of the Pleuronectidæ, many in the young state are to be met with in the harbours. In the summer months, the French or lemon sole (Solea pogusa), and the variegated sole (Monochirus variegatus), are not uncommon in Ventry harbour. The Cyclopteridæ, or suckers, are many of them frequent; the Cyclopterius lumpus has been taken of large size in Castlemaine harbour, sometimes frequenting the salmon weirs. In some specimens the belly is of a rich azure. The Cornish sucker (Lepidogalter cornubiensis), has been taken at low water, attached to the stones in Smerwick harbour, its light tinge of carmine hue attracting attention. All the known British species of the pipe fishes (Sygnathidæ) I have obtained on the south west coast; some are beautifully and vividly marked in the living state, and their singular marsupial habits would render observance of their movements and peculiarities interesting. The deep-nosed pipe fish (Sygnathus typhle) I met rather abundantly in the spring months in Dingle harbour, and the Oquoreal pipe fish (Acestra oquorea) more frequent during summer. The Hippocampus brevirostris, short-nosed sea-horse, has been taken at low water in Smerwick, adhering in its peculiar manner to the rigid stems of cistoseira. Fish, like the gay plumage of our birds, assume their gaudiest tints in the bridal season, and this is remarkably seen in the Sygnathidæ, in the Cottidæ, and in the Gobies. Skates and rays, and the singular horney pouches containing the young, are met in all the harbours; but sufficient has been said of the interest that exists to the naturalist, and which a dredge and a small boat-sean can always command the capture of. To follow out more closely such investigations, how interesting would be the experiments resulting from daily examination of the habits of these different fish placed in those large tanks, with shingly and sandy beds, rock, and with sea plants and confervæ, to please their habits and tastes. Thus, beautiful fields of interest are laid open to the astonishment of the admirers of nature's works, and the hidden mysteries of the tenants of the deep, unveiled and unravelled to physiological science. In the large cisterns of the vivaria at the Zoological Gardens, I have watched with interest the perfect lifelessness of the pike and the perch —they appeared like beautifully varnished specimens suspended in the fluid—motionless and inanimate, and no perceptible pulsation of the operculi or gill covers. Living in an element heavier than air, and suspended in a liquid of nearly the same specific gravity as their own bodies, their forms are beautifully proportioned to offer the least resistible force to progression, while the muscular powers of the tail in some and of the pectoral fins in others are admirably adapted to rapid movements of progression and of elevation. Fishes, of all vertebrated animals, are said to be the least sensitive of emotions of pain or pleasure; their organs or sensation awaken no impressions; rigid in countenance, and eyes almost immoveable, and which no tears dim, nor eyelids protect, they seem, with all their beauty of form and brilliancy of colour, mere automatons in sensibility, and mute as the silent depths they inhabit. This in the fullest extent is not strictly accurate, for they recognise the hand that feeds them, and follow apparently with joy and sportive liveliness the movements of those that protect them. Mr. Andrews then alluded to the great interest of the vivarium which some years had been formed and kept up by Mr. Bland, of Derriquin Castle, Kenmare Bay. In an inlet, guarded by reefs of rocks in Sneem harbour, a strong barrier of stones had been closely formed across the entrance, out through which every tide flowed and ebbed, leaving a sufficiency of water within. In this, mullet, whiting, bream, soles, and plaice succeeded best—haddock did also well, but gurnards became paler in colour. Whiting became so tame as to feed out of the hand, and all assembled at the feeding time at the appearance of the tray; all seemed fond of potatoes. This singular character is strikingly shown in the natatores, particularly in the mergansers and sheldrakes, birds whose formation of bill appear only adapted to feed on the shellfish and soft mollusca, their habitual diet. When tamed or domesticated they greedily eat potatoes, altogether rejecting the food of their wild habits. Many admirable positions existed on the west coast for the formation of extensive marine store ponds, and where turbot, soles, haddock, cod, and lobsters could be securely stored, and made available in times of scarcity and boisterous weather. Under such circumstances, the artificial

propagation of the turbot, the sole, and the codfish and haddock, could, with the same results, be accomplished from the spawn, as the propagation of the ova from the salmon or trout.

The Chairman considered the subject brought forward was one of great value, not alone to the scientific man, but in a practical and economical point of view. He could confirm, with regard to the fisheries, how useful the formation of those store ponds would be. At the island of Inishtrahull, about six miles from Malin Head, off the coast of Derry, he had observed the islanders were prepared to bring fish to vessels passing the island. The fishermen of that island had very fine whale boats, which were sheltered and drawn up in a sandy creek. In a store pond, naturally formed in the island, the fish taken by them, such as turbot and other prime fish, were deposited, and they were always prepared to put fish on board the steamer passing from Sligo to Glasgow, or to Liverpool.

Mr. Ffennell, commissioner of fisheries, observed that the concluding part of Mr. Andrews's statement was one of great importance, and as it bore upon the artificial propagation of fish, he would take the opportunity of saying a few words as to what was doing in the salmon fisheries of this country. He had received a large quantity of the impregnated ova, and he had sent about 30,000 to Mr. Cane's, at St. Woolstan's, for the purpose of carrying on the propagation in the Liffey. Mr. Ffennell said he had a large quantity of the ova, which he was experimenting on at the Custom-house, and he would, from time to time, present to the Society phials of the ova, showing the progressive development; and he would further be most happy to assist any who were desirous of following similar experiments and investigations. Mr. Ffennel was also happy to say, that the young fry which created so much interest at the Exhibition, were thriving and growing well. A few days since he took one with a small net from the tank, of which he had an accurate drawing and measurements made. Its length was 4½ inches, showing the size of growth from the time he first got them in June. At that time they were barely an inch in length. If any of the members call at the Custom-house, it would give him much pleasure to show them.

Mr. George A. Pollock said, that in the time of the Earl of Hardwicke, the Irish fisheries were considered of the highest importance; and it was remarked, in a correspondence, that it was one of the principles inculcated on the members at their election, that they should support the Irish fisheries.

After some interesting discussion the ballot was declared, and James Haughton, Esq., of Moorfields, Roebuck, was elected a member. The meeting then adjourned to February.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

OCTOBER 22, 1853.

Dr. BALL, President, in the chair.

J. O. Westwood, Esq., F.R.S., &c., &c., being proposed and seconded, was unanimously elected a corresponding member.

Mr. Hogan read the following note by J. Walter Lea, Esq., Corresponding Member :—

PARASITIC (?) MOTH FOUND IN THE PUPA OF LASIOCAMPA TRIFOLII.

In the course of the early summer of 1848 I found a caterpillar of Lasiocampa trifolii, in the vicinity of Oxford, which throve satisfactorily, and in due time entered the pupa state, having formed its cocoon in the regular compact oval form peculiar to it. Instead, however, of the imago appearing, as it should have done, in July or August, it continued in the pupa state the whole of the summer, autumn, and winter of that year, and also through the spring and summer of 1849. I then thought it must be dead, and opened the cocoon to ascertain the fact, when I found it not only alive, but quite lively, and apparently in perfect health. Having carefully

closed the cocoon, I replaced it in the box where I was preserving it, and looked at it from time to time during the autumn and early winter of the same year, always finding it alive and lively, and very carefully closing the cocoon and box after each examination, so that no mischief should happen to it. In the beginning of 1850, the pupa ceased to show signs of life, when examined and handled; but, not knowing what to make of it, I took redoubled care of it, and kept it by me all through the summer and autumn of the year; but towards Christmas, being persuaded that it must be really dead, I at last resolved to open it, which I did, and the first thing that I saw, on making an opening in the puparium, was the head and eyes of a small moth, moving about rapidly, and in the most lively manner. A few moments sufficed to exhume the little creature, which was about the size, and had very much the general appearance of Margaritia hyalinalis. It was very lively, and walked quickly about the table, moving its antennæ in all directions. The wings were all shrivelled and crumpled together, so that I could make but very little of them, nor did they in the least expand with exercise. The inside of the puparium of the Lasiocampa trifolii was filled with a dry, pale powder, and I could find no trace of any cocoon, or vestige of any kind, of the moth which I had just extracted from it. There was no evidence to show how long it had been there; and as it was manifestly far too small and feeble to make any opening in its prison, by its own efforts, it must have remained there until it died, had I not opportunely set it free. It did not occupy more than one-sixth of the interior of the puparium, and lay in a reversed position, with the apex of the abdomen in the place of the head of the proper occupant. It was quite unable to turn itself round inside the case, as it was too long, and also the whole space, which it did not fill, was well filled with the dry powder above mentioned. A rigid examination showed no opening in the puparium through which anything could have entered; and, indeed, the pupa had been too carefully preserved to be within the reach of accident or enemies. Most unfortunately, before I had completed my investigations, I was suddenly called away, and in my absence the whole was swept away and destroyed by a servant. I took no memorandum of it at the time, being exceedingly busy, but I have the clearest recollection of the circumstances, and can answer for the facts being in every particular correct. I cannot explain the matter, and should be very glad of any light that can be thrown upon it.

Professor Allman remarked, that if truly parasitic, the insect would, doubtless, have been provided with some means of effecting its escape.

The Rev. Joseph Greene said, that he thought it was not a parasitic moth, or it would not have been so placed in the pupa; for even if it had been endowed with the power of secreting acid, it would, in all probability, not have been able to make its escape, as in all normal cases the parasite was placed with its head in the same place as that of the natural occupant; he thought it would yet be proved that moths were not parasitic on moths.

Mr. Hogan stated, that he had mentioned the case to Mr. Westwood, who observed that the subject was still very much in the dark.

Dr. Ball exhibited Sphærii, attached to the larva and pupa of Lepidopterous insects, from Kelso Bay, New Zealand.

NOVEMBER 5, 1853.

Dr. Ball, President, in the chair.

Mr. E. P. Wright announced the following donations of books:—Historia Naturalis Orcadensis, Part I., from Dr. W. B. Baikee, and the Annual Address to the Dublin Geological Society, by Dr. Ball.

The Rev. J. Green exhibited a pupa of Steropus fagi, partially formed of a beech leaf, and from which the external membrane had been removed without disturbing the venation of the leaf.

Dr. Ball exhibited a specimen of the fork-tailed Petril (Thalassidroma Leachii), shot near Clontarf; also some Radiata, found floating on the sea, near the West Indies, which Professor E. Forbes pronounced to be a species of Glaucus; and some Gulf weed, taken by Mr. Hassal, in lat. 21° 10′, long. 37° 20′, in February,

1853. The weed was covered with campanulæ, which were still alive; thus forming a miniature vivarium.

Some conversation then ensued relative to the so-called Aztec children.

Professor Forbes stated, that Mr. Connolly of London said he could find instances perfectly similar to them in this country, allowing for difference of race, &c.

Dr. Carte said, that they were by no means so old as was imagined; he had had an opportunity of examining the teeth of one of them, who could not have been more than eight years old.

Dr. Ball exhibited skulls of various races, to illustrate the flattened character which some of them possessed in a great degree.

Mr. E. P. Wright read a letter from R. Davis, Esq., Clonmel, relative to the appearance of the Dotterel and other birds.

NOVEMBER 19, 1853.

Dr. Ball, President, in the chair.

Mr. Hogan read the following note on the larvæ of Diglossa mersa, by J. O. Westwood, Esq.:—

"I have carefully examined and dissected the little larvæ you gave me as those of Diglossa mersa; I find them very interesting animals, and differing very much from the ordinary type of Staphylinideous larvæ. The articulated caudal appendages, which are so much developed in the larvæ of Staphylinus and all the other larvæ of the family which I had previously examined, are in these larvæ reduced to a very minute but *still articulated* pair of lateral setæ, much shorter than the joint to which they are attached. The mandibles will do well for a Staphyline's larvæ; but the maxillæ are quite unlike those of any other larvæ I know, being long and like the blade of a sword, with a short palpus on the dilated handle or base. As Diglossa itself is such an aberrant form, I suppose, under all the above circumstances, that the larvæ may belong to it rather than to any other Necrophagous group."

The Rev. J. Greene exhibited a box of rare Lepidoptera, among which were specimens of Acronycta euphorbiæ.

Mr. Hogan then read the first part of a

CATALOGUE OF COLEOPTERA FOUND IN THE NEIGHBOURHOOD OF DUBLIN.

Imperfect though a list such as the following must necessarily be, I trust that it will be of use in assisting to determine the limits of distribution which exist among our native beetles.

Much of the information contained in this catalogue has been communicated to me by A. H. Haliday, Esq., and Alfred Furlong, Esq., for whose kind assistance I have great pleasure in returning my best thanks. The names of the genera are those adopted by the late Mr. Stephens in his "Manual of British Coleoptera."

Cicindela campestris, *L.* Killiney beach.
Demetrias atricapillus, *L.* Killiney and Portmarnock.
Dromius quadrimaculatus, *L.* Under the bark of trees, common.
,, linearis, *Ol.* Portmarnock, &c.
,, fasciatus, *F.* Killiney and Portmarnock.
,, foveolus, *Gyl.* Portmarnock.
,, truncatellus, *L.* Ditto.
,, meridionalis, *Ste.* Cherrywood, Loughlinstown.
,, melanocephalus, *Dj.* Portmarnock, &c.
,, agilis, *F.* Not uncommon.
Clivina fossor, *L.* Abundant.
Dyschirius thoracicus, *Gyl.* Portmarnock and Portrane.
,, salinus, *Schaum.* Portrane.
,, globosus, *Hbst.* Common.
Carabus granulatus, *L.* Very abundant.
,, auratus, *L.* This insect was taken some years since at Lough Bray, by the Rev. E. Tardy and the late T. Coulter, Esq.; but I have not heard of any recent instance of its capture.
,, glabratus, *Pk.* Lough Bray.
,, nemoralis, *Mlr.* Common.

Carabus catenulatus, *Pz.* Local.
,, monilis, *F.* Taken by the late J. Tardy, Esq.
,, clathratus, *L.* Enniskerry.
Leistus spinilabris, *F.* Very local.
Helobia brevicollis. *Pk.* Everywhere.
Loricera pilicornis, *F.* Common.
Badister bipustulatus, *F.* Scarce, though generally distributed.
Chlænius vestitus, *F.* Along the Dodder banks.
Anchomenus prasinus, *F.* Abundant.
,, oblongus, *F.* Rare.
,, albipes, *F.* Common.
Agonum marginatum, *L.* Dodder banks.
,, parumpunctatum, *F.* Common.
,, micans, *Nic.* Dodder banks.
,, piceum, *L.* Local.
Olisthopus rotundatus, *Pk.* Sea-coast.
Synuchus vivalis, *Ill.* Portmarnock, on the sea sands.
Sphodrus leucophthalmus, *L.* Dublin and Malahide.
Pristonychus terricola, *F.* Dublin, in cellars.
Calathus cisteloides, *Pz.* Common.
,, flavipes, *Dft.* Portmarnock.
,, melanocephalus, *L.* Very abundant.
,, mollis, *Mm.* Portmarnock; plentiful.
(Amphigynus, *Hal.*) piceus, *Mm.* Frequent.
Argutor erythropus, *Mm.* Local.
,, vernalis, *Gyl.* Ditto.
Adelosia picea, *Ste.* Taken by the late Mr. Tardy.
Pogonus chalceus, *Mm.* Marshes at Baldoyle, Portrane, &c.
Pæcilus cupreus, *L.* Very common.
,, var. *versicolor*, Sturm. Frequent.
Omaseus nigrita, *F.* Local.
,, melanarius, *Ill.* Not uncommon.
,, orinomus, *Ste.* Military road.
Steropus madidus, *F.* Abundant.
Broscus cephalotes, *L.* Common along the sea-coast.
Platysma niger, *Ste.* Everywhere.
Abax striola, *F.* Generally distributed.
Amara similata, *Gyl.* Common.
,, vulgaris, *Gyl.* Scarce.
,, communis, *F.* Abundant.
,, trivialis, *Gyl.* Local.
,, familiaris, *Crz.* Portmarnock.
,, brunnea, *Gyl.* Ditto.
,, bifrons, *Gyl.* Ditto.
,, tibialis, *Pk.* Not common.
,, nitida, *Er.* Local.
,, acuminata, *Pk.* Not uncommon.

Bradytus apricarius, *F.* Local.
,, fulvus, *Deg.* Portmarnock.
,, consularis, *Dj.* Ditto.
Cyrtonotus piceus, *F.* Local.
Harpalus æneus, *F.* Portmarnock.
,, ruficornis, *F.* Common.
,, tardus, *Ill.* Portmarnock.
,, honestus, *Dj.* Ditto.
,, limbatus, *Sturm.* Common.
Ophonus puncticollis, *Pk.* Portmarnock.
,, pubescens, *Pk.* Marine marshes at Baldoyle, &c.
Trechus aquaticus, *Ste.* Common.
,, rubens, *F.* Very rare; Clontarf and Killiney.
,, fulvus, *Mm.* Not unfrequent.
Blemus pallidus, *Ste.* (Trechus labidosus, *Dawson*). Of this local species I have captured a single specimen on the beach at Killiney; it has also been taken by Mr. Haliday, at Holywood, Co. Down.
Cillenum laterale, *Lch.* Baldoyle, abundant.
Tachys immunis, *Ste.* In river gravel.
,, obtusus, *Dj.* Local.
Ocys rubens, *Ste.* Very rare; North Bull sands, and Bray.
,, currens, *Ste.* Dodder banks; very rare.
Notaphus ustulatus, *L.* Banks of the Liffey, at Celbridge.
Lopha assimilis, *Gyl.* Local.
Peryphus concinnus, *Sturm.* Mouth of the Dodder.
,, inamarithus, *Ste.* Ditto.
,, saxatilis, *Gyl.* Dodder banks.
,, maritimus, *Ste.* Killiney; but not common.
,, Bruxellensis, *Wesm.* Local.
,, littoralis, *Pz.* Not unfrequent.
,, tibialis, *Dj.* Dodder banks.
,, viridi-æneus, *Ste.* Plentiful.
,, decorus, *Dj.* Dodder banks.
Tachypus celer, *L.* Everywhere.
,, bipunctatus, *L.* Portmarnock.
,, pallidipennis, *Ste.* Baldoyle.
,, ærosus, *Er.* Dodder banks and Loughlinstown.
Philocthus æneus. *Grm.* Local.
Notiophilus aquaticus, *L.* Common.
,, semipunctatus, *Sturm.* Ditto.
,, palustris, *Dft.* Ditto.
Elaphrus riparius, *L.* Glen near Ticknock; by R. H. S. Smith, Esq.

Haliplus elevatus, *Helw.* Canal, Dublin, and Loughlinstown.

Haliplus fulvus, *F.* Not uncommon.
,, ruficollis, *Deg.* Canal, Dublin.
,, lineatocollis, *Mm.* Ditto.
,, obliquus, *F.* Ditto; taken by Miss M. Ball.
Noterus semipunctatus, *F.* Same locality.
Hyphydrus ovatus, *L.* Portmarnock, &c.
Hygrotus inæqualis, *F.* Not uncommon.
,, pictus, *F.* Phœnix Park Zoological Gardens, but rare.
Hydroporus palustris, *L.* Somewhat local.
,, planus, *F.* Very abundant.
,, reticulatus, *F.* Canal, Dublin.
,, rivalis, *Gyl.* Loughlinstown.
,, lepidus, *Ol.* Local.
,, depressus, *F.* Loughlinstown.
,, erythrocephalus, *L.* Not uncommon.
,, nigrita, *F.* Ditto.
,, pubescens, *Gyl.* Ditto.
Laccophilus minutus, *L.* Local.
,, hyalinus, *Deg.* Generally distributed.
Colymbetes fuscus, *L.* Common.
,, nebulosus, *Ste.* Dundrum.
,, bipustulatus, *L.* Exceedingly abundant.
,, chalconotus, *Kug.* Local.
Colymbetes guttiger, *Gyl.* A single specimen at Kingstown.
,, angustior, *Gyl.* Fox-rock, &c.
,, fuliginosus, *F.* Common.
,, ater, *F.* Local.
Dytiscus marginalis, *L.* Not common, though generally distributed through the county.
Acilius sulcatus, *L.* Howth and Portmarnock.
Gyrinus natator, *L.* Everywhere.
,, æneus, *Ste.* Canal, Dublin.
Orectochilus villosus, *Mlr.* Loughlinstown.
Heterocerus femoralis, *Kies.* Baldoyle: the var. called *sabulosus* (Hal.) also occurs here.
Helophorus grandis, *Ill.* Local.
,, aquaticus, *L.* Not uncommon.
,, granularis, *L.* Frequent.
,, griseus, *Hbst.* Local: a var. with a black head has been taken at Clontarf, by Miss M. Ball.
Hydrobius fuscipes, *L.* Tolerably frequent.
,, globulus, *Pk.* Scarce.
Laccobius minutus, *L.* Dundrum.
Limnebius mollis, *Ste.* River Dodder.
Ochthebius punctatus, *Ste.* Portmarnock.
Philhydrus melanocephalus, *L.* Local.

Mr. A. Furlong said that as yet our Irish fauna did not contain more than one-third of the British insects. Even taking into account the difference of seasons and latitude, he thought it would not be too much to expect one-half; he also thought that so small a number of Coleoptera being discovered in Ireland might be owing either to the defectiveness of local lists or the scarcity of collectors. Some insects it would be useless to expect in this country, as, for instance, those frequenting the chalk hills of England; but, at the same time, he was persuaded that our Irish sands were very much superior to any in that country.

The Rev. J. Greene stated, that he had met with a second instance of a hybernating Vanessa Io, making a noise when disturbed; it occurred at Colney Hatch, Hertfordshire.

DECEMBER 3, 1853.

Dr. Ball, President, in the chair.

The President exhibited some specimens of the Cirrhopedæ, including the Lepadidæ and Balænidæ, and gave a short account of the various species. He also exhibited a female merlin, given him that morning by Mr. Nicholson; shot eating a snipe, at Balrath, near Kells.

Mr. Warren exhibited a dotterel, which, he fancied, was the little ringed dotterel (Charadrius minor, Meyer); shot at Clontarf Island by Mr. Lamprey.

Mr. Kinahan said he was quite certain it was the Charadrius minor, from the description given of it by the Rev. L. Jenyns.

Mr. Warren promised to have it more critically examined, and would bring it before the Association at an early meeting.

DECEMBER 17, 1853.

Dr. BALL, President, in the chair.

The following donations were received:—A Treatise on the Educational Uses of Museums, by Professor E. Forbes, from the author; and a Treatise on the Propagation of Salmon and other Fish, by E. and T. Ashworth, Esqrs., from Mr. Ffennell, Inspecting Commissioner of Fisheries, and thanks ordered to be given to the Donors.

ENTOMOLOGICAL SOCIETY.

DECEMBER 5, 1853.

EDWARD NEWMAN, Esq., President, in the chair.

The following donations were announced, and thanks ordered to be given to the donors:—The "Zoologist" for December; by the Editor. The "Athenæum" for November; by the Editor. The "Literary Gazette" for November; by the Editor. The "Journal of the Society of Arts" for November; by the Society. The "Philosophical Transactions of the Royal Society," 1853, parts 1 and 2; by the Society. "On two new Species of Calanidæ, with Observations on the Spermatic Tubes of Pontella and Diapotmus," &c., by John Lubbock, Esq., F.Z.S.; by the Author. "On the Destructive Powers of Scolytus destructor and Cossus ligniperda," by Captain C. J. Cox; by the Author. A specimen of Plusia bractea; by R. S. Edleston, Esq. Two specimens of a Sciaphila, greatly resembling S. Penziana, from Scotland; by John Scott, Esq., of Renfrew. An extract of a letter from Mr. Henry Doubleday, announed that if this Sciaphila, upon further examination, were proved to be a distinct species, he intended to describe it.

R. G. Schofield, Esq., Glen Mohr Villa, Greenwich, and W. Groves, Esq., 12, Morden Place, Lewisham Road, were balloted for, and elected subscribers to the Society.

The Secretary announced that the Council had determined to distribute the Society's duplicate specimens of British Lepidopetra among the members.

Mr. Westwood exhibited a piece of honey-comb, sent to him by a correspondent, in which the queen had laid drone-eggs in worker-cells, which had been enlarged for this purpose.

Mr. Curtis exhibited some Hymenoptera and Diptera he had received from M. Leon Dufour and Signor Passerini, most of them valuable as typical specimens of species described in the "Annales de la Societe Entomologique de France." In the box, also, was Tryphon nigriceps, *Grav.*, a species new to this country. It was bred by Mr. Foxcroft from cocoons of Trichiosoma lucorum, which he found in Wales. Mr. Curtis remarked that in 1828 he had bred Tryphon rufus from the cocoon of his Trichiosoma pratense, the larvæ of which he found in a damp meadow, near Ambleside, in the previous year, on a plant he did not remember; it certainly was not whitethorn, but he thought a spiræa or some herbaceous plant. The Tryphon rufulus of Stephens is the male of T. rufus. These species, from the form of the petiole, belong decidedly to the genus Mesoleptus, which Gravenhorst hints at in his work; but the multitude of exceptions to the characters of the genera proposed in the systematic tables, show how imperfect the latter are, and how difficult it is to study the Ichneumonidæ.

Mr. Stevens exhibited two specimens of the very rare British longicorn beetle, Pogonocherus fasciculatus, taken by Mr. Foxcroft, in the Black Forest, Perthshire, and the new Noctiluca from Scotland; but being a female, he had not been able to determine the species with certainty.

Mr. Douglas exhibited specimens of the scarce moth, Hyponomenta irrorellus, reared by Mr. W. Kirby, of Wandsworth, from larvæ found feeding upon Euonymus Europæus; and Mr. Stainton exhibited some of the cocoons.

Mr. Wallace exhibited a fine new longicorn beetle, Acanthocinus sp.? from California, and a splendid butterfly, Zenonia Octavius, *Fab.*, from Para.

Mr. Smith exhibited two wasps' nests, one formed in a bee-hive and the other in a cask; and he also exhibited a cell of Anthophora retusa, containing a larva of the bee, and several females of its parasite Anthophorabia; and stated, that the duration of the life of the *males* he had observed was seven weeks. Since the last meeting of the Society, Mr. Walker had informed him that he had described the Anthophorabia retusa of Newport, as far back as 1839, in his monograph of the family, under the name of *Cirrospilus Acasta*.

Mr. Westwood, referring to his remarks upon Anthophorabia at the last meeting, said that Mr. Smith having afforded him an opportunity of viewing the insect under a high magnifying power, he was convinced that Mr. Smith was correct in saying it possessed true ocelli.

Captain C. J. Cox laid upon the table a block of wood perforated by larvæ of Cossus ligniperda, and pieces of the wood and bark of elm and ash, illustrating the different ways of mining pursued by the larvæ of Scolytus destructor and Hylesinus Fraxini. For several years he had devoted his attention to these insects, especially the Scolyti, and he was convinced that their ravages were so extensive as to be of great importance. Some of the oldest and finest elms in the parks had been destroyed, and young, sound trees were not exempt from their attacks. In opposition to several distinguished entomologists, he was convinced that Scolytus destructor attacked sound trees, and caused them to become diseased, partly through the influence of a poison contained in the excrement of the insect; and a course of experiments had not only assured him on this point, but had also enabled him to state to the Office of Woods and Forests that the damaged trees might be saved and the pest prevented from spreading, if they would adopt his plan of partially barking the trees in the places attacked, and removing and destroying the portions cut off. Once, when in a ship-timber yard, where he had a yacht building, he saw an ash tree so covered with these insects, that he calculated there were not less than 280,000 of Hylesinus Fraxini in it; the Scolytus was certainly quite as prolific, and unless some such steps as he had pointed out were speedily adopted to check the evil, he would venture to say that in sixty or seventy years there would not be an elm tree in or about London. The damage caused by Cossus lipniperda was very great, and he also attributed a poisonous quality to the excrement of the larvæ; but he found that if the larvæ were followed up and cut out, the trees soon recovered. He said that in the Royal Botanic Society's Gardens, Regent's Park, out of two hundred and forty trees, only ninety had escaped being attacked, and out of eighteen operated upon, all had done well except one.

Mr. Westwood said his late lamented friend, Audouin, who had paid great attention to this subject, had once, when he was visiting Paris, pointed out to him that a female Scolytus first attacked a tree for food, and then other females followed to lay their eggs on the perforated and exposed place.

Mr. Edward Sheppard said he had found the insects alive in old elm rails.

Mr. Curtis had never known young trees attacked; but at St. John's Wood his attention had been called to some old elms, which had completely lost their bark from the attacks of Scolytus; and he thought that only trees in an unhealthy state, which frequently happened from many causes, or old trees decaying, became the prey of this beetle.

Captain Cox replied to these objections:—1. That he was sure, from observation, that the females laid their eggs on sound trees, to which they went for that purpose. 2. That he had known the insects eat down into the solid wood, but only when they had deprived the bark and alburnum of their nutriment. And, 3. That the majority of the trees in the Regent's Park were growing vigorously, even to the terminal shoots, when attacked. He added that the efficacy of the plan he recommended as a cure, was proved by the fact, that trees rapidly in process of destruction by Scolytus and Cossus had, after the operation, become quite healthy.

The President, in concluding the discussion, said that the society was greatly indebted to Captain Cox for his lucid explanations on a subject of such great importance and general interest. Without wishing in the slightest degree to undervalue those exhibitions of rarities, or those descriptions of genera and species which

formed the staple of the society's proceedings, he considered that carefully-prepared observations on the habits of insects possessed a still higher value and interest, more especially when such habits exercised an important economical influence, whether beneficial or injurious. He also wished to observe, that, in discussions like that which had just taken place, and to which he had listened throughout with the utmost attention and pleasure, it would be a great advantage if a month's notice could be given, in order that members might have the opportunity of refreshing their memories by referring to what had been previously written on the subject—in fact, of "reading up," so to speak, for the occasion—for we really came as it were unprepared, and treated almost as new a subject to which our best entomologists had already given their earnest attention. With regard to the opinions advanced and ably advocated by Captain Cox, he inclined to offer two remarks. First, in reference to the Scolytus attacking young and sound trees, he thought the Captain's views were fully borne out by the sound and healthy wood of a young tree which was exhibited, and in which the ravages of the insect had been closely watched from their very commencement until they caused the death of the trees: this view was also in accordance with his (the President's, own observations on the trees in Camberwell Grove, where he had for years watched the progress of the pest, and found it extended indifferently to old and young, sound and unsound trees. The other remark he wished to make was, that he dissented from Captain Cox's opinion, that any poison was diffused by the insects, either in the case of the Cossus or Scolytus; he attributed the injury to simple mechanical causes, since the galleries or perforations of these insect-pests either arrested the flow of sap altogether, or diverted it from the ordinary channels; the admission thus given to rain-water, and also to other insects, likewise tended to accelerate decay.

Mr. Wallace read the concluding portion of "Notes on the Habits of the Butterflies of the Amazonian Valley."

Mr. Westwood, in reference to a remark in Mr. Wallace's paper, that a certain species of Hesperia, with a beautiful under-surface, sat with its wings erect, observed that Nature generally provided that adornments of this kind should be exhibited; it was particularly the case with the Catocalidæ, which, having very beautiful under-wings, rested with the upper wings open, so that the under-wings were exposed.

Mr. Curtis differed from Mr. Westwood; he thought that in the genus Catocala, especially in C. nupta, this was not the case.—J. W. D. (Zoologist.)

LITERARY AND SCIENTIFIC INSTITUTION OF KILKENNY.

DECEMBER 9, 1853.

The December meeting was held at the Tholsel Rooms, on Friday evening, 9th ultimo,

Dr. Cane in the chair.

The routine business having been transacted, the Secretary, Dr. Lalor, announced the following donations:—

A whip made of the lace tree of Jamaica, presented by Dr. William Swan, staff surgeon.

A small but neatly carved Burmese idol of alabaster, a most favourable specimen of the art of the Burmese; by Surgeon Langley, 62nd Regiment.

The Report of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne; by the Committee.

A Dutch bottle found at the Rabbit-borough, Tramore; by Captain Helsham.

Mr. Cotton, Waterford and Kilkenny Railway Company, was unanimously elected a member.

Mr. Rawnsley read his paper on "Cruelty to Animals."

Dr. Cane, in the absence of the writer, read a paper by the Rev. James Graves—

ON THE GEOLOGY OF THE COUNTY OF KILKENNY.

"There are certain subjects, ignorance on which is, by universal consent, held to be deplorable if not shameful; and the character of the age we live in tends every day to the enlargement of the limits within which ignorance is a disgrace. In the olden times of chivalry, learning was so little deemed essential to the knightly character, that the noble actually boasted of his incapacity to read or write, deeming all such effeminate acquirements only the fitting concern of the churchman, whose profession debarred him from the great business of war. Now, however, things have taken a turn *tout au contraire;* the circles of science are rapidly widening, and fields of knowledge, but lately held the peculiar demesnes of the professor, are cultivated by the many. Natural history, geology, and chemistry have been made part of an academical education, and drawing and music bid fair soon to be as essential to the educated classes as correct grammar or orthography.

"These observations must plead my excuse for bespeaking your attention to the geology of our county of Kilkenny; and I am pleased to believe, that to many of my hearers the language of the geologist is not an unknown tongue. Nature's great bard, Shakspeare, who seems to have anticipated nearly all the grand discoveries of science, found 'sermons in stones;' and sublime, indeed, are the records from which the student of geology derives his knowledge. As he humbly and reverently reads the world's history in the rocky strata, which form the leaves of this great volume, his mind expands; he finds himself capable of forming ideas of duration, of power, and of all-planning design, which lead him to the contemplation of the Everlasting—the Almighty—the Omnipotent Creator. [Mr. Graves here entered into a detailed description of the classification and nomenclature of rocks, as given by Colonel Portlock, in his useful "Rudimentary Treatise on Geology;" and then proceeded as follows, to apply the subject to the geology of the county of Kilkenny]:—

"The *plutonic rocks* are found in small patches to the south-east of the county, in the form of granite. Granite forms the core of Brandon hill, over Graigue-na-managh, which has evidently been protruded from below, through the sedimentary strata which rest against its sides; these sedimentary rocks have been again re-acted on by this plutonic agency, and in many places have, in consequence, assumed the *metamorphic* character; the greater portion of the southern tract of our county is composed of the older sedimentary *sand-stones*, *clay-slates*, and *brecchias;* the boundary line of this formation extends from the neighbourhood of Graigue-na-managh round by Thomastown, by Knocktopher, and Kilmoganny, to Garryricken, near Slieve-na-man. These formations contain many useful building stones; as, for instance, the granite, and many of the sand-stones. Its mill-stone grits are worked at Drumdowney hill, and near Waterford; whilst it likewise affords fine roofing slates from the quarries on the estate of our noble president, the Marquis of Ormonde, near Carrick-on-Suir, worked by our fellow-townsman, Alexander Colles, Esq. In the opening address, which I had the honour to deliver at the commencement of our last session, I alluded to the recent discovery of several magnificent fossil ferns, fruits, and fish, in the sandstone strata of Kiltorkan hill, which excited so much attention amongst the scientific men assembled in Belfast, in 1852, when the British Association held their annual congress there. These fossils present the most highly organised examples of animal and vegetable life, as yet found, in these very ancient sedimentary strata. The magnificence of the fronds of fern, only equalled in the present vegetation of the world by tree ferns of Australia, and to which, by the way, they are botanically related, may be imagined, when I tell you, that I have seen a slab of the Kiltorkan sandstone, in the Museum of Economic Geology, in Stephen's-green, Dublin, nearly three feet square, and yet only containing a portion of a single fern-leaf.

"The *mountain limestone*, another, but very early sedimentary rock, occupies the remainder of the county of Kilkenny, or that portion lying north-west of the line I have already indicated as bounding the sandstone, and older sedimentary rocks. The limestone has been raised or canted upwards by a force acting in a northerly direction from below upwards; by this means the edges of the strata have been

exposed, and it is proved to rest on the sandstone. The actual junction of the two rocks is nowhere, that I am aware of, exposed to view; but they may be seen approaching to within a few hundred yards of each other on the line of the Waterford and Kilkenny Railway, the *sandstone* being exposed at the western pier of the great Nore viaduct, and the *limestone* having been cut through close to the Thomastown station. Besides the great expanse of the limestone, occupying the central and northern portions of the county (and which is, after all, but a limb of the greater limestone formation which covers the central plain of Ireland, stretching from Galway to Dublin, and from Athy to Leitrim), small patches occur at Grannagh, Dunkitt, and Piltown, which are of incalculable value, in an economic and agricultural point of view, supplying a great portion of the primitive districts of the counties of Kilkenny and Waterford with lime. Access is had to the water's edge from the limestone quarry at Grannagh, by a tunnel, running under the public road. It is needless to dwell on the advantages arising from the prevalence of the mountain limestone in our county; all our richest lands, either for cultivation or pasture, are situate within its bounds; when burnt it makes a valuable manure, thus fertilizing the sandstone districts beyond its borders, and (but in a less degree) useful to the limestone tracts themselves. As a building stone it is superfluous to sound its praise; the sculptured ornaments of St. Canice's Cathedral, of Kilcooly Abbey, and many another ancient buildings, show it sharp and uninjured by the lapse of centuries, whilst its black marble quarries, running in a line across this county by Kilkenny, Farmley, and Callan, afford an abundant and elegant material for internal ornamentation. The mountain limestone of Kilkenny presents many varieties. Of these, it will be sufficient to enumerate, beside the *black marble* already alluded to, the *brown spar* and *magnesian limestone*. 1. The *brown spar* is a dove-coloured and highly crystalline limestone, altered by fire, and on its way, as one may say, to be made white marble; for the Carrara marble, of whose spotless purity sculptors have taken advantage in every age, is but limestone altered by the action of heat under great pressure. The old geologists called the brown spar *sidero-calcite*, or *iron-limestone;* and as such you will find it mentioned in Mr. Tighe's admirable survey of the county. The localities where this rock is apparent reach from Archer's Grove, where it forms an extremely picturesque line of cliffs, across the Nore, showing again at Lavistown and Dunbell, in the cuttings of the Waterford and Kilkenny Railway, from thence stretching towards Gowran, where it rises into the elevation known as Freestone Hill, and so across to the base of the Johnswell mountains, where, at Kilcomar, it is well defined. At Riverview, a small stream separates the dark-blue limestone from the brown spar, in a very remarkable manner, the different rocks coming quite to the brink of the stream at each side. The researches of the government geological survey, which is at present being carried on in Ireland, have, as I am informed, brought to light a very curious cause for this altered limestone. It appears that it lies in the direction of a great fault, or upheaving of the earlier sedimentary strata, caused by the protrusion of the plutonic rocks, which form the mountain ranges of Carlow and Wexford; from this crack, or fault, there would be an emission of the central heat, which, acting from below on the limestone, and under the pressure of a superincumbent ocean, would convert these rocks which came in contact therewith, into a species of marble; and it is remarkable, that the other marbles of our county strike across the district close to, and in a line with, the brown spar. 2. The *magnesian limestone* covers a large tract of country, within which Ennisnag, Annamult, Flood Hall, and Kells, are situated; and a patch of the same rock occurs near Piltown, in the barony of Iverk. This rock differs chiefly from the other calcareous strata in containing a large quantity of flint in its composition, sometimes exhibiting in the form of clusters of very beautiful prisms of quartz; and, in consequence, makes a bad building stone, and worse lime. In compensation for these defects, the magnesian limestone often contains ores of lead and silver; and a mine of this metal was worked in this district, with considerable success, at Knockdrina, over Flood Hall, as mentioned by Mr. Tighe in the work already quoted. A magnificent silver cup, the property of this mine, was kindly entrusted to this Society by Mrs. Flood, to accompany the geological specimens forwarded by this institution last summer to our great National Exhibition.

"The fossils of the mountain limestone are both numerous and beautiful; indeed, so much so, as to defy even enumeration in a paper such as this is. They are, I believe, without exception, marine.

"It may have seemed strange to any observant person, that I should have made the assertion, that the mountain limestone extends over the entire of the north-west of the county of Kilkenny, when it is well known that extensive tracts of sandstone and slate occur in that very district, while hills and eskers of sand, gravel, and clay, cover much of the remainder. These tertiary and later deposits do not, however, invalidate the well-established fact of the continuity of the first-mentioned rock over the region alluded to.

"Let us now briefly examine the character of these groups of sandstone and slaty hills, which here and there rear their rounded summits over the limestone plains —I allude to the *coal fields* of the county of Kilkenny. I have already briefly stated the generally received theory as to the formation of coal, and shall not take up your time by again going over the same ground. The same theory which accounts for the formation of the English coal deposits, is as fully applicable to ours; there is the same recurrence of numerous beds of coal, separated by gritty and slaty strata, the same indications of a luxuriant tropical vegetation. The principal difference arises from this, that our coal is devoid of bituminous matter, and burns without a flame. This peculiarity may be accounted for, by supposing that, after its formation, it was charred by a subterranean heat, approaching, as it does, nearer to pure charcoal than any other known mineral coal. From this peculiarity, it has received the name of *anthractite*. The history and statistics of our Kilkenny collieries would be an interesting topic to enlarge on; but as I am informed that it will be brought before you ere the session closes, by another member of the institution, I will not here enter on it.

"The strata which contain this valuable deposit, form hills which, commencing in the barony of Gowran, and known as the Johnswell mountains, sweep round by Ballyfoyle and Ballyragget, forming the north eastern boundary of the county, and extending backward into Carlow and the Queen's County, embrace, within the limits of Kilkenny, the Castlecomer coal-field. Separated by the Nore from the Castlecomer coal-field, we find, rising on the western bank of that stream, a similar group of hills. At the point where the Dinan pours its tributary waters into the Nore, Mount Eagle rock rises its picturesque front, thence stretching backwards, the coal measures extend southwards, to within a mile of Kilkenny, at Richmond; and then, trending westwards, stretches on to Ballykeef. From Mount Eagle, northwards, again, the coal measures, forming a line of picturesque bluffs, extend by Barnaglissane, Clashacrow, and Upper Court, to Kilcooly, the entire tract between the two boundary lines just now briefly indicated, belonging to the same formation. Within the bounds of the county of Kilkenny, but little coal has been discovered in this coal-field; it extends, however, into Tipperary; and at Slievardagh extensive pits of coal and culm are worked.

"From the similarity of character in the eastern and western Kilkenny coal-fields, Mr. Griffiths, a high authority in such matters, has supposed that they originally formed one unbroken mass; but that at some remote period in the world's history they have been separated by diluvial action, and the gap scooped out which now forms the valley of the Nore. I may be allowed to state two facts, which strongly corroborate Mr. Griffith's theory. Near Wellbrook, about a mile and a-half from Freshford, and on the old road to Kilkenny, there is a quarry where the limestone is worked within a hundred yards or so of the adjacent coal-measures. Here may be seen, overlying the limestone, *not* the undisturbed slaty strata of the adjacent hill, *but the broken fragments of those strata*, and not rolled and rounded, for the distance through which they were transported was too short to allow of that, *but just as they were torn from their present beds*, piled up like a mass of road metal, and forming the bearing or crown of the limestone quarry."

"The wide range which geological science takes will, I trust, prove my excuse if in anything I have been obscure; and when, as was unavoidable, I have been compelled to omit much of importance; but if what has been said leads even one of my hearers to cultivate the noble science of geology, I shall be amply rewarded."

THE

NATURAL HISTORY REVIEW.

Reviews.

NORWAY AND ITS GLACIERS, VISITED IN 1851. By James D. Forbes, D.C.L., F.R.S., &c. Edinburgh: Adam Black. 1853. Price, £1 1s.

A GOODLY volume lies before us—broad margin, fine paper, excellent illustrations. We like such books. We use the word "like" as did the child who being asked whether she liked pudding or mamma better, adroitly replied—"I like pudding; I love mamma." We like a handsome book; we love a good one. That Forbes's Norway is the former must be "plain to all beholders;" it at once recommends itself to those who purchase on such considerations, and needs not our commendation of its external beauty. Having thus the advantage of a favourable first impression, we endeavour, to a certain extent, to inform our readers of its other merits. Thinking it probable that the generality of reviewers will address themselves particularly to his descriptions of the glaciers, we first take, as an example of his style, and as an extract having a special interest to Irish readers, his account of his visit to an encampment of Laplanders, near Tromsö. It is right that we should explain that the learned Retzius has shown that the earliest inhabitants of Ireland, of whose skulls remains still exist, were identical in ethnological character with the Lapps of the present day; thus the interest referred to arises in us:—

"In the evening, a party from the steamer, accompanied by several gentlemen, from Tromsö, proceeded in a boat across the sound (which is here only one-third of an English mile in width), to visit an encampment of Laplanders, who annually return to the same spot with their herds of reindeer. We landed near the opening of a valley which terminates in a hill of considerable height partly covered with snow. It is called, I believe, the Tromsö-tind. On either side of the valley, hills rise to 1,500 feet or more, and are green to the top. These furnish pasture to the reindeer. The bottom is well wooded with trees of respectable growth, far superior

to those behind Tromsö, and consisting, so far as I recollect, of birch, alder, and willow. There were no firs. The ground was boggy in many places, from the abundance of land springs, which, in part at least, are alimented by the melting snows, which evidently had but lately disappeared on the shady slopes. One good spring which appeared to rise from a rock, and which might have an elevation of 150 feet above the sea, had a temperature of 37° 5′. We at length extricated ourselves from the wood, and, crossing the stream, saw the Lapp camp before us, on a dry and pleasant grassy space, about two and a-half English miles from the sea. Some piles of sticks and mounds, which seemed like no human habitation, first attracted attention. The piles of sticks form, as we found, a sort of skeleton shed, which can be enclosed in bad weather by a kind of rude tarpaulin. They contain barrels, clothes, and many nondescript utensils and stores, which, in fine weather, are exposed, suspended from the bare poles. Two low, round mounds of turf, overlaid with sticks and branches, in a most disorderly fashion, composed the habitations of a multitude of men, women, and especially children, who seemed, at first sight, to be countless. Their appearance, uncouth, squalid, and diminutive in the extreme, was, I thought, decidedly unprepossessing. But an attentive survey brought out some more favourable features. The countenance was altogether unlike any I had seen, but by no means devoid of intelligence, and even a certain sweetness of expression. Notwithstanding that our party was tolerably numerous, they exhibited no signs either of distrust or of shyness; and whilst some of them entered into conversation with one of the gentlemen from Tromsö, who knew a little of their dialect, and others went, attended by several small, active dogs, to fetch some reindeer for our inspection from the heights, the greater part remained quietly engaged in their huts, as we had found them, quite regardless of our presence. On inquiring into their occupation we were surprised to find them possessed of some excellently-printed and well cared-for books, particularly a Bible in the Finnish tongue, and a commentary, each forming a quarto volume. We found some of them also engaged in writing. This was a matter of surprise, where we had been led to expect something approaching barbarism; and we had soon a proof that their pretension to religious impressions was not merely theoretical: for they positively refused to taste the spirits which were freely offered to them, and of which our party partook; though it is well known that excessive and besotting drunkenness used to be the great sin of the Lappish tribes, and still is. Of those who have not been converted to habits of order and religion, by the zealous efforts of the Swedish missionaries (particularly, I believe, Lestadius and Stockfleth) who have indefatigably laboured amongst them.

"The characteristic composure of the people was well shown in a young mother with rather pleasing features, who brought her infant of four months' old out of one of the huts, and seating herself on the sunny side of it, proceeded in the most deliberate way imaginable to *pack up* the child for the night in its little wooden cradle, whilst half a dozen of us looked on with no small curiosity. The cradle was cut out of the solid, and covered with leather, flaps of which were so arranged as to lace across the top with leather thongs. The inside and the little pillow were rendered tolerably soft with reindeer moss; and the infant fitted the space so exactly that it could stir neither hand nor foot, yet made little resistance to the operation. A hood protected the head whilst it admitted air freely. When the packing was finished, the little creature was speedily rocked asleep. The elder children were inquisitive, but far from rude, and they played nicely with one another. The Lapp hut is formed interiorly of wood, by means of curved ribs, which unite near the centre in a ring, which is open, and allows free escape for the smoke; the fire being lighted in the centre of the floor. The exterior is covered with turf. The door is of wood on one side. The inmates recline on skins on the floor, with their feet towards the fire, and behind them, on a row of stones near the wall of the hut, are their various utensils. Their clothing—chiefly of tanned skins and woollen stuffs—looked very dirty. Their whole wealth consists in reindeer. The two families who frequent this valley possess about 700 deer. We saw, perhaps, about one-fourth of that number. A few of them were driven for our inspection into a circular enclosure of wooden paling, where they are habitually milked. One of the men dexterously caught them by the horns with a lasso or noose. The deer are small, but some of them carry immense branching horns, the weight of which they seem almost unable

to support. At this season, their long winter coat of hair came off by handfulls. They make a low grunting noise almost like a pig; the milk is very small in quantity and excessively rich."

The theory of glacier motion, communicated by Professor Forbes in his former work, is that—"A glacier is an imperfect fluid, or a viscous body, which is urged down slopes of a certain inclination by the mutual pressure of its parts. When we think of a mass of Wenham ice on our dinner tables, flying into fragments on slight acupuncturation, we are not prepared to consider it as a plastic body, yet such it surely is, when we view it in the enormous masses of the glacier—squeezing through defiles of varying breadth, spreading out where there is space, and passing, by extension, longitudinally when the gorge narrows; yet though this plastic nature, subject to the enormous pressure it occasionally bears, will account for the slow descent of the glacier, and though we fully agree with the general philosophic views of the author, we do think he has neglected to give to hydrostatic pressure its full value in facilitating the motion in question.

In 1838, our learned countryman, Robert Mallet, gave to the Geological Society of Dublin, a most excellent paper on the mechanism of glaciers. He there very clearly showed how the glaciers may be water borne for a while, until the escape of the water below resulted in a downward motion of the mass above. Every schoolboy knows the hydrostatic paradox, that a drop of water will float a man of war, so will a drop float a glacier. When we see workmen with levers urging along some enormous mass of stone, it is scarcely moveable until a roller is placed beneath, so with the glacier, the mighty forces to which it is subjected, and its plastic nature may admit of some motion; yet we believe it would be small, but for the lifting power below. Never having seen a glacier, we feel diffident in thus expressing an opinion which would, probably, have been unnecessary had Professor Forbes noticed Mr. Mallet's papers on the subject, as he has those of Esmarh and others. The observations of Professor Forbes, in Norway, go to confirm his views as formed in Switzerland, that the glacier moves as a great river, allowance being made for its immensely greater viscosity. Be it so; but it has helps which the river has not, *we think*. Amongst others, freezing of water in the crewasses, if it be so, would be a mighty power, pushing forward where there was least resistance.

We consider that it may, perchance, be useful to give such circulation to the desiderata of our author as our pages can supply; we, therefore, here insert them.

"I will briefly refer to a few of the many observations desirable to be

made with reference to the glaciers of Norway, which may be recommended to future travellers :—

"1. To ascertain whether unquestionable and well-defined snow fields occur south of lat. 60°; the level of the snow line, and the period of the year at which it retreats highest.

"2. To examine the glaciers on the west slope of the Justedal mountains, and at the head of the Sogndal and Veitestrandswand, and to trace to their origin the remarkable granite boulders which seem to be derived from thence.

"3. To select amongst the glaciers of the Justedal range one or more suitable for careful observations of progression, both during the height of summer, and from year to year. The Lodal's glacier is probably one of the best.

"4. To ascertain carefully the snow line of the Folgefond, and in Nordfiord (between Justedal and the sea).

"5. To visit and describe the glaciers of the Jenesfield, &c.

"6. To explore the country to the west and north-west of Sneehättan, on the Doore-field ; to observe its geology, and ascertain the level and extent of its snow fields.

"7. Generally, in the preceding excursions, to notice the occurrence of grooved and polished rocks, and the direction, by compass, of the striæ, especially on level places, not in the direction of valleys. The attempt to trace generally the boulders to their origin could only be attempted by persons familiarly conversant with the intricate and obscure geology of Norway. But moraines should be watched for, and sketched. That of Vasbotten, near Stavanger, mentioned by Esmarh, would be worthy of a visit.

"8. In Nordland, and the higher north, the traveller may explore the Börgefield between the Namsen and Vefsen rivers, frequented for their fishing by numerous tourists.

"9. The glaciers and snow fields of Foudal (lat. 66°, 67°), would, unquestionably, repay a week or a fortnight's research. From the steamboat station of Rödö the Mels-fiord, Flolands-fiord, and Gloms-fiord might be easily visited, of which the two first, at least, contain glaciers at a very low level. The mountains of Foudal are, in a great measure, detached from the interior chain, and it is probable that the explorer might return from Gilleskaal, beyond Cape Kunnen, by the landward side, to the head of the Ranen-ford (lat. 66° 10′), and rejoin the steamer.

"10. The promontory of Syngen, with its numerous glaciers, might be made an object of an excursion from Tromsö, with the aid of the steamer.

"11. A detailed examination of the Bergs-fiord, Jökuls-fiord, and Qvenanger range has been already recommended (page 84).

"12. Every opportunity should be taken to ascertain the direction of the abraiding and smoothing agency, which has left such extraordinary traces along the coast between the Throndhjem-fiord and the Lofoddens; and in general it should be sought to observe how far the striæ correspond or not in direction with the general declivity of the ground, or whether they are in any case extensively parallel with the coast.

"13. The limits of vegetation of the birch and the snow line should be observed wherever practicable; but, with regard to the latter, the great difficulty of ascertaining the extreme limit of recession of the snow should be borne in mind; and the time of year, the character of the season, and the exposure should be particularly noticed.

"14. The meteorology of Norway is in a state which is not creditable to the acknowledged intelligence of the people and the eminence of its scientific men. I know of but two places—Christiania and Kaa-fiord (separated by 10° of latitude)—of which the mean temperature is known with any accuracy. This is lamentable in a country whose climate is one of the most interesting in Europe. The means of remedying it seems easy. Let observations, in the first instance, be confined to the thermometer. It is impossible to doubt that a net-work, of say fifty stations, might be quickly established over the entire country. The intelligent officers of the Royal Marine and Trigonometrical Survey, the clergy (who have almost all had a university education), the masters of schools and academies—like my well-informed friend, Mr. Blom, at Tromsö—the active magistrates and civil officers, even the station holders and substantial merchants on the steam-boat routes, would, probably, in many instances, lend a cheerful aid to so simple and interesting an inquiry; whilst the combination of the results could not be placed in better hands than those of the professors of Christiania."

In chapter IX. the philosophic Professor shows how the temperature of Norway is favourably modified by the heat brought northward by the currents of the great Atlantic, clearly explaining the apparently anomalous distribution of the isothermal lines, a phenomenon which makes Norway comfortably inhabitable, while a country of similar latitude, in the southern hemisphere, would be a desert waste. In this work many interesting observations will be found as to the limit of growth, in elevation, of certain plants; he also shows how the simple peasants there, like our own, do not understand how men climb mountains and endure privations merely for the love of knowledge. The book, though known as Forbes's Norway, has appended to it excursions in the high Alps of Dauphine, Berne, and Savoy.

Our space will not permit us to enter into this at any length, it gives a narative of several deeds of difficulty, but particularly of the successful ascent of the Jungfrau, and its result—the view of a stupendous cloud! The ascent of difficult mountains has been, and, probably, will always be, a feat which many will desire to accomplish, yet it very rarely happens that the end gained is anything equal to an equivalent for the great labour and risk encountered. The ascent of the Jungfrau, it appears, had been doubted before; thus the eclat of a positive accomplishment of the deed was something to be gained, but one which we should not have thought our author would have cared for—it not being the character of his countrymen to labour without some good end in view. We began by admiring the general appearance of his book, we have been instructed and entertained by its perusal.

TERRA LINDISFARNENSIS. — THE NATURAL HISTORY OF THE EASTERN BORDERS. By George Johnston, M.D. 8vo. Vol. i., Botany. London: John Van Voorst. 1853. Price, 10s. 6d.

IN this volume, the first of a series, to be issued by Dr. Johnston, illustrative of the natural history of the Eastern Borders, we have a most pleasing record of the botany of a large district, which comprehends within its circuit the whole of Berwickshire, the Liberties of Berwick, North Durham, and the immediately adjacent parts of Northumberland and Roxburghshire, forming together a district of a nearly circular figure, about forty miles in diameter, and bounded by a tolerably distinct outline, which the eye may trace from any commanding height within its area. The district is one peculiarly fitted, from its varied character, for the researches of the naturalist; and, judging from the volume now before us, the history of its natural treasures will be gladly welcomed by those who love to observe the works with which an all-wise Creator has surrounded their daily path, and the beauty of which is often not sufficiently appreciated, only because of the frequency with which they meet the eye. Habits of *observation* cannot be too carefully inculcated; independently of the vast importance they exercise in every profession, their possessor enjoys within himself a rich mine, "at once adorning and relieving the toils and vexations of a busy life, and refining and exalting the enjoyments of a social one."

Dr. Johnston is *no mere recorder of habitats*, nor is his present work only suited to the border botanist; its pages are plentifully and pleasantly interspersed with notices of "The Club," and its worthy members—their

happy meetings, and rare discoveries—with much of what may be termed the poetry of science; its author has lent his pen willingly to record the sayings and customs, the plays and incidents associated with the plants which pass under review, and with a praiseworthy zeal has endeavoured to rescue from oblivion much of that traditionary lore which still lingers in remote haunts, though now to be sought among a motley race, constituting the herbalists of the present day, who, even still, in some places, dispute the skill and pretensions of the more regular practitioner.

Few writers are so capable of illustrating the natural history of the Eastern Borders as the author of the "Terra Lindisfarnensis." Himself a borderer, he is bound to the task by a natural predilection, while his deep acquaintance with the records of the past, peculiarly fits him to pursue with profit the line of research which he has so happily adopted; and though, perhaps, the over-fastidious may be disposed occasionally to cavil at his modes of expression as rough and uncouth, still these defects—if they really exist—would seem to spring naturally from a close acquaintance with the quaint diction of those early writers, so often and appropriately quoted by him with the respect they deservedly merit from all true lovers of nature.

We feel, however, that our readers will be best fitted to judge of the merits of this most pleasing contribution to local natural history, by a few extracts taken, almost at random, from its pages, all of which will amply repay an attentive perusal.

Under the head Rubus—*Bramble*, we have, at page 60, the following analytical table to assist the student in determining the Eastern Border shrubby brambles :—

"A. Stems erect or nearly so.
Leaves white underneath . . . R. idæus.
Leaves green on both sides . . . R. plicatus.
B. Stems arched or trailing.
* Stem smooth, glabrous or slightly hairy.
† Lower leaflets overlapping.
T. leaflet cordate, the lower stalked . R. nitidus.
T. leaflet rhomboid, the lower sessile . R. corylifolius.
†† Lower leaflets separate, retroflexed.
§ Stem angular.
T. leaflet obovate cuspidate green beneath . . . . . R. macrophyllus.
T. leaflet obovate cuspidate white beneath . . . . . R. rhamnifolius.
T. leaflet cordate cuspidate green . R. cordifolius.
§§ Stem roundish.
T. leaflet suborbicular cuspidate green . R. mucronatus.
T. leaflet cordato-ovate acute . . R. carpinifolius.

** Stem villous, the hairs patent. . . . R. leucostachys.
*** Stem rough, with setæ and glands, angular.
† Leaves 5-nate, lower leaflets stalked.
Stem furrowed or concave between the angles . . . . . R. rudis.
Stem convex or plane between the angles. R. radula.
†† Leaves 3-nate or 5-nate, when the l. leaflets are sessile. . . . . R. Koehleri.
**** Stem setigerous, round and glaucous . R. cæsius."

Passing on a few pages further, we meet with the following interesting notes on the *Calluna vulgaris*, which we extract as a fair sample of the antiquarian research and ability developed by our author:—

"*Calluna vulgaris.*—Hooker's Brit. Flora (1830), i. 177.—Heather: he-heather. The principal covering of our moors, and descends without reluctance to the sea-coast. The beautiful flowers are commonly rose-coloured, but a white variety is occasionally met with; and another variety with a hoary or pubescent foliage is not uncommon. The calluna is called he-heather, from its superiority as a fodder, for sheep have an aversion to other heaths, on account, shepherds say, of their bitter taste. As the old plants become woody, it is customary, and has been so from the earliest times, to burn the heather, in fixed proportions, once in three or four years

'How grand the scene yon russet down displays.
While far the withering heaths with moor-burn blaze!
The pillar'd smoke ascends with ashen gleam:
Aloft in air the arching flashes stream;
With rushing, crackling noise the flames aspire,
And roll one deluge of devouring fire;
The timid flocks shrink from the smoky heat,
Their pasture leave, and in confusion bleat,
With curious look the flaming billows scan,
As whirling gales the red combustion fan.'—LEYDEN.

(The burning of heather, whins, and fern is observed often to bring rain in its suite, and is sometimes productive of a very misty state of the atmosphere. Notes and Queries, v. p. 302. I find this is believed to be true in Berwickshire.) 'This encourages the growth of grass among the heath, by admitting the influence of the sun and air, and by the manure communicated from the ashes of the burnt heath; and it gives leave for young and tender plants of heath to spring up, in place of the old and unprofitable woody plants that have been burnt down. When allowed to stand unburnt for a good many years, heath is apt to disappear altogether, after the application of fire; which is often a misfortune on moors unfit to produce better pasture plants, at least for many years afterwards.'—Kerr's Berw., p. 342. In the Scotch parliament, February, 1401, in the reign of Robert III., a statute was made 'to be observed through the whole realm, that there should be no muir-burning, or burning of heath, except in the month of March; and that a penalty of 40 shillings should be imposed upon any one who dared to contravene this regulation, which should be given to the lord of the land where the burning had place.'—Tytler's Scotland, iii. p. 110. In the first parliament of James I. of Scotland, in 1424, this enactment appears to have been renewed, with some modification. 'No man, under a penalty of 40 shillings, was to burn muirs from the month of March till the corn be cut down; and if any such defaulter was unable to raise the sum, he was commanded to be imprisoned for 40 days.'—Ibid., p. 215. It is reckoned beneficial to the health of sheep on turnips, if they have liberty of grazing out on heather. In the Lammermuirs it is one mark of an early season if this heath is in bloom before the 12th of August. Usually it begins to blow about the middle of the month, when the flowers of our fields are mostly gone; and it then becomes

advantageous to carry bee-hives to the moors, as is practised in several places in the district. There are few flowers which yield more honey, and since they are twenty-fold more numerous in the same space than any others, the bees collect their stores with rapidity—

> 'Upon thy sloping banks and lonely glens,
> Thy wide-extended moors, and mountains hoar,
> My country, many a beauteous flower beneath
> The eye of morning smiles in gracefulness
> And beauty; but, the chief o'er all the rest,
> Old Scotland's "symbol dear," which he, the Bard
> Of Coila, hath immortalized, and spared
> The inspiring emblem waving in the breeze,
> I love to mark; nor less the heather flower,
> Of scent delicious, and inviting still
> The eye to rest upon its beauty, spread
> For miles athwart the moor, where wild fowl haunt,
> And where the industrious bee collects her sweets
> Medicinal, and ministers alike
> To luxury's claims, and to the comforts which
> Sometimes descend to cheer the poor man's heart.'—CREASE.

The plant appears to be affected, in its secretion of honey, by the nature of the soil on which it grows. Around Wooler there is a sandstone and a porphyritic soil. The bees on the latter produce considerably greater quantities of honey than those pastured upon the former. Heather honey is of a brown colour, and has a peculiar flavour—which raises it in the estimation of many.

> 'The tiny heath-flowers now begin to blow;
> The russet moor assumes a richer glow;
> The powdery bells, that glance in purple bloom,
> Fling from their scented cups a sweet perfume;
> While from their cells, still moist with morning dew,
> The wandering wild bee sips the honied glue;
> In wider circle wakes the liquid hum,
> And far remote the mingled murmurs come.'—LEYDEN.

Those shepherds who have passed their youth amongst the Lammermuirs have their gaits so affected by traversing the rough heath, that, for the rest of their lives, they are accustomed, in walking, to lift their feet higher than other people. This practice is called by the lowlanders 'heather-lamping.' In a long-continuous storm it is customary to drive sheep to some heathery spot, as the snow is usually drifted from the moors, and the heather lies bare, offering a welcome pasturage.

"That the Picts knew the art of distilling an ale from heather, some antiquaries consider a myth, and some a fact; and of the latter some maintain that there exist remains of the breweries in which this ale was made (see Wilson's Archæology of Scotland, p. 76). The secret died with the people; and the tradition of how it died so worthily is well told by Mr. Chambers, as it still lingers amidst the Lammermuirs, "the last ground contested by the Scots and Picts."

We have already alluded to the meetings of the Berwickshire Naturalists' Club, which, like the "Friday Club" celebrated in "Lord Jeffrey's Life," owed its success to the result of some negatives, as its members were troubled by no written laws, no motions, no disputes, no ballots, no fines, no business of any kind, except what was managed by one of ourselves as secretary. Under *Veronica chamædrys* we have a sketch of one of its meetings, which we extract, trusting that the pleasing picture it presents may tempt the speedy formation of similar clubs in districts where none yet exist:—

"*V. chamædrys.*—V. bibarbata, Stokes, Bot. Comment. i. 56.—Germander Speedwell. Milk-maid's-eye: Eyebright:—

> 'There bloom'd the Strawberry of the wilderness,
> The trembling Eyebright show'd her sapphire blue.'
> WORDSWORTH, Memoirs, i. p. 177.

It is often miscalled the forget-me-not, albeit its ephemeral and deciduous blossoms are not false types of that friendship which the world swears shall be life-lasting. The plant is common on road-sides, in pastures, and in deans, flowering with the hawthorn, which it rivals in beauty, although that beauty has been less celebrated in song. Yet it has not been overlooked: thus Ebenezer Elliott, under the name of 'Eyebright'—

> 'Blue Eyebright! loveliest flower of all that grow
> In flower-loved England! Flower whose hedgeside gaze
> Is like an infant's! What heart doth not know
> Thee, cluster'd smiler of the bank! where plays
> The sunbeam with the emerald snake, and strays
> The dazzling rill, companion of the road
> Which the lone bard most loveth, in the days
> When hope and love are young? O come abroad,
> Blue Eyebright! and this rill shall woo thee with an ode.'

It was a beautiful May morning—the 1st of May, in the year of grace forty-four, when the 'Club' assembled at Etal (Mr. Selby has given an interesting account of this meeting in the Transactions of the Club, ii. p. 86), the loveliest village of our plain; and so gay and happy with its parterres and green lawn, and broad walks, and trees, and ruins, and the Hall, that I ween a prettier village may not well be seen anywhere. ('To see what a village in our northern regions may be, and ought to be, go to Etal. There you will find flower-gardens in perfection—with the village green as a lawn in the best-kept pleasure-ground, and the rustic benches under the spreading branches of elm and sycamore. One fine tree, with the seat around its trunk, is conspicuous, with an inscription, which shows the considerate kindness of the noble family, now residing in the mansion-house—"Willie Wallace's Tree." I believe the old man is still alive in whose honour the tree is thus devoted to longevity. But it is to the flower-gardens in front of the cottages at Etal to which I am anxious to direct attention, because, as a French author says, "It is the cultivation of flowers which announces a change in the feelings of the peasantry. It is a refined pleasure making a way for itself through grosser materials, like the first opening of the eyes—it is the perception of the beautiful—a new sense awaking in the soul. Those who have wandered through country scenes can testify how the rose-tree at the window, or the honeysuckle at the door of a cottage, always promise everything that is delightful within, and a welcome to the weary traveller; for the hand that cultivates flowers never shuts it at the prayer of the destitute or the wants of the stranger. In all countries women love flowers, and make bouquets of flowers, but it is only in the midst of comfort that they conceive the idea of adorning their dwellings with them." —Rev. Dr. W. S. Gilly, 'Peasantry of the Border,' p. 13, 1841. It does one good to visit that florulent village; and the zephyr, full of fragrance, that came upon us, sunning from a thousand blossoms, gave a whet to the appetite, when the call to breakfast hurried us from these aërial essences to a substantial fare. The hearty and substantial meal over, we again sally forth to saunter a-field, amid such wildnesses as modern agriculture permits—in meadows and woods, in brakes and deans, and

> 'By shallow rivers to whose falls
> Melodious birds sing madrigals,'

And so away—all chatting—few listening—the admiration of every ruddy-cheeked lass, and the wonder of every Colin Clout—a queer group, as pied in dress, and cast in as many characters, as a strolling company; the clerical suit of sober black, mellowed and relieved by the freckled and chequered sporting jackets that suit so

well this holiday. The village is left; and the lane leads us by an abrupt turn, down to the rat-rat-rattling mill, all grey and dusty, and quite a picture, with the lusty miller leaning on the half-shut door, eying us complacently, while the two cats that bask at his feet seem to be half alarmed at the novel route. How hurriedly the water runs from beneath that heavy revolving wheel, as it were glad to have escaped from thraldom and from beneath the wheel of torture;

> 'It flows through Alder banks along
> Beneath the copse that hides the hill;
> The gentle stream you cannot see,
> You only hear its melody,
> The stream that turns the mill.
> Pass on a little way, pass on,
> And you shall catch its gleam anon;
> And hark! the loud and agonizing groan
> That makes its anguish known,
> Where, tortured by the Tyrant Lord of Meal,
> The Brook is broken on the Wheel.'
>
> SOUTHEY, Works, p. 126.

The eye seeks relief from the painful image in the caul beyond, over which the river rolls itself, in a round and oily wave, into the linn beneath, where, fretted by the fall, it ruffles itself into a white foam, and murmurs, not loud and scarcely displeased, at the accident and delay! After a short whirling play, the water goes on in a smooth and placid flow, that, after a space, quickens into a tumbling, brattling stream, as if suddenly become conscious that it had dallied here too long, and must make up the lost time. We take the hint, and we start to follow the river, leading by a pathway, which the inscription, carved on a rock, in rustic fashion, informs us was made by my Lord Frederick Fitzclarence—not for our ease, who are all too regardless of a trespass. So onwards we saunter, changing companions as whim and chance dictate, now in front—now lost in the rear—now plucking a new variety of flower—and now entrapping the gorgeous insects that flit about everywhere. The air is full of life, but 'twas unlucky to be so engaged just at this particular moment, for I cannot participate in that laugh which some story of Douglas's has provoked, and I lost the fun, too, for the sake of a fly that I have not captured. ('One should take care not to grow too wise for so great a pleasure of life as laughter.'—Addison.) Onwards again; and now the wood is passed, when we cross, with a quicker pace, the open fields, and scarcely tarry at the queer little house and mill, which is sunk, as it were, in the bank, over which the road is carried. But we greet the good woman who stands there, with her infant in her arm, all a-wondering at the throng; and our greeting is returned with a cheerful smile that bespeaks the good woman to be happy with her lot. And the opposite bank, covered with the bonnie broom, is sunny, and alive, too, with yur-yur-yurlings, and chirps, and melody; and the river is alive with the leaping trout and the up-and-down flies—and it plays in its course with alternate streams and stills, rapids and circling deep pools; and the sun shines on all things, living and dead, and we know not what to say but that this is beautiful and fine, and we say this to one another very often and never dream that we repeat a twice-told tale. Now a precipitous rock, partly quarried, and clothed with flowering sloes, with a golden whin or two, with hazel and budding hawthorn, with honeysuckle clambering amidst the shrubs, and with ivy that festoons the dark rock, and much varied herbage, draws us to remark with what successful art nature has grouped and mingled all this heterogeneous furniture, producing a very pleasing and picturesque effect with materials, which, separately viewed, are of a mean and regardless character. Turned by this rock, the river now runs in a rougher channel, banked on one side by a green pasture slope, while the steeper bank, along whose base we travel, is wooded with almost impenetrable shrubbery and trees of minor rank, where the varied botany that luxuriates in their shelter calls us to frequent admiration. The primrose and violet banks, the trailing ground-ivy with its modest flowers, the tall and graceful rush, the starwort with its blossoms of vestal purity—are all beautiful, and although often seen before, their beauty comes fresh and new

upon us. I do love these wild flowers of the year's spring. And on we stroll—almost palled with sweets, and almost weary with loitering—so that it is felt to be a relief, when a sylvan dean, that opens aside on our path, tempts us to trace its unknown intricacies and retreats. It is a dean without a name, but sunny and odorous, and silent. Here the brae glows with whin and budding broom—there copsed with grey willows and alders, and every wild shrub and trailer; here a gentle bank with its sward pastured by a lamb or two and their dams that have strayed from the field above; while opposite, a rough quarry contrasts, yet not disturbs, the solitude, for the prickly briars and weeds, that partially conceal the defect, tell us that it has been some time unworked. Now a sloe-brake gives shelter to every little bird which is seen flitting out from its shelter stealthily, and stealthily returning; and the lark sings and soars above; and the blackbird alarms the dean with its hurried chuckle. And as we near the top, we find a grove of elms, and poplars, and willows, which hang partly over a little shallow linn, formed by a rill that has fallen in a gentle stream over a moss-grown shelf of rock; and then the water steals, more than half-hidden, down the grassy bed of the dean. The quietness of the place begins to influence us all—the conversation assumes a subdued tone, and some are evidently meditative, when the current which the thoughts of some young dreamer amongst us has taken, is marked out visibly by the question that is asked—'What is the blewart of Hogg?' No one—nor old, nor young—has thought the question abrupt or out of place, but we enter upon it, as if the scene had suggested it, and made our young friend its spokesman. 'What is the blewart in Hogg's beautiful pastoral?' 'Why the blewart must be the same as the blaver or blawort—the Centaurea cyanus.' 'Nay, that cannot be; the Centaurea is a corn-field weed, an autumnal flower, nor is it a sleeper at eventide. Let us hear the verse:—

'When the blewart bears a pearl,
And the daisy turns a pea,
And the bonnie lucken-gowan
Has fauldit up her ee,
Then the lavrock frae the blue lift,
Draps down, and thinks nae shame
To woo his bonnie lassie
When the kye comes hame.'

'Very well, my good fellow, the blewart grows there at your feet, and its first blossoms are giving blue eyes to that sunny hillock. The blewart is the *Veronica chamædrys;* its blossom is the pearl, when at eve the flower has closed, and turned upon us the pale glaucous underside of its petals; it is the companion of the daisy and lucken-gowan; it is the ornament of the dean without a name.' After a little more light discussion, the demonstration appears complete; and we feel that there is more interest, and as much utility, in settling the nomenclature of our pastoral bards as that of old herbalists and dry-as-dust botanists.

"I have here attempted to sketch, slightly, a meeting of 'our Club' and one of its rendezvous, and to indicate the nature of the discoveries and discussions with which we beguile the morning walk; but I feel that the attempt is weak and ineffective. Yet on my return from such a meeting, the conviction has often been forced upon me that the poet was right when he said—

'And he is oft the wisest man
Who is not wise at all.'"

We had marked many similar passages, intending to transfer them to our pages, but want of space prevents us. We will now merely direct attention to the "Sketch of the Fossil Flora, of the Mountain Limestone Formation, of the Eastern Borders," which is from the able pen of Mr. G. Tate, the present President of the Berwickshire Naturalists' Club, and without which the present volume would be far from complete. Though the fossil

flora is, to a certain degree, destitute of the poetic attractions with which the rest of the present work is enriched, this chapter is far from "presenting merely a bare enumeration of fossil plants with technical descriptions," for the subject is rendered most interesting by the way in which local facts are used to illustrate scientific truths. In treating this subject the appendix opens with a well-digested sketch of the history of coal, viewed under the several sub-divisions of relative position—origin, plants, or the original materials of which coal was formed; and, lastly, the changes which coal has undergone, and the conditions of the era during which it was deposited. Under each of these heads much useful information is contained. From the first we learn :—

"That *true* coal has been rarely seen amongst the oldest rocks; the only instance known to the author being that of an anthracite coal, six feet thick, in Portugal, belonging to the lower silurian formation; while the most remarkable coal in the secondary series is a rich bituminous bed, 36 feet thick, in Eastern Virginia, which Sir Charles Lyell has shown to be not more ancient than the lias formation. But with these and a few other exceptions, productive or valuable seams of coal are found only in that formation which lies between the old red sandstone and the new red sandstone, and which has been called carboniferous, because a large amount of carbon has been locked up in the coal and limestone bed. This conclusion is of practical value, as enabling the geologist to point out the class of rocks which will produce coal, and so prevent useless and expensive boring in formations which are unproductive of coal seam."

We would gladly extract the entire of the last of these sub-divisions; we have, however, space only for one passage, illustrative of the conditions of the era during which the coal formation was deposited :—

"The complicated phenomena of our district evidence frequent oscillations of level, and repeated changes of land, freshwater, and marine conditions. During the carboniferous era, this district had its hills and valleys, its rivers and lakes; but there were also extensive, low-lying plains, rank with vegetation, bordering on the sea. These swamps were converted into lakes, and the submerged vegetation was covered with sand and mud, in which were stems and branches of trees; other changes succeeded—the waters gradually became shallower, and at length a new marshy surface appeared, supporting vegetation as luxuriant as before; after the lapse of ages, the scene is again changed—the vegetable accumulations have sunk—the waters of the ocean have rolled over it, and eventually it is covered with lime and mud beds, which are crowded with marine animals, that had lived and died on the spot where they are now entombed.

"The carboniferous deposits have a wide range in both hemispheres, from the arctic regions down to the 33° of north latitude. Over the whole, the same general conditions prevailed, for the same peculiar flora is found in every portion of it. That flora was not varied, though extraordinarily luxuriant and enormous in the aggregate. At present there are in Great Britain 1428 species of flowering plants and ferns, but only 300 species have been found belonging to the carboniferous era. The different proportion of ferns is also remarkable; for while nearly one half of the carboniferous flora are ferns, they constitute only about 1-35th part of the entire existing flora. Conditions such as are indicated by the carboniferous flora are to be met with only in countries, especially in islands, bordering on the tropics; and it may, therefore, be inferred that the climate of the era was humid and equable, and, if not warm, at least temperate. This conclusion is strengthened

by some peculiar characters of the coniferous fossils found in the valley of the Tweed, for they have few and very slight appearances of concentric rings, which arise from interruptions of growth, consequent on changes of temperature.

"The scenery of these primæval lands, though not glowing with beauty nor radiant with light, has its charms, and arrests attention by the strangeness and vast proportions of its vegetation. The summits of the hills and slopes of the mountains were adorned by the picturesque forms of the lofty araucarias and other cone-bearing trees; on the extended swampy plains, dense forests of gigantic club-mosses flourished, their huge arms flung wildly out, and covered with scaly leaves, and terminated with cones; fluted trees stood erect on widely-spreading roots, their long narrow leaves forming a series of drooping curves rising from the summit and sides of the stem, and giving to the scene sepulchral solemnity; tall reeds sprung upward, straight as the mast of a vessel, with slender leaves or branches in whorls around the stem. The foliage of the whole was sombre, but somewhat relieved by the brighter green herbaceous ferns which grew in the shade, and by the graceful tree ferns crowned with overarching fronds. No warm-blooded creature then 'walked the earth'—no beast roamed through the forest—no bird was there with its gay plumage and sportive song; only a few reptiles crawled in the swamps, and an insect here and there fluttered on the wing; yet the thoughtful mind, connecting this scene with the distant future, feels deeply interested with its aspect and bearings; for here the all-wise Creator, who adjusts the working of physical laws to the attainment of moral purposes, caused the vegetative powers of nature to put forth their strength, to make provision for the future wants of the intellectual and moral beings who were to people the world.

"It now remains for us to attempt to explain the chemical changes which the entombed vegetable mass has undergone in its conversion into coal.

"Coal is formed of the same elements as wood, but in different proportions. Leaving out unessential materials, wood is composed of oxygen and hydrogen gases united with about an equal quantity of carbon. Oak, for example, contains 49.432 parts of carbon, 44.499 of oxygen, and 6.069 of hydrogen. Now, when wood is immersed in water, a change commences, which Liebig calls mouldering, and which is different from the decay which results when air is freely admitted; oxygen and hydrogen are given off, in combination with smaller quantities of carbon; the hydrogen and carbon forming carburetted hydrogen, the fire-damp of miners; and the oxygen and carbon forming carbonic acid, the choke-damp of miners. Trees submerged in bogs are undergoing this change; and, hence, the swamps bordering the Mississippi are constantly emitting carburetted hydrogen, especially wherever the ground is dug into. Bog-wood, therefore, contains a larger proportion of carbon than wood does, its composition being 57.0 of carbon, 37.5 of oxygen, and 5.9 of hydrogen. When the mouldering process has gone on for a longer period, lignite, such as is found in the tertiary beds, is formed, in which the carbon is further increased, the composition being 58.56 of carbon, 26.85 of oxygen, and 5.95 of hydrogen. As we go backward in time, the disproportion becomes greater, for the rich bituminous Bensham coal, belonging to the Newcastle coal-measures, consists of 86.44 of carbon, and only of 5.67 of oxygen, and 5.74 of hydrogen. And in anthracite, where the series of changes is nearly completed, the oxygen and hydrogen have all but disappeared, and the result is nearly pure carbon.

"Here a practical hint may be given. Some persons, especially those living in the country, expose coals to rain, in the belief that their quality will be thereby improved; but exposure to moisture hastens on the decay of coal—it cannot, indeed, be stored in too dry a situation. For steam-vessels, dry storage is of great importance, because access of moisture, besides wasting coal, may cause spontaneous combustion, when sulphuret of iron is in combination with the coal.

"The mouldering process is still going on in coal-fields, for to this is owing the evolution of carburetted hydrogen, the dreadful enemy to miners; and yet this destructive element, when rightly treated, ministers to our wants, cooking our food, and lighting our villages and towns. Bearing in mind what has already been achieved in controlling and directing the powers of steam and of the electric fluid, it may be hoped that science, impelled onward by humanity, will ultimately be able to bring the carburetted hydrogen from the mine, where it spreads misery and

death, and, conducting it into proper receivers, to apply it to economical purposes."

We must now take leave, for a season, of the natural history of the Eastern Borders, which we hope soon to renew our acquaintance with, in a second volume from the same accomplished pen, as we have rarely taken up a local flora in which we felt greater interest than in the present, which has at each page reminded us of the force of an observation of Göethe, quoted by our author, that—"plants and flowers of the commonest kind may form a charming diary for us, because nothing that calls back the remembrance of a happy moment can be insignificant;" and some of the lowliest of our wild flowerets are associated with treasured memories of the past, the full force of which, perhaps, we did not realize until they were summoned before us as we read page after page of Dr. Johnston's "Botany of the Eastern Borders."

POPULAR PHYSICAL GEOLOGY. By J. BEETE JUKES, M.A., F.R.S., M.R.I.A.; author of "Excursions in Newfoundland," "Narrative of the Voyage of H.M.S. *Fly*," &c. London: Reeve and Co., Henrietta-street, Covent Garden. 1853. Price, 10s. 6d.

"BEUDANT'S Geologi, Lyell's Geology, &c., would lead one to suppose that the tyro geologists' wants were all supplied; yet, our author has discovered that it is not only not so, but he has given us a work more calculated to attract attention than the very excellent volumes to which we have referred, and while he has done so, he has not supplied their places, but has made them still more valuable; is not this a paradox? The fact is, Mr. Director Jukes's work is freely written and easily read—it does not hamper the student with technicological difficulties, nor require of him to enter into palæontological pursuits at the outset, but it sets forth by showing the active agencies at present at work, goes over in an intelligible way the various formations, and finishes by informing his readers that the time is coming when the professionally educated geologist will be indispensable. The work is beautifully illustrated, and well calculated to afford pleasure to the amateur geologist, who will from it learn to make his eye for observation, and thus open a source of perpetual pleasure, while to the artist it especially commends itself. To us the landscapes of Mr. Dunoyer (who has illustrated the work) have always had a surpassing excellence, as we could see in them nature combined with artistic skill. There was a great painter, who, going into tropical climes, could not forget his native oaks and other familiar trees; these he introduced

occasionally into pictures, when palms, bamboos, &c., should have appeared. The consequence was disastrous; so is it in the eye of the geologist, or indeed of any one who uses his eyes in observing, when, in pictures, artistic rocks take the place of real ones. Though the illustrations of our author would, at first sight, make us think that no fancy could be so wild as to produce a rock scene, of which a likeness could not be found, it is not so. There is a character in nature which is not to be trifled with. We earnestly recommend this work to all landscape painters, and to all gentlemen geologists. As a sample of its style take the following—

"I do not know that we can commence an elementary book on geology in a better way than by asking the reader if he knows *what sand is*. Because any one who thoroughly understands the origin and nature of common sand—whether it be found in the gravel-pit, in the river-bed, or be "the ribbed sea-sand" of the shore—has made no despicable commencement in the study of the science.

"If the reader will examine a handful of sand by the aid of a lens, he will find that it is composed of grains, or minute, irregularly-shaped particles of a hard, shining, often semi-transparent substance. These particles are, if not round, very much *rounded*, often having on the surface a rubbed appearance, as if they had been worn and ground against each other.

"As to river or sea sand, it is obvious that this rubbing must actually have taken place, because, as the moving water must frequently wash the sand about, and roll it onwards in its course, the particles must be constantly exposed to friction against each other, or against whatever substance it may be that lies at the bottom of the water. It is clearly possible, therefore, that all river or sea sand may have been produced, or brought into the state of sand, by the action of the running or moving waters tearing away fragments of rock, breaking them up into constantly diminishing particles, and, by perpetual friction and rolling, grinding those particles into small rounded grains.

"If this mode of formation be true for all sand found now beneath or on the margin of any moving water, it is, *a priori*, highly probable that all sand whatever, even that of the wide deserts of Sahara, the sands of Arabia, or those of the centre of Australia, have been thus formed.

"If we come to consider of it, indeed, there appears to be no other at all likely method by which sand could, in any case, be formed, unless it were originally created as sand, such as we now find it.

"Let it be taken for granted, then, for the present, as the reader sees its great probability now, and will be quite convinced of its truth hereafter, that all sand was produced by the action of moving water on solid rock.

"It is, however, by no means necessary to suppose that the water always detached the sand directly from the rock *as sand*—that is, in small grains. On the contrary, if we examine the action of moving water, now whether we go to the rapids and cataracts of rivers, or to the breakers of the sea battering against a rocky coast, we shall everywhere see large blocks of rock lying about, often but newly detached from their original site, with all their angles sharp, and the fractures fresh, the yet unhealed scar perhaps plainly visible in the cliff above. We should see, also, blocks having every gradation of form, from this newly-broken angular fragment to smaller and smoother, well-rounded boulders and pebbles, having every projecting angle ground off, and all the surface worn as smooth as a billiard-ball. This has been effected by the frequent moving and rolling of all these blocks, one against the other, on the pebble-beach or in the bed of the torrent; every roll removing some little corner, chipping off some little projection, each separated fragment being itself shortly smoothed and rolled into a pebble or shingle, and all the waste of this process being carried off by the moving water in the shape of sand.

"We come then now to look upon not only all sand as a water-worn material, but upon every pebble and every detached stone, of whatever shape and size,

whether found in river, lake, or ocean, if it has at all a worn and rounded outline, as having probably acquired that outline by the action of moving water, and as having been probably transported by that action from its parent site to the place where we now find it. But, as in the case of the sand, so in that of the pebbles and boulders—if all those found in rivers or on shores have been rounded by the action of moving water, it is, *a priori*, highly probable that all pebbles and boulders and round stones whatever, however high and dry they may now be on plains or hills or mountain-slopes, are, in fact, but water-worn fragments of older rock.

"There is not a shower of rain that falls, whether on the crowded street, the dusty road, the plains, the hills, or the mountain summits, that does not cause a multitude of rills, and streams of muddy water to flow from higher to lower levels. The mud borne along by that water was once part of a solid rock. Even if it be but the waste of the bricks and tiles of our houses, this is still true; and it is equally true for every other case, except for those particles of it that may be the result of the decomposition of animal or vegetable matter. Even the gentlest rain that soaks silently into the most richly-carpeted meadow of grass, contributes to the stock of water contained below ground, which here and there bursts forth in springs, carrying momently some grain of mineral matter to the brook, the river, and the ocean. Who has not seen the springs discoloured after heavy rain? Who has not watched, in wet weather, the swollen brook or the roaring mountain-torrent, with its thick, muddy, coffee-coloured water? Who does not know the flooded aspect of a river, with its dull, yellow, turbid eddies, so different from the limped stream that commonly flows between its banks? Whoever has seen these things, has seen one of the multitudinous actions of nature which are for ever and everywhere in operation, performing slowly, and in the lapse of ages, mighty works by means apparently inadequate, and at first sight, perhaps, not especially adapted to the purpose.

"There are, however, other agencies at work—agencies acting with greater local power than mere rain—in wearing away solid rocks and transporting the waste to other localities. We have alluded to the action of brooks and rivers; but if we were to trace them more minutely and in detail, and follow them up to where they acquire a swifter stream, or where rapids and cataracts occur in them, we should estimate still more highly their destructive power on solid rock. Rivers are, in fact, great natural saws or planes, for ever grooving furrows in the land. Let any one look at the bed of a mountain torrent, where it has cut a deep ravine through hard rock, and he will see the amount of its force perpetually acting through uncounted ages. As a well-known example, let him take the Falls of Niagara, as detailed in Sir C. Lyell's 'Principles of Geology,' and he will see somewhat of the nature of river action in deepening its own beds through the destruction and transportation of the rock composing it."

HIMALAYAN JOURNALS; OR, NOTES OF A NATURALIST IN BENGAL, THE SIKKIM AND NEPAL HIMALAYAS, THE KHASIA MOUNTAINS, &c. Two vols. 8vo. Plates. London: John Murray. 1854. Price £1 16s.

WE had long looked with an anxious desire for the appearance of these volumes; and now that they have appeared, we gladly hail them as a welcome addition to our previous scanty and very imperfect knowledge of the regions they treat of.

The readers of Hooker's Journal of Botany will, no doubt, as the title meets the eye, recall with pleasure the letters from their accomplished author, which studded its pages, while he was pursuing the researches whose results

are so ably recorded in the pages of the present volumes. During their perusal, the observations of the venerable Baron Humbolt regarding their author was forcibly recalled to our recollection—"What a noble traveller is Joseph Hooker!"*—writes the Baron to his father—"what an extent of acquired knowledge does he bring to bear upon the observations he makes, and how marked with sagacity and moderation are the views which he puts forward." After such a testimony from one so capable of appreciating the objects of our traveller's research any attempt at criticism must appear indeed ridiculous; and we will, therefore, only endeavour to give such glimpses of the book as will make its perusal, we trust, desired by all who have not yet met with it, feeling assured that they will rise from it with the conviction that the time spent over it has not been wasted.

Its author is no mere novice; he had long been known as an able observer, and, by habits of thought nurtured under the most favourable auspices, was peculiarly fitted for such an undertaking. Dr. J. D. Hooker had previously accompanied Sir James Ross on his voyage of discovery to the Antartic regions, where botany was his chief pursuit. On his return, prompted by a desire to carry his researches into other latitudes than those he was already acquainted with, after some hesitation he determined on proceeding to India, being influenced in his choice by kind offers of assistance from Dr. Falconer, the superintendent of the Honourable East India Company's Botanic Garden, at Calcutta.

Through the intervention of the Earl of Carlisle and the late Earl of Auckland, his journey assumed the character of a government mission, and £400 per annum was granted by the treasury for two years. Lord Auckland and Dr. Falconer both selected that portion of the Himalaya best worth exploring, recommending Sikkim as being ground untrodden by traveller or naturalist.

Since the period of Turner's embassy to Tibet, in 1789, no part of the snowy Himalaya, north-west of the British possessions, had been visited; and here it was highly important to explore, scientifically, a part of the chain which, from its central position, might be presumed to be typical of the whole range.

Among our author's earliest recollections in reading, we are told, were "Turner's Travels in Tibet," and "Cook's Voyages." The account of Lama worship and Chumulari in the one, and of Kerguelan's land in the other, always took a strong hold on his fancy. It was, therefore, singular that Kerguelan's land should have been the *first* strange country he ever

* Hooker's Journal of Botany, iii. 21.

visited, and that in the *first* king's ship which has touched there since Cook's voyage, and while pursuing the track of the illustrious navigator in south-polar discovery; and that, at a later period, he was nearly the *first* European who has approached Chumulari since Turner's embassy. We are not surprised at the influence that these works exerted on the mind of Dr. Hooker; as, to the mind of every original thinker, they appeal with a force and energy which the ordinary run of modern travels are incapable of.

Having thus very briefly sketched our author's prospects, we will proceed a short way in his company, allowing him to state his observations as much as possible in his own words.

On the 11th of November, 1847, the *Moozuffer*, with our author on board, left England, and after a voyage of two months, was steaming among the low, swampy islands of the Sunderbunds. Here the large fruits of the *Nipa fruticans* appear to have excited most interest, as they were thrown up by the paddles of the steamer. They are the product of a low, stemless palm, which grows in the tidal waters of the Indian ocean, and bears a large head of nuts; which are interesting to the geologist from the nuts of a similar plant abounding in the tertiary formations at the mouth of the Thames, and having floated about there in as great profusion till buried in the silt and mud which now forms the Isle of Sheppy.

During Dr. J. D. Hooker's stay at Calcutta, his leisure hours were spent partly at Government House and partly at Sir Laurence Peel's residence. The attractions he there met with do not appear to have prevented his attention being steadily employed on the great objects of his mission; for towards the close of the month of January we meet him at Mr. Williams's camp, at Taldangah, a dawk station, near the western limits of the coal basin, the Damooda valley; here—

"The coal crops out at surface; but the shafts are sunk through thick beds of alluvium. The age of these coal-fields is quite unknown, and I regret to say that my examination of their fossil plants throws no material light upon the subject; upwards of thirty species of fossil plants have been procured, and of these the majority are referred by Dr. M'Clelland to the inferior oolite period of England, from the prevalence of *Lamia*, *Glossopteris*, and *Tæniopteris*. Some of these genera, together with the *Vertebraria* (a very remarkable Indian fossil), are also recognised in the coal-fields of Sind and of Australia. I cannot, however, think that botanical evidence of such a nature is sufficient to warrant a satisfactory reference of these Indian coal-fields to the same epoch as those of England or of Australia; in the first place, the outlines of the fronds of ferns, and their nervation, are frail characters, if employed for the determination of existing genera, and much more so of fossil fragments; in the second, recent ferns are so widely distributed that an inspection of the majority affords but little clue to the region or locality they come from; and, in the third place, considering the wide difference in latitude and longitude of Yorkshire, India, and Australia, the natural conclusion is, that they could not have supported a similar vegetation at the same epoch. In fact, finding

similar fossil plants at places so widely differing in latitude, and hence in climate, is, in the present state of our knowledge, rather an argument against than for their having existed contemporaneously. The *cycadeæ* especially, whose fossil remains afford so much ground for geological speculations, are far from yielding such precise data as is supposed. Species of the order are found in Mexico, South Africa, Australia, and India, some inhabiting the hottest and dampest, and others the driest climates on the surface of the globe; and it appears to me rash to argue much from the coal of Yorkshire and of India, when we reflect that the geologist of some future epoch may find as good reasons for referring the present Cape, Australian, or Mexican flora to the same period as that of the lias and oolites, when the *cycadeæ*, now living in the former countries, comes to be fossilized.

"Specific identity of their contained fossils may be regarded as fair evidence of the contemporaneous origin of beds, but among the many collections of fossil plants that I have examined, there is hardly a specimen, belonging to any epoch, sufficiently perfect to warrant the assumption that *the species* to which it belonged can be again recognised. The botanical evidences which geologists too often accept as proofs of specific identity, are such as no botanist would attach any importance to in the investigation of existing plants. The faintest traces assumed to be of vegetable origin are habitually made into genera and species by naturalists ignorant of structure, affinities, and distribution of living plants; and of such materials the bulk of so-called systems of fossil plants is composed."

We would glady accompany our author through each step of his route, culling a flower here and there to present to our readers, but such a course would not be just. We can gather but an occasional bud, and trust that they will tempt many to read with the care they so well merit these most suggestive volumes. We had marked the account of Dr. Hooker's interview with Lieutenant Ward, one of the suppressors of *Thuggee*, "who kindly showed him the approvers, or king's evidence, of his establishment, belonging to those three classes of human scourges—"Thug, Dakoit, and Poisoner." We refrain from following our first intention, partly from the conviction that these passages will be transferred into most notices of the work, and partly because, though most curious, it does not, strictly speaking, fall within our province as a Natural History Review. In order, however, to give some idea of the extent to which Thuggee prevails, we may mention that—

"Major Sleeman has constructed a map, demonstrating the number of 'bails,' or regular stations for committing murder, in the kingdom of Oude alone, which is 170 miles long by 100 broad, and in which are 274, which are regarded by the Thug with as much satisfaction and interest as a game preserve in England. Nor are there 'bails' less numerous in other parts of India. Of twenty assassins who were examined, one frankly confessed to have been engaged in 931 murders, and the least guilty of the number to 24."

The details of the entire system, so often, though superficially, noticed in works on India, is here ably condensed, and will, no doubt, be read with interest by all who have the good fortune to meet with the "Himalayan Journals."

In the month of March, Dr. Hooker reached Patna, where he took up his residence with Dr. Irvine, an old acquaintance and botanist; here his

principal object was to see to the opium godowns (stores), which Dr. Corbett, the assistant agent, afforded him every facility for doing. We extract his notes on this great source of East Indian revenue :—

"The East India Company grant licenses for the cultivation of the poppy, and contract for all the produce at certain rates, varying with the quality. No opium can be grown without this license, and an advance equal to about two-thirds of the value of the produce is made to the grower. This produce is made over to district collectors, who approximately fix the worth of the contents of each jar, and forward it to Patua, where rewards are given for the best samples, and the worst are condemned without payment; but all is turned to some account in the reduction of the dung to a state fit for market.

"The poppy flowers in the end of January and beginning of February, and the capsules are sliced in February and March, with a little instrument like a saw, made of three iron plates, with jagged edges, tied together. The cultivation is very carefully conducted, nor are there any very apparent means of improving this branch of commerce and revenue. During the north-west or dry winds, the best opium is procured; the worst during the mist or E. and N. E., when the drug imbibes moisture, and a watery, bad solution of opium collects in cavities of its substance, and is called passewa, according to the absence of which the opium is generally prized.

"At the end of March the opium jars arrive at the stores, by water and by land, and continue accumulating for some weeks. Every jar is valued, and stowed in a proper place, separately tested with great accuracy, and labelled. When the whole quantity has been received, the contents of all the jars are thrown into great vats, occupying a very large building, where the mass is distributed, to be made up into balls for the market. This occupation is carried on in a long, paved room, where every man is ticketed, and many overseers are stationed, to see that the work is properly conducted. Each workman sits on a stool, with a double stage and tray before him. On a top stage is a tin basin containing opium sufficient for three balls; in the lower another basin containing water; in the tray stands a hemispherical cup, in which the ball is worked. To the man's right hand stands another tray, with two compartments, one containing their pancakes of poppy petals, the other a cupful of sticky opium-water, made from refuse opium. The man takes a brass cup, and places a pancake at the bottom, smears it with opium-water, made from refuse opium. Of this he takes about one-third of the mass before him, puts it inside the petals, and agglutinates many other coats over it; the balls are then again weighed, and reduced or increased to a certain weight, if necessary. At the day's end each man takes his work to a rack with numbered compartments, and deposits it in that which answers to his own number; there the balls (each being put in a clay cup) are carried to an enormous drying-room, where they are exposed in tiers, and constantly examined and turned, to prevent their being attacked by weevils, which are very prevalent during moist winds, little boys creeping along the racks all day long for this purpose. When dry, the balls are packed in two layers of six each in chests, with the stalks, dried leaves, and capsules of the plant, and sent down to Calcutta. A little opium is prepared, of a very fine quality, for the Government Hospitals, and some for general use in India, but the proportion is trifling, and such is made up into square cakes. A good workman will prepare from thirty to fifty balls a day, the total produce being 10,000 to 12,000 a day; during one working season 1,353,000 balls are manufactured for the Chinese market alone. The poppy-petal pancakes, each about a foot radius, are made in the fields by women, by the simple operation of pressing the fresh petals together. The liquor with which the pancakes are agglutinated together by the ball maker, and worked into the ball, is merely inspissated opium-water, the opium from which is derived from the condensed opium (passewa), the washing of the utensils and workmen, every one of whom is nightly laved before he leaves the establishment, and the water inspissated. Thus not a particle of opium is lost. To encourage the farmers, the refuse stalks, leaves, and heads are bought up, to pack the balls

with; but this is a far from economical plan, for it is difficult to keep the refuse from damp and insects.

"A powerful smell of opium pervaded these vast buildings, which Dr. Corbett assured me did not affect himself or the assistants. The men work ten hours a day, becoming sleepy in the afternoon; but this is only natural in the hot season; they are rather liable to eruptive diseases, possibly engendered by the nature of their occupation. Even the best East Indian opium is inferior to the Turkish, and, owing to the peculiarities of the climate, will, probably, always be so. It never yields more than five per cent. of morphia, whence its inferiority, but is as good in other respects, and even richer in narcotive. The care and attention devoted to every department of collecting, testing, manipulating, and packing is quite extraordinary; and the result has been an impulse to the trade beyond what was anticipated. The natives have been quick at apprehending and supplying the wants of the market, and now there are more demands for licenses to grow opium than can be granted. All the opium eaten in India is given out with a permit to licensed dealers, and the drug is so adulterated before it reaches the retailers in the bazaars, that it does not contain one twentieth part of the intoxicating power it did when pure."

When Dr. Hooker set out to investigate the botany and the physical character of the eastern extremity of the great Himalaya range, Baron Humbolt addressed him a letter on certain objects which it was especially desirable he should keep in view. He there writes—

"Que je suis heureux d'apprendre que vous allez pénétrer dans ces belles vallées d' l'Himalaya, et même au-delà, vers Ladak et les *Plateux de Thibet*, dont la hauteur moyenne, non confondue avec celles des cimes qui s'elévent dans le plateau même, est un objet digue de recherche."

And in another passage—

"Eclaircir le problême de la hauteur des neiges perpétuelles à la pente meridionale et a la pente septentrionale de l'Himalaya, en vous rappelant les données que j'ai réunies dans le troisème volume de mon 'Asie Centralé."*

We have inserted these extracts, as showing the interest which the veteran Humbolt took in the objects of the mission undertaken by Dr. Hooker. Need we say that the two objects proposed for his observation received such an amount of attention as to ensure their solution. Difficulties of no ordinary character had to be surmounted, arising partly from physical obstacles, which required great labour and patience to overcome, and partly from the jealous bickerings of the Sikkim tribes, who occupied the southern frontier passes; but the task had been undertaken by no mere adventurer; Dr. Hooker was a *genuine* traveller, and no holiday sight-seer, about to write for the million. He had an object in view; and after twelve months of laborious anxiety, he achieved the object of his ambition, and succeeded in determining the elevation of the great Tibetian table-land, and also solving the second problem indicated by M. de Humbolt—the elevation of the snowline. We deeply regret our inability to follow our tra-

* Hooker's Journal of Botany, vol. i., p. 337.

veller through the history of his difficulties, and we feel that to give *any* extract from his most amusing record of them would be doing a positive injustice to their "admirable" relator, who appears to be gifted with a rare union of all that is required to be found in the explorer of almost unknown regions. We venture to predict that Hooker's Journal will long be sought for by the Himalayan tourist as *the* book on that region; one in which the desultory reader will find ample stores of information pleasingly narrated, and in which the studious inquirer will find the most important questions that may, or, indeed, could be brought under his notice, treated of with all the vigour of a master mind.

PALM TREES OF THE AMAZON, AND THEIR USES. By Alfred R. Wallace. With forty-eight plates. London: John Van Voorst. F.cap 8vo., pp. 130. Price 10s. 6d. 1853.

IN this pleasing little volume we have, from the pen of an accomplished naturalist, an account of the Palm Trees of the Amazon Valley. Its author collected the materials during a residence of four years in the valley of that river, which were most labouriously spent in acquiring an intimate knowledge of its natural history. On his return to Europe with a large collection which he had made during his residence there, the vessel in which he was a passenger took fire, and went down, leaving him to the mercy of the waves. He was picked up by the "*Jordeson*," 200 miles from land, and has lived to record in this, and another work of great power and interest, the record of his observations and discoveries. The present work is well got up, and the plates, though uncoloured, are very characteristic of the forms of vegetable life which they represent, and will prove acceptable to many who have not the opportunity of either seeing or procuring the splendid works of Dr. Martius on the Palm Tribe.

Notices of Serial Publications.

[We purpose, under the above head, briefly to notice the contents of the various periodical publications devoted, in whole or in part, to the pursuits of the Naturalist, which may have reached us during the previous three months. We feel assured that in adopting this course, we materially serve the cause of Natural History, by directing the student to the various memoirs which may have appeared either at home or on the Continent on the subjects which engage his attention; while by their being carefully indexed, at the close of each volume, a valuable register will be gradually formed of the progress of scientific observation.]

Annales des Sciences Naturelles. Tom. xx., Nos. 1, 2, 3. Paris: Victor Masson.

No. 1.—*Zoologie*—Memoire sur la destruction des Termites au Moyen d'injections gazeuses, par M. A. de Quatrefages; Note sur les Termites de la Rochelle, par M. A. de Quatrefages; Memoire sur la comparaison des Membres chez les animaux vertébrés, par M. Paul Gervais. *Botanique*—Memoir sur la l'ergot des Glumacées, par M. L.-R. Tulasne; Remarques sur l'organogénie des Hépatiques, par M. G. W. Brischoff.

No. 2.—*Zoologie*—Memoire sur la comparaison des membres chez les animaux vertébrés, par M. Paul Gervais (suite); Monographie de la famille des Ballistides, par M. Hollard; Rapport sur un Memoire de M. Lacaze Duthiers, intitulé; *Recherches sur l'alimentation des Insectes gallicoles*, par M. A. de Quatrefages; Nouvelles observations sur l'ostéologie des *Troglodytes Gorilla*, par M. Owen; Analyse des observations de M. Müller sur le développement des Ophiures, par M. Camille Dareste. *Botanique*—Memoire sur le developpement des Loupes et des Broussins, envisagés au point de vue de l'accroissement en diamètre des arbres dicotylédonés, par M. A. Trécul; Description d' un genre nouveau de la famille des Labiées, par MM. E. Cosson et Durieu de Maisonneuve; Description d'un genre nouveau de la famille des Crucifères, par M. Durieu de Maisonneuve; Vingt et unieme Notice sur quelques *Septoria* nouveaux, par M. J. B. H. J. Desmaziéres; Organogenic des familles des Myrtacées, Punicées, Philadelphées; Loasées et Ombellifères, par M. Payer.

No. 3.—*Zoologie*—Analyse des observations de M. Müller sur le developpement des Ophiures, par M. Camille Dareste (suite); Remarques sur

l'appareil pulmonaire du *Gymnarchus Niloticus*, par M. le Professeur Fœrg de Munich ; Note additionnelle, par M. Duvernoy ; Memoire sur la famille des Ocypodiens, par M. Milne Edwards (suite). *Botanique*—Nouvelles recherches sur l'appareil reproductuer des Champignons, par M. L. R. Tulasne ; Note sur la formation des feuilles, par M. Trécul ; Note sur la Galle des tiges du *Poa nemovalis*, par M. Prilleux.

The Annals and Magazine of Natural History, including Zoology, Botany, and Geology. No. 73, January; No. 74, February; No. 75, March, 1854. 8vo. London: Taylor and Francis. Price 1s. each.

No. 73, January:—(Müller, Johannes) On the structure of the Echinoderms—a translation made by Mr. T. Haxley of a Paper read before the Royal Academy of Sciences of Berlin ; (Sclater, P. L.) On a new species of *Tanager*, in British Museum ; (Kellaart, E. F.) Descriptions of new or little known species of Reptiles, collected in Ceylon ; (Forbes, Edward) Note on *Spadix purpurea*, Gosse ; (Deakin, Richard) Descriptions and illustrations of new species of *Verricaria* and *Sagedia*, found about Torquay, Devonshire ; (Gray, John Edward) Description of a MS. of Laurence Theodore Gronov, lately purchased for the British Museum, with a collection of dry fish which it describes. A box of dry skins of fish, arranged between sheets of cartridge paper, like a collection of dry plants, said to be accompanied with a MS. description, was offered for sale in a collection of objects of *vertu*, in Bond-street ; at the time of sale, and while on view, the MS. could not be found. Dr. Gray, however, thought that, even independently of the MS., the collection would be an advantageous purchase. The MS. was subsequently found, and, on examination, it proved to be a collection, generic and specific, with descriptions, made by L. T. Gronov, better known by his Latinized name Gronovius. In a scientific point of view, such a collection is most important, and we are glad, therefore, to see that it has passed into the hands of the British Museum. (Jordon, T. C.) Catalogue of Species of Plants found in Southern India. Proceedings of Societies—Zoological; Botanical; Royal Society of Edinburgh. Miscellaneous.

No. 74, February:—Monograph British Graphideæ ; (Benson, W. H.) New European Pupa and new Australian Bulimus ; (Jordon, T. C.) Catalogue of Ants of Southern India ; (Hancock) Notes on Greenland and Iceland Falcons ; (Müller, Johannes) On the Structure of the Echinoderms ; (Layard, Edgar L.) Notes on Ornithology of Ceylon ; (Williams, Thomas) On the Mechanism of Aquatic Respiration and Structure of the Organs

of Breathing in Invertebrate Animals; (Kellaart, E. F.) Catalogue of Reptiles collected in Ceylon. Proceedings of Societies. Miscellaneous Notices.

No. 75, March:—(Wright, Thomas) Contributions to the Palæontology of Gloucestershire—a description with figures, of some new species of Echircodermata, from the Lias and Ooilites; (Blackwell, Y.) Description of some newly-discovered species of Araneidea; (Williams, Thomas) On Mechanism of Aquatic Respiration, &c., continued; (Gray, Dr. J.) New Genus and Species of Seals (*Helioptoca Atlantica*) from *Madeira;* (Leighton, Rev. W. A.) Monograph of British Graphideæ; (Layard, Edgar L.) Notes on the Ornithology of Ceylon, continued. Proceedings of Societies. Miscellaneous Notices.

Quarterly Journal of Microscopical Science. No. VI. 8vo. T. Highley.

January, 1854:—(Boswell, R. S.) Remarks on Actinophrys Sol, supplementary to the Paper in the Microscopical Journal, vol. i., pp. 25 and 98; (Busk) Remarks on the Structure and Function of the avicularean and vibracular organs of the Polyzoa, and their value as diagnostic characters in the classification of these creatures. After describing these curious appendicular organs which are affixed to many of the *Cheilostomata* of Busk, or *Celleporina* of Ehrenberg, and rapidly reviewing the researches already made into their structure and functions, their importance, as affording excellent and available systematic characters, is briefly discussed. These organs are divided into two kinds apparently with distinct functions—*avicularia* and *vibracula;* the one, probably, prehensile, the other defensive; of those the avicularia are found by far the most extensively, being wanting in but few of the genera constituting the *Cheilostomatous* class of Polyzoa. For the purposes of classification, they are subdivided into three classes—1st, pedunculate; 2nd, sessile; and 3rd, immersed. The two latter classes run insensibly into each other, while the pedunculate form is quite distinct, as it presents an additional member in the form of a basal joint. To this form of *avicularium* the term "birds," or "vulture's heads," is more properly applied. Examples of this form may be found in *Bugula avicularia*, *B. plumosa*, and *B. flabalata.* Another modification of pedunculate avicularium, where it assumes the form of a large trumpet-shaped or infundibuliform tube, exists in *Bicellaria tuba.* The pedunculate form of avicularium appears to be restricted to the genera *Bugula* and *Bicellaria*, though it does not exist in

every species of each genus, and in one assumes a form quite different from the ordinary. The sessile form of avicularium may be subdivided into the projecting and the immersed. Of these, the latter is the more extensively distributed; it is placed either at the angles or margin of the cells, usually of their anterior aspect, but sometimes on the posterior; instances of this latter may be found in *Cabarea nuda*, and the genus *Retaphora*. The importance of a due attention to these organs as affording specific and even generic distinctions, may be best appreciated in the difficult and hitherto much confused families of Flustradæ—*Membraniponda*, and especially of the *Celliporidæ*, *Escharadæ*, and *Selenaridæ*. In *Lepralia* these organs are of the utmost importance and easily available. The mode in which Mr. Busk has employed this character may be seen in his "Catalogue of British Marine Polyzoa," published by the British Museum. (Queckett, John) On the Minute Structure of a peculiar Combustible Mineral from the Coal Measures of Torbane Hill, &c. This mineral, our readers may remember, has lately excited considerable attention in the scientific world, and a trial, "second to few in importance, has lately taken place in Edinburgh, having for its object the determination whether the Torbane Hill mineral should be called a coal or not, and whether it should be included in the missive of agreement for a lease, and let as coal." On the trial, 78 witnesses were examined—33 for the plaintiff, and 45 for the defendant—who might be differently classified. This memoir only enters into the evidence offered by the microscopists examined, among whom was its accomplished author, and has for its object to prove —"That the Torbane Hill mineral is not, microscopically speaking, a coal; that it is not like any of the combustible substances used in this country as coal; and though possessing some of the properties of coal, it is, notwithstanding, a mineral *sui generis*, having a basis of clay which is strongly impregnated with a peculiar combustible principle; and that when plants are found in it, they are accidental, and have no more been concerned in the formation of the mineral, than has a fossil bone in that of the rock in which it may have been imbedded." (Gregory, William) New Forms and Varieties occurring in the Diatomaceous Earth of Mull, with Remarks on the Classification of the Diatomaceæ. Translations—(Virchow, Rud.) On the Irratibility of Ciliated Cells; (Tulasne, M. L.-R.) On the germination of the Spores of the *Uredineæ*, extracted from "Comptes Rendus," tom. xxxv. Reviews—(Fresinius, Dr. George) Beitrage Zur Mycologie (contributions to Mycology); (Unger, Dr. F.) Botanical Letters to a Friend. Notes and Correspondence. Proceedings of Societies.

ZOOLOGIST. No. 135, January; No. 136, February; No. 137, March, 1854. 8vo. London: Van Voorst. Price 1s. each number.

IN the pages of this periodical, the following, among other articles, have appeared during the last three months :—

No. 135, January:—(Couch, Jonathan) Some further Remarks on Habits of Bats, in continuation of his diary in Zoologist, p. 3,936; (Sclater, Philip Luttley) List of Birds exposed for Sale in the Market at Rome.

No. 136, February:—(Douglass, T. W.) Entomological Localities (continued from page 4,001), Terra Incognita; (Greene, Rev. Joseph) List of Lepidoptera captured near Aylesbury, Buckinghamshire. We see by it that the *Lithosia trebicollis* meets with that pest, the ichneumon, nearly as often as the genus Nothodonta. (Scott, John) A few notes on the necessity for rearing the Tineidæ, and other small groups; (Hogan, Arthur R.) List of Coleoptera found in the neighbourhood of Dublin (second part).

No. 137, March:—Entomological Society, President's Address; an able review of the labours of the British and Foreign Entomologists during the last year. A suggestion thrown out by the learned President we would gladly see carried out in other Societies—namely, that a month's notice should be given of papers likely to excite discussion, in order that the minds of those interested in the subject might have their attention specially directed to them. Miscellaneous Notices, &c.

PHYTOLOGIST. Nos. 102, 103, 104. Price 1s. each. 8vo. London: J. Van Voorst.

January:—(Robson, Joseph) Catalogue of Wild Plants of Gosforth, Cumberland, and adjacent district, in 1853; (Warrington, Robert) On Preserving the Balance between the Animal and Vegetable Organisms in Sea-water. A very interesting communication on a subject which is now engaging the attention of many of our leading naturalists, and which will, probably, ere long, lead to the discovery of many facts hitherto unnoticed. Notices of Books—(Shacht, Dr. Herman) The Microscope in its Special Application to Vegetable Anatomy and Physiology; (Leeman, Berthold, H.M.S. *Herald*) Part III., Botany. Proceedings of Societies—Phytologist Club. Among other notices we have here a new Irish Equisetum recorded, and forming the third striking form of Equisetum discovered in Ireland, the other being *E. Mackaii* and *E. Wilsoni;* the new plant has been named *E. Moorii*, in honour of its discoverer. It may be distinguished from *E. Hyemale*, the species it most resembles, by the *long*, *loose*, *white* sheaths, with *white*, *setaceous teeth*, besides the stems are *longer*, *much more*

attenuated, and have fewer Striæ; the latter characters would appear to connect it with *E. Mackaii*, from which it may be distinguished by the colour of its sheaths, and their having shorter teeth, and in its stems, which never branch. In addition to these marks, it may be remarked, that while the stems of all British unbranched species of Equisetum are persistent, remaining green throughout the winter; the economy of *E. Moorii* is the reverse of this, as its stems die down annually. The present only recorded habitat is clay-banks facing the sea, at Rockfield, County Wicklow, where it was found by Mr. D. Moore, in company with Professor Melville. Botanical Society of Edinburgh; Phytological Club, in connection with the Pharmaceutical Society; Linneæan Society, including notices of two new British ferns, one the *Polypodium alpestre* (Hoppe), and the others supposed to be undescribed, with the name of *P. flexile* provisionally assigned.

February:—(Baker, John G.) On *Salix acutifolia*, and its occurrence in Britain; (Newman, Edward) Contributions towards a History of a British Asplenium, considered as a distinct species, and as entitled to a place in the British Flora. In this contribution we have most ably discussed the claims of *Asplenium acutum* to a place in the British Flora; and we trust that the materials for properly considering the subject, here so impartially collected, will meet with the attention they so well deserve from all botanists who have made our native ferns a special object of study. (Borrer, William) Notes on the "Cybele Britannica," vol. iii. These notes are communicated, with their author's permission, by the able author of the "Cybele Brittanica," to whom they were originally sent. Notices of Books—(Hooker, Sir W. J.) Species Filicum, part vi., or vol. ii., part ii. Proceedings of Societies—Phytologist Club; Linneæan Society; Dublin Natural History Society; Phytological Club; (Tulasne, M. L. B.) On Germination of the Spores of the Uredineæ.

March:—(Leeman, Berthold) Remarks on Sarsaparilla. The object of these remarks is to prove that the greater portion of Sarsaparilla is the produce of *one* species of Smilax, and that species is *S. officinalis H. and B.* (*S. papyracea Poir S. Mediên Cham et Schlecht*), but is not intended by so doing to abolish the commercial distinctions now so universally recognised in the Sarsaparilla trade. As long as the Brazilians continue to strip the roots of the beard, and put them up in the same long rolls as they now do, there will always be Lisbon Sarsaparilla in the market; as long as the inhabitants of the Spanish Main continue to preserve the rootlets, we shall have Jamaica Sarsaparilla; and as long as the climate and other physical circumstances of Guatemala remain unchanged, we shall

always receive from that locality Sarsaparilla, distinguished by its abundance of starchy matter. (Mudd, William) Account of the Lichens of Cleveland. Proceedings of Societies—Phytologist Club, including a list of new or scarce Irish plants, by J. Carroll; Botanical Society of Edinburgh, including notice of *Desmarestia Dresnayi (D. pinnatervia Mont)*, at Molville, near the mouth of Lough Foyle, in August last; and some observations on that troublesome pest, the *Anacharis alsinastrum*, in Ireland, at Waringstown, where it is supposed to have been located nearly eighteen years. Rules of Foreign Exchange Club, which has been established in connection with the Botanical Society of London, to facilitate the exchange among its members of specimens of foreign plants.

HOOKER'S JOURNAL OF BOTANY. Nos. 60, 61, 62. Price 2s. each.

January:—(Bentham, George) Florula Hongkongensis; (Hooker, Sir W. J.) Notice of some of the contents of the Kew Garden Museum; the Poppy family (*Papaveraceæ*) form the subject of the present notice, which embraces most copious details respecting the mode of cultivating the Opium Poppy (*Papaver somniferum L.*); Cyperaceæ Cumingianiæ Herbaris Lindleyani, Auctore Neesis ab Esenberk; Botanical information, &c.

February:—(Spence, R.) Journal of Voyage up the Amazon and Rio Negro; (Roe, J. S.) Report of Journey of Discovery into Western Australia; the Vine Disease. This notice is a translation of M. Tulasne's "Notes on the Fungus which causes the Vine disease," extracted from the "Comptes rendus des Séances de l'Académie des Sciences, vol. xxxvii. This fungus, now well known under the name *Oïdium Tuckeri* (Berk), consists of a network (*Mycelium*) of white, loose filaments, which covers here and there the green and healthy parts of the vine, and causes the formation of brownish or blackish spots. From these filaments, which are all superficial or external on the epidermis of the infested plant, spring thick tufts of simple pointed stalks, the ultimate points of each of which quickly becomes a large oval cell, as capable of propagating the fungus as any true seed could be. Independently of these reproductive bodies, the Oïdium Tuckeri produces brown, generally pedicellate, fruits, coated with a cellular membrane, and containing very minute seeds, capable of germinating. These fruits are commonly larger than the swollen acrogenous bodies, described above, but not always so; they are of the same form, and are often borne on the same footstalk, almost appearing as if they were caused by a transformation of the normal seeds. From a close observation of these peculiar organs, M. Tulasne conjectures that the *Oïdium Tuckeri* is of a very

different nature from that hitherto supposed, and he proposes referring it to the parasitic genus *Erisyphe;* the precise species of which cannot be satisfactorily determined until its ascophorous fruits shall have been observed, as the two secondary modes of multiplication already observed (naked acrogenous spores and polysporous fruits) are not sufficient to distinguish it from many of its congeners. (Leeman, Berthold) Remarks on Passifloraceæ and Turneraceæ. These orders, confessedly closely allied, are proposed to constitute one and the same natural family of plants; the connecting link being the American genus *Eriblichia*, one of these peculiar genera the discovery of which will always produce great changes. Botanical information—Plants of Boazel; Bourgeau's Spanish Plants; British Hieracia; Linden's South American Plants. Notices of Books—Steetz's Family of Iremandrex (Die Familie der Iremandreen, &c.); Botanists' Word-book (Macdonald and Allan); Monographic des Maratteacees (De Vries and Harting); Notes on Welwitsch's Cryptogamic Plants collected in Portugal, 1842-50 (Rev. M. J. Berkeley).

March :—(Thwaites, G. H. K.) New Genera and Species of Ceylon Plants; (Bentham, George) Florula Honkongensis, comprising Genera allied to Euphorbiaceæ; (Roe, J. S.) Report of a Journey of Discovery into Western Australia; (Smith, John) Observations on a remarkable Cycadeous Plant from Port Natal. Botanical Information—Pine-leaf Fibre of the Silesias and Bahamas Plants of Armenia, Mons. Huet de Pavillon's collection of; South American Plants, Mr. Spencer's collection of; Plants of the North of Western Australia, Mr. Drummond's collection of; Plants of Tunis, appointment of M. Kralick as collector of. Notices of Books—Carpary Geneva Plantarum Flora Germanica, Fasc. xxvii.; (Klotzoch, J. F.) Uder Pistia; (Lindley, Professor) Folia orchidacea, Part v. London, 1854.

The Journal of Industrial Progress (Edited by W. K. Sullivan). No. 1, January; No. 2, February; No. 3, March. 8vo. Dublin: W. B. Kelly. Price 1s. each part.

If, in the present day, there can be any necessity to reply to the question, "What practical end do the researches of the scientific naturalist ever tend to?" an answer might be readily found in the pages of this most promising Journal. We can only refer here (as is the case with other serials) to those papers which are connected with the pursuits of the naturalist.

No. 1, January :—(Sullivan, W. K.) On the Undeveloped Resources of Ireland—No. I., Application of Fish Offal and Marine Exuvia to the Manufacture of Artificial Manure.

No. 2, February :—(Corte, M.) On the Artificial Oyster Beds of Lake Fusaro, and the importance of adopting a similar method on other Coasts.

No. 3, March :—(Allman, G. J.) On the Artificial Breeding of Fish; a most able memoir on a subject now attracting considerable attention. (Jukes, J. Beete) The Mines of Ireland, No. I.

The Naturalist: conducted by B. R. Morris, Esq., A.B., M.D. Nos. 35, 36, and 37. 8vo. Groombridge and Co. Price 6d. each number.

No. 35, January, 1854 :—The Coney; Notes on the Cere and Legs of Birds; Notes on the days when the Summer Birds were first observed about Barnsley; Protracted continuance of Insects in Chrysalis state; Notes on the Lepidoptera of Banff; the Propagation of Hardy Trees and Shrubs; Anagallis Arvenis, &c., in Flower, November 14; Miscellaneous Notices; Review; Retrospect; Querist.

No. 36, February, 1854 :—A Glance at the Feathered Residents in, and Visitants to, the Grounds of Terrick House; Local Jottings, No. 11., Dorchester—Dorsetshire; Notes on the Dodo; Extracts on the Nightjar, or Fern Owl; Entomologist's Excursion to Ebbor Rocks; Two new British Marine Algæ; Miscellaneous Notices; Proceedings of Societies; Querist.

No. 37, March, 1854 :—Utility of the common Mole; Notes on the Nesting of Birds; Ornithological and other Notes; The common Ring-snake; The Salmon Manufactory on the Tay; Lepidoptera round Exeter; Stray Notes on the Elm; Sand Martins; The Late Frost; Miscellaneous Notices; Retrospect; Querist.

Proceedings of Societies.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 14, 1853.

Dr. Stevelly in the chair.

Professor M'Coy read a paper "On Experiments to determine the Effect of Pressure in Modifying the Temperature of Fusion, with their Applications to Geology;" in which he drew attention to the great apparent difficulties of reconciling the precision of the equinoxes and rotations of the earth's axis, with theoretical views supposed to follow from a consideration of experiments on central heat. He then described the instruments and mode of procedure adopted by Mr. Hopkins, of Cambridge, in his recent successful experiments, which proved that the great mass of the earth might be solid, although heated far above the temperature required to fuse all known rocks at the surface.

DECEMBER 21, 1853.

Mr. Patterson, President, in the chair.

Mr. A. O'D. Taylor read a paper on "The Gigantic Birds formerly found in the Mauritius and adjacent Islands." Having glanced at the subject of geographical distribution, he mentioned the Æpyornis of Madagascar, a bird which M. St. Hilaire, of Paris, supposes to have been from $9\frac{3}{4}$ feet to 13 feet in height. This conclusion had been arrived at from inspecting some immense eggs and bones found in the alluvial deposits of that island. The Dodo of the Mauritius was next noticed; it was exterminated by the year 1679, and now the only sources of information regarding it are the rude descriptions of unscientific voyagers, three or four oil paintings, and a few bones. It appears that two species of brevi-pennate birds were to be found in Bourbon during the 17th century; one of which was mentioned by a French visitor in 1669, and by him called the "Oiseau Bleu;" and another species was described by a Captain Castleton, who touched there in 1613. It is also known that a very large bird, called from its habits the "Solitaire," inhabited the neighbouring island of Rodriguez, in the early part of the 18th century. These four last-named species seemed to have been destroyed chiefly, if not entirely, by the agency of man, from whose destructive powers escape was impossible; for these birds had no means of defence in the shape of dangerous talons or otherwise; they were supplied with merely rudimentary wings, and the isolated tracts over which they ranged were exceedingly limited. It cannot, however, be positively affirmed that the Æpyornis of Madagascar is extinct, as that island has been scarcely explored in any parts by scientific men, and it is not impossible that the Æpyornis, or some allied species, may yet be discovered in the lonely central tracts. In illustration of the subject, Professor Carlile exhibited some bones of the "Dinornis," sent from New Zealand to Dr. Dickie. Professor Carlile explained the peculiarity of structure in these osseous fragments, their formation, indicating a more simple or less advanced stage of development than now obtained amongst

birds. He also alluded briefly to the "Porphyrio Melanotus," a cognate species of which a specimen was exhibited.

After the conversation which the paper elicited had terminated, the President, Mr. Patterson, laid before the meeting a specimen of the sea-loche, "Motella tricirrata," which had been captured in Strangford Lough, and forwarded immediately to the Museum through the kindness of Mr. B. Meenan, to whom the thanks of the Society were desired to be offered for his attention.

JANUARY 25, 1854.

Dr. ANDREWS, V.P., in the chair.

Dr. Stevelly delivered a lecture on the "Electric Telegraph," detailing its history and present mode of operation, illustrated by numerous diagrams and apparatus.

FEBRUARY 1, 1854.

Dr. DICKIE, V.P., in the chair.

Mr. R. Patterson read a paper on the "Instincts of Animals." After some introductory remarks, an extract was read from Paley, and one from Kirby and Spence, to show the meaning attached to the term "instinct" by those writers. It was then remarked that, up to the present time, we had not any really philosophical treatise on the subject, and that the humble inquirer of the truth could do little more at the present time than classify the observed facts under distinct heads. Acting on this idea, Mr. Patterson brought forward examples of instincts for the propagation and support of offspring; and, next, of instincts for the well-being of the individual. After these had been dwelt upon at some length, instincts which were originally acquired, and had in time become hereditary, were referred to, and the common but erroneous opinion that all the actions of the lower animals are to be attributed to instinct, and those of man to reason, was noticed, and the views on this subject entertained by Archbishop Whately were brought forward. After showing that, among animals, we have instances of this conforming to circumstances, and adapting means to an end, examples were adduced of their manifesting emotions and passions similar to those of man, and the question discussed, of how are actions which are properly the result of reason, to be distinguished from those which are instinctive? The remarks of Archdeacon Paley, of Lord Brougham, Dr. Reid, were referred to on this subject, and illustrative examples given from the writings of White, Darwin, and other naturalists. An animated and protracted discussion took place at the conclusion of the lecture, in which Professors Stevelly, Dickie, M'Cosh, and other members took part.

MARCH 1, 1854.

ROBERT MACADAM, Esq., in the chair.

Mr. Patterson read some notes on "Chinese Mirrors."

When Sir James E. Tennent was last in Ireland, he entrusted to Mr. Patterson's care a Chinese mirror, in order that the members of the society might have an opportunity of examining it, and expressing their opinions as to its construction. Sir James, it will be remembered, had been a member of this society many years ago, and has always manifested the warmest interest in its progress. During his residence at Ceylon, he collected various specimens of great interest and value, many of which were presented, on his return, to the Belfast Museum.

The Chinese mirror consists of a thin disc of yellowish-white metal, slightly convex on one side, and slightly concave on the other. The convex side is highly polished, so that it may be used as an ordinary mirror; the other is ornamented with figures

in relief. The peculiar property of it is, that if the polished side be used to reflect the rays of the sun on any plain surface, the reflection presents a perfect image of the figures on the other side. This singular phenomenon has been explained in two ways. Sir John Davis, the author of a work entitled "The Chinese: a General Description of China and its Inhabitants," says that the effect is produced by etching on the convex side a copy of the figures on the other; that the surface is then highly polished upon some soft, yielding substance, as cloth, so that the hollows may be polished equally with the rest of the surface; and that this etching is so light that the figures will only be visible in very strong lights.

Professor Faraday supposes that the mirror is cast in what is technically called a "chill," that, consequently, the density of the thick parts of the mirror is less than that of the thin portion; that the surface in the process of polishing grinds away unequally, as the denser parts will resist the grinding more than the other; that thus hollows are produced on the convex surface corresponding in position to the figures on the back, and that these form concave mirrors, which reflect the images as described above.

At Mr. Patterson's request, Mr. William Gray, a member of the society, undertook to make a small casting to test, from actual experiment, the effect of a "chill." His experiments, however, were not sufficiently extensive to enable him to arrive at any satisfactory conclusion on that head; but, from the difficulty he experienced in getting the metals composing the alloy thoroughly mixed, he thought that the unequal density on the metal, arising from imperfect mixture, would materially interfere with like unequal density arising from the mode of casting. Hence he inferred that the less dense portions of the convex surface would not invariably correspond in position to the figures on the back, and he suggested that, after the mirror had been cast in a "chill," as Professor Faraday supposed, the upper surface was subjected to some such process as that described by Sir J. Davis. By this means slight hollows would be produced in proper positions; and, afterwards, in the process of grinding, the hollows would become greater when the density had varied according to the law laid down by Faraday, and the inequalities of surface produced by the acid in those parts of it where the density was regular would not be diminished by grinding the surface on cloth.

Mr. MacAdam read some notes on Physical Geography, relating to the distribution of the great masses of land on the surface of the globe, and referred to some theories which had been started in explanation.

Mr. Patterson laid on the table a number of engravings of Lycian coins, and read the following announcement respecting them:—"Sir Charles Fellows, being about to publish some account of relative dates of the works of art discovered by him in Lycia, is anxious to perfect, as far as possible, the portion illustrated by the ancient coins of that province. Sir Charles sends impressions from the plates he is preparing, and asks assistance in making *additions* or corrections, that he may be enabled to to bring together, he believes for the first time, all the coins of Lycia before the age of Alexander the Great."

DUBLIN NATURAL HISTORY SOCIETY.

FEBRUARY 10, 1854.

Dr. GORDON, M.R.I.A., in the chair.

The usual routine business being disposed of, Mr. Kinahan presented to the Society two volumes of Pennant's "British Zoology."

Mr. Callwell, in proposing a vote of thanks for the donation, observed that works of such a class were valuable to the Society as records of the state of zoology of that day, and as comparison withh the present superiority of all works of the kind, and of the advanced state of scientific research. The works of Pennant, however, are well known for the accuracy of his details.

Mr. Andrews then said that he had a few remarks to make relative to the paper brought forward on a former evening, on the capture of the membranaceous duck, in Castlemaine Bay, County Kerry. He had since traced every circumstance fully confirmatory of its capture there; he regretted, however, that the trachea or windpipe had not been preserved, nor the sternum, which might have afforded additional interest to the observations. Apparently, the membranaceous duck would possess great power of flight, although its wings were extremely short, as in the Fuligulinæ, the scaups or pochards, &c., whose powers of swimming and diving are great. Through the kindness of Dr. Farran, he had the opportunity of exhibiting and comparing fine specimens of the gadwall and of the shoveller duck. These beautiful birds, like the membranaceous duck, were remarkable in having the laminæ of the mandibles largely developed, and which were strongly so in the gadwall—a provision suiting them to their peculiar habits of feeding. The membranaceous duck, whose bill was extremely soft in its substance, seemed only suited to feed upon the softer mollusca and gelatinous marine and freshwater animals; thus, the finely pectinated laminæ retain the minute creatures upon which the bird feeds, allowing only the watery portions to escape. In the paper before alluded to he had mentioned the capture, off the island of Valentia, of the dusky petrel, Puffinus obscurus, and he was now, through the kindness of Mr. and Mrs. Blackburne, of Valentia, enabled to exhibit the specimen, which had been beautifully preserved. This bird—the Puffinus assimilis of Gould, a native of Norfolk Island and the eastern shores of Australia—is the first record of its capture in Europe, never having been known north of the Mediterranean. It is, however, plentiful at the Cape of Good Hope, and, probably, on the north-west coast of Africa, and its true specific name is the dusky petrel, Puffinus obscurus. The Puffinus obscurus is extremely like the Manx petrel, Puffinus Anglorum, but is readily distinguishable by its diminutive proportions. At the same time, the dusky petrel is a southern species, while the Manx petrel is a northern. Mr. Andrews had also the opportunity of exhibiting a specimen of the Manx shearwater with the egg, taken in one of the cliffs, on the Island of Valentia. These birds were always considered to breed on the Skellig Islands, but Mr. Andrews had never known the eggs to be obtained there. An egg had been sent to him taken from the smaller Skellig Island, stated to be that of the Manx shearwater, but, on comparing it with the egg sent by Mr. Blackburne, it was of much smaller size, and not so oval as the egg of the Manx shearwater. On examination of the eggs in the British Museum, Mr. Andrews found one corresponding with it, marked as the egg of Bulwer's petrel, Thalassidroma Bulweri. It was gratifying to have so well authenticated, by Mr. Blackburne, the egg of the Manx shearwater, as it but little known to the naturalists of this country. The eggs of the petrel are large in proportion to the size of the birds, and it would be extremely interesting yet to prove that the egg of the petrel that had been sent to him was that of T. Bulweri. Having noticed these instances on the west coast of such rare birds, discovered within the last year, we may naturally expect to meet other species of the petrels on that coast. The petrels on the south-west coast seemed principally to breed on the smaller Skellig Island, and on the islands of Innismacalaun and Innisnabroe—two of the Blasquett Islands. In concluding, Mr. Andrews could not but observe on the extreme interest of the birds exhibited this evening; two of the rarest additions to British ornithology that had been made for years. The dusky petrel excited great interest, when exhibited by Mr. Yarrell, at the Linnæan Society, in June last; and this society was much indebted to the kindness of Mr. and Mrs. Blackburne, of Valentia, in now affording the opportunity of seeing the specimen, and of that of the Manx shearwater. Living in a wild and remote retreat, Mr. and Mrs. Blackburne, with their daughter, devoted much of their time to literary pursuits, and the two latter had, by their observations, gained and added much interesting information to the zoology and botany of that district.

Mr. Williams said that he had long and great experience in watching the habits of water fowl, and he did not consider that the shoveller had any peculiarity in its feeding; he observed it, when swimming, to skim the surface of the water with its bill, but it ate potatoes and meal, in common with other of the duck tribe.

The Chairman remarked that the habits of birds in confinement could not be

considered generally as the true mode of seeking and using food, as their wild state influenced them. They more commonly adapted their habits to the use of the artificial food supplied to them.

Mr. Andrews said that, in the instance of a merganser, whose strong serration of the mandibles in the wild state enabled it to retain the fish it captured, the serrated character of the bill became blunt, and, to some degree, obliterated, by its change of food in confinement.

Mr. Kinahan observed, that the paper possessed particular interest in the remarks concerning the breeding of the Manx shearwater and Bulwer's petrel in this country. Mere stragglers have no right to be regarded as natives, though their occurrence should always be noted. He had no doubt that observation would add some birds to the list of those which breed in this country, at least occasionally. He might remark, that he believed the siskin was amongst the number, having met them in various years, in the summer, in Rathgar and Donnybrook, in the County Dublin, and in Tipperary, and in Powerscourt woods as late as the 22nd of July. He had also little doubt that the redwing sometimes bred here, and it was also believed that the black-cap warbler did so too.

Mr. Kinahan then read his paper

ON THE REPRODUCTION AND DISTRIBUTION OF THE SMOOTH NEWT, AND A NOTICE OF THE POPULAR SUPERSTITIONS RELATING TO IT.

Some years ago my attention was directed to these interesting animals, chiefly with reference to the number of species found in and about Dublin. I was then so fortunate as to have an opportunity of watching the progress of some of the earlier stages of development of our only Dublin species, the smooth newt, (L. punctatus—Bell. Within the last few months my attention was again called to them, by a very interesting and valuable paper, by J. Higginbottom, of Nottingham, in the annals for December, 1853. In this paper, which is stated to be the result of five years' close study, the author enters very fully into the habits and distinctions of the different species, corroborating, for the most part, the previous researches of Rusconi, in his "Amours des Salamandres," and of Professor Bell, in his excellent treatise on British reptiles, and also adding much to our knowledge by researches into what he calls their terrestrial stage. On reading this paper, I was struck with several discrepancies between Mr. Higginbottom's and my own observations. Whether this arose from his observations having been made solely on the warty newt (on which point there is some ambiguity in his paper), and mine on the smooth newt, or from some accidental cause, leaving others to decide, I shall content myself with detailing what I saw, and pointing out the discrepancies between the conclusions arrived at by Mr. Higginbottom and the results of my experiments. On the 11th May, 1851, I placed two smooth newts (L. punctatus—Bell), one a female, captured in the Bishop's Fields, on the preceding day, the other a male, taken some ten days previous, in a glass jar, four inches in diameter, and about eighteen inches high; this was filled with water within a few inches of its summit, and had floating in it a plant of the Indian pond-weed (Pistia stratiotes). On the 15th I found that the female had deposited half-a-dozen eggs; these were small and made up of a round, white body, about the size of a grain of white mustard-seed (which it much resembled), floating inside of a pellucid, opal-coloured sac. During the two following days she deposited about a dozen more; they were arranged in strings of four to six, adhering in rows, and intertwined among the long, floating roots, and also through the axils of the leaves, but in no instance could I find them deposited singly in the folded edges of the leaves as Bell states, and Mr. Higginbottom asserts, is necessary for their preservation. Bell, indeed, states that they are sometimes placed in the axils of the leaves. The female, when depositing the ovum, wound her tail round the roots of the plant, as if to anchor herself. Of the ova produced I distributed among my friends all but two; these I placed in a small bottle of water, in a window facing the south-west, in a room of the temperature of from 60 to 70 degs. Fahrenheit. They were soon hatched; the one on the 3rd of June, the other on the 5th. This appears to contradict Mr. Higginbottom's statement, that the ova must be folded up in a leaf, and thus protected from the free

access of the water, as these ova were hatched while lying in the bottom of the vessel, and had been knocking about for several hours, in a small bottle, in my pocket, previous to having been placed in the window. I do not mean to assert that the ova are not deposited also singly in the folded leaves, but merely that they are not necessarily so. The progress of their farther metamorphosis has been so well detailed by Bell that a lengthened description on my part were superfluous; suffice it to state, that the newts lived with me for fourteen days from the day they were hatched, and five weeks from their extrusion as ova; they then died, and, at this period, the most forward had the anterior extremities well-formed, and the situation of the posterior marked by a protuberance on each side, as you may see.

With respect to fecundation, my observations would lead me to corroborate Professor Bell's statement, in opposition to the belief of Rusconi and others, including Higginbottom—*i.e.*, I believe it is to be internal, with actual contact. This species is distributed through the entire of this county (Dublin), even at considerable elevations above the sea. I have found them near the summit of Howth, and in every quarry-hole among the Dublin and Wicklow mountains. It is known by several names—in its aquatic state, as man-keepers, man-eaters, dark-leukers, daddy-leukers, and art-leukers; and, in its terrestrial stage, as the dry ask and lizard. It is much earlier in awaking from its hibernation, and seeking the water here than in the midland counties of England. I generally find them in the ponds in the Bishop's Fields, about the second week in February. In other parts of Ireland they are pretty generally distributed. Thompson states, "occurring from north to south, but not generally distributed;" and in his comparative list records it in Belfast, Dublin, and the west. There are numerous specimens of this species, obtained in the north, in the Ordnance Survey collection, now in the Museum of Irish Industry. I have obtained it in, or received specimens from the following places:—North of Clare, rare; Tipperary, north, scarce; south, common; King's County, Kildare, Wicklow, Wexford (where it is also called Evet); Kilkenny, on the authority of the Rev. J. Graves, who informs me it there goes by the name of dark leuker, which, he suggests, is derived either from dearc, a reptile, and leucair, brightness—*i.e.*, the shining reptile; or from luacrac—*i.e.*, the reptile dwelling in rushy places—by this name it is known all over Ireland. It is also, I am informed, found in Louth, Queen's County, and Carlow. It is omitted in the catalogue of the Cork Cuverian Society; and I searched for it unsuccessfully about Youghal and Ardmore, though I have reason to believe it is found in part, at least, of the County Waterford. Rutty, in his "Natural History of Dublin," mentions this animal among "the quadrupeds," in its two states, as distinct species:—1st. The dry ask, or man-keeper; 2. The water ask, or arglogher (the last manifestly the same word as dark leuker, which name, in some parts of the County Dublin, is pronounced art looker). He mentions, for the purpose of contradiction, two traditions, connected with it as current in his time—1st. That it is poisonous. 2nd, That it can live in the midst of fire. With respect to its popular name, I find some of the lower orders call both the dry ask and the water ask, man-keeper or man-eater, while the names dark leuker, &c., are restricted to the animal in its aquatic state. In Scotland, in Gaelic, the animal is also called Dearc luachrach. I find, also, that, in part of Kilkenny, it is also called Derrig na dioul—a name properly applied to one of the Staphylinidæ. This brings me to the third part of my paper—viz., the superstitions connected with this animal; there are several of these curious and interesting, as having a connection with the religious belief of the former inhabitants of this country, and are now fast dying away. In almost every part of the country we find these animals looked on with disgust and horror, if not with dread; this arises from two superstitions—one, common to a great part of Ireland, relating chiefly to the animal in its aquatic state, and which, in the County of Dublin has earned it the names of man-eater and man-keeper, though the dry ask of the county of Dublin—*i.e.*, the animal in its terrestrial stage, is supposed to be equally guilty with the first-mentioned in the habit of going down the throats of those people who are so silly as either to go to sleep in the fields with their mouths open, or to drink from the streams in which the dark leukers harbour; they are also said to be swallowed by the thirsty cattle; in consequence, the country

people kill them wherever they meet them on land, and poison the stream they are found in, by putting lime into the cattle's drinking pools. In either case the result is the same; the reptile taking up his quarters in his victim's interior—in some way, it would puzzle a physiologist to explain how—contrives to live on the nutriment taken by the luckless individual or animal, so that, deprived of its nourishment, the latter pines away; nay, so comfortable does the newt make herself, that, not content with living by herself, she contrives to bring up a little family. Often have I been told of the man who got rid of a mamma newt and six young ones by the following recipe, which, I am assured, is infallible:—The patient must abstain from all fluids for four-and-twenty hours, and eat only salt meats—at the expiration of this time, being very thirsty, he must go and lie open-mouthed over a running stream, the noisier the better, when the newts, dying of thirst, and hearing the music of the water, cannot resist the temptation, but come forth to drink, and, of course, you take care that they do not get back again. The dry ask, in addition to this evil character, is also supposed to be endowed with the power of the evil eye, children and cows exposed to its gaze wasting away. The Rev. J. Graves writes to me, that in Kilkenny it is looked on as "a devil's beast," and, as such, burnt. But, to compensate in some measure for its evil qualities, the dry ask is said in Dublin to bear in it a charm. Any one desirous of the power of curing scalds or burns, has only to apply their tongue along the dry ask's belly to obtain the power of curing these ailments, by the touch of this organ. In the Queen's County it is also used to cure disease, but in a different manner, being put into an iron pot under the patient's bed, it is said to effect a certain cure, though of what disease I am not quite clear. Of the other species of newts I have not been able personally to find any trace. The warty newt, T. cristatus, rests solely on Mr. Templeton's authority; it is an inhabitant of every part of England, and might naturally have been expected to be found in Ireland. It may, perhaps, yet be found in the western wilds, where Mr. Thompson has, from description only, recorded the palmated newt, L. palmipes, which has been found both in England and Scotland. It is recorded in the catalogue of your museum, but of the locality where it is said to be obtained I cannot find any record. Other points of interest, relating to the economy of these animals—many of them bearing on Mr. Higginbottom's paper—I hope, at some future period, to lay before you, when I have made further experiments.

After some interesting discussion, the meeting of the Society was adjourned to the month of March.

MARCH 10 1854.

Dr. CROKER, M.R.I.A., in the chair.

After the usual preliminary business,

Mr. Andrews stated, that he had received a communication from Mr. Ffennell, Inspecting Commissioner of Fisheries, mentioning that his absence from Dublin would prevent him from giving his paper "On the Propagation of the Salmon, and on the Progressive Development of Ova, the results of experiments now carrying on," until next month.

Mr. Gilbert Sanders read the following paper:—

ON THE FRUCTIFICATION OF THE GENUS DESMARESTIA.

At the request of my friend, Dr. Allman, I beg to present to the Dublin Natural History Society a short description of the fructification of Desmarestia, as observed in the species Ligulata. Dr. Harvey, in both editions of his Manual, and in the Phycologia—as well as every other algological authority I am acquainted with—records the fructification of Desmarestia as unknown. I was recently engaged in microscopically examining the structure of several specimens of Desmarestia ligulata, when I observed some very minute brown dots on the pinna I had under the microscope, which were resolved by a higher power into well-defined tubercles, through the pellucid walls of which I saw assemblages of angular spores of the usual pink colour of the spores of the Florideæ. Further examination showed that these

tubercles were pretty freely distributed over both surfaces of the pinna, on the margins as well as on the flat surfaces; those seen on the margins, being in profile, showed a hemispherical outline, the greater part of which projected beyond the margin. I have no doubt of these tubercles being the fruit, and that they are to be regarded as conceptacles and superficial. I examined pinnæ from two other specimens of D. ligulata, which I had in my possession some years, and in both I noticed traces of the same appearance of fruit, but not nearly so distinct as those on my first specimen. In these last the capsules and spores appeared to have discharged their endochrome, which is very probable, as this genus is very impatient of fresh water, or even exposure to the air, decomposition commencing almost immediately after they are removed from the sea. If the mode of fructification is to guide us in the arrangement of the genera under orders, I conceive Desmarestia should be removed from the order Sporochnacæ to Dictyotacæ, as the fructification I have observed in D. ligulata is much more conformable to the latter order than to that of the former. I have not as yet perceived any symptom of fruit either on D. aculeata or D. viridis, but the scattered single spores, so very abundant on Mr. Sawer's late important addition to British botany, Desmarestia pinnatinervia, cannot but be the fruit of that species. These spores have the same pink colour as those of D. ligulata; but, instead of being in capsules, they appear on every part of the frond, like strings of beads or chains. I think it not improbable that young spring plants of the two other species, aculeata and viridis, will reward careful examination by a discovery of their fructification, and I would recommend search to be made among the Byssoid fibres with which the young plants are clothed.

I take this opportunity to exhibit some specimens of Desmarestia Pinnatinervia, for which I am under obligation to Mr. William Sawers, of Londonderry, to whom belongs the honour of adding it to the marine botany of our country. Mr. Sawers sent specimens of his plant to the meeting of the British Association, at Hull, and to most of our best algologists, some of whom pronounced it a mere variety of a Laminaria. At length specimens reached Dr. Montague, of the French Institute, who recognised it as his D. Pinnitinervia, a description and figure of which he gave in the "Annales des Sciences Naturelles," for 1842, vol. xviii. As there are some differences between the appearances of the Spanish plant, as described by Dr. Montague, and those found by Mr. Sawers, I will refer to a free translation which I have made of the article in the "Annales."

"Is it truly a Desmarestia? That is a question not easily decided, in the absence of any fructification. M. Aghardh is inclined to believe it is to that genus we should refer it. This alga requires careful description, because it has a perfect resemblance to Laminaria debilis, collected on the coast of Corsica by my friend Mr. Solierol. The only differences which I have found, though essential differences, and which separate our plant from those with which I have compared it are—first, the presence of a well-defined stipe, about four or five millimetres long—second, a midrib, which traverses the entire length of the frond, and from which nervures issue to the right and left, at the distance of five and ten millimetres from one another, forming, with the midrib, angles of about 24 degs. All these nervures, though strongly marked, are of the greatest tenuity. The form of the frond is obovate, fourteen millimetres long by eight in width at the widest part, which is the summit. It has the same delicate tissue as Laminaria debilis. If it is a Desmarestia, as all believe it to be, we must consider the frond as formed by the fusion of the opposing pinnules, which will represent the nervures."

The differences which I find between the Spanish plant as described by Dr. Montague, and the specimens of the Irish plant supplied by Mr. Sawers are—The Spanish plant is dentated at the margin, obovate, and the widest at the summit. Mr. Sawer's specimens are entire at the margin, very slightly waved, lanceolate, and widest about one-fourth of the length of the frond from the base, tapering thence towards the summit; the proportions of length and breadth of the two plants, are very dissimilar. However, I am inclined to regard them at present as identical, merely altered by the circumstance of climate. It is singular that, although the figure given in the "Annales" exhibits an appearance of dots, Dr. Montague has made no mention of chain-like series of spores, such as are contained in the dots in Mr. Sawer's plants.

I imagine that, from these spores on our Irish specimens, the exotic ones have them also. By some it has been doubted if the plants, taken at Lough Foyle, are indigenous to that coast, but have supposed them to be stray waifs, brought from more temperate regions by tides or currents. I cannot subscribe to such ideas, from the fact of Mr. Sawers having found fronds of his Desmarestia in tolerable abundance during a large portion of last year (1853), even up to near Christmas, and as Desmarestia undergoes decomposition so very rapidly when dead, I cannot believe it possible those fronds, which we see here in excellent preservation, could have been knocking about on the ocean for months. I, therefore, conclude they grew not far from the spot where Mr. Sawers found them. In conclusion, I would wish to remark on the doubt implied in Dr. Montague's paper as to the alga in question being a Desmarestia. The structure certainly agrees with that of ligulata. As my specimens were quite dry when they reached me, I could not determine if the single-jointed tube, mentioned by Dr Harvey, as traversing the fronds, exists in pinnatinervia. Should it be found there, I have no doubt that it will appear in the nervures and midrib. Altogether, the question is one of much interest to algologists, and I look forward, with expectation, that Dr. Harvey will investigate the subject on his return, and clear up existing doubts. I think it very evident that if the pinnatinervia be a Desmarestia, and if the tubercles I have observed on ligulata be the true fruit, then Dr. Harvey will have to construct the genus anew, for the diagnosis does not meet the existing facts.

[Mr. Sanders gave very clear explanations of his several microscopical examinations, which he illustrated by handsomely-coloured diagrams. He was clearly of opinion that he had detected the spores indicative of a true state of fructification.]

The Chairman said that the society was much indebted to Mr. Sanders for the very interesting statement he had given—interesting, because Mr. Sanders had brought forward an investigation which had hitherto escaped the notice of the scientific. He would be happy to hear any remarks on Mr. Sanders's views.

Mr. Andrews said that it would be difficult to comment on the excellent statement made by Mr. Sanders, unless the same opportunities of investigation had been afforded, that Mr. Sanders so perseveringly followed out. The highest credit was due to Mr. Sanders in submitting views which had not been noticed by any authority in algology. Statements, so put forward, had frequently influenced fuller inquiries, and which often resulted in the formation of new alliances or genera. In a notice of the discovery, in Cork harbour, by Mr. Isaac Carroll, of Stenogramme interrupta, Dr. Harvey, in this society, gave a review of the several discoveries and wide distribution of that plant. This genus was established by Dr. Harvey; Agardh, who had constituted it a Delesseria, having mistaken the linear conceptacle for a nerve. Many of our most commonly distributed lichens and mosses are considered a rarity when found in fruit, and several species of the most frequent occurrence have never been known to fruit in the British Isles. Desmarestia ligulata is a plant of common occurrence. On the west coast it may be found in the tide pools of low water mark, and to the greatest depth that algæ exist. Mr. Andrews trusts that Mr. Sanders may successfully establish the investigations which he has so ably commenced.

Dr. Kinahan next read the following paper:—

ON THE INJURY DONE TO FRY IN FISH PONDS AND VIVARIA, BY THE SMOOTH-TAILED STICKLEBACK. G. LEIURUS (CUV. AND VAL.).

During a former session I had the honour to submit to your society some observations on the spawning of the above fish; to-night I have occasion again to call your attention to it with reference to a very different matter, the destruction it causes among young fry, a subject of economic importance, since the breeding of fish has become not only a fashionable amusement, but even an object of commercial speculation. That the smooth-tailed stickleback, and, indeed, all the fresh-water fish of that genus, are, when grown, most destructive to fry, even of fish much larger than themselves—such as gudgeon, rudd, dace, minnow, trout, &c.—has long been established by Baker and others, and any one anxious to verify it for himself need but to watch the shallows adjacent to the spawning beds, where the

fry congregate, to have an ample proof of it, among the myriads of pinkeens which swarm in such places. In fact, the voracity of the mature or half-grown stickleback almost exceeds credibility. Nothing comes amiss that has life—small crustaceans, molusca, fry, often double their own size; worms, grubs, all alike are acceptable. I have often been amused by the struggles and efforts of a pinkeen to engulf one of those large white moths which, in the autumn, are so often found floating on the water; the fish, being unable to get a sufficient purchase to enable him to overcome the resistance offered by the insect's outspread wings, would return again and again to the charge, spinning the moth round and round on the water, and often, in his eagerness, springing completely out of it himself. A still more remarkable instance of this ravenous appetite fell under my notice, having when bait fishing, captured a pinkeen, scarcely more than an inch long, on a hook, armed with a gentle nearly as big as himself, which the little brute had the impertinence to swallow, and was, in consequence, hooked through the lip. But, though acquainted with the voracious appetite of the full-grown fish, I must confess I was not prepared to find it more strongly developed in the fry scarce six weeks old, rendering them the terror and scourge of the fish pond—a fact first brought under my notice by the same accurate observer who called my attention to their nest-building powers, Mr. C. Brunetti, to whom I am principally indebted for the details. In the month of September the following fish were placed in a long glass jar—viz., two dace, about half an inch long, four gold-fish (hatched in June), about an inch in length, one gudgeon, a minnow, and a single smooth-tailed stickleback, the last measuring about a fourth of an inch in length. For about three weeks the fish lived in harmony together, and seemed to be thriving, feeding freely on bread crumbs, but at the end of that time my informant remarked that the stickleback had given up feeding on the bread, while the gold-fish seemed out of sorts, languid and pining, lying more at the bottom than had been their wont, and evidently not thriving; this led him to watch them, when he was witness to a singular scene. He saw the pinkeen, after deliberately setting one of the gold-fish, as a dog would a hare, make a dart at it, and bite a piece out of one of the gold-fish's pectoral fins, and, retaining the piece in his mouth, rise to the top of the water, and there chew and masticate it, in the peculiar manner common to most fishes, till he had reduced it into a sufficiently comminuted state to allow it to be swallowed. After a momentary rest, the little glutton would, diving, select another gold-fish, and go through the same round of setting it, and biting a piece out of his fins, making as many as five or six attacks in as many minutes. Having devoured as much of their pectorals as he could, he next attacked their tails, and so persecuted them that, at length, the unfortunate gold-fish, unable to preserve their balance, turned over on their backs and died. Our little tyrant then paid similar attentions to the dace (which was about double his own size), and succeeded in stripping its pectoral fins, but the dace, being a hardier fish, bore this rough handling better than the gold-fish. The minnow was also attacked, but proved too active for its tiny foe, while the gudgeon escaped uninjured, protected either by his size, or, perhaps, because his fins are too tough.

This voracity exceeds that of all his fresh-water congeners, not even excepting the pike, and opens up the question whether some effort should not be made to exclude him, if possible, from our spawning ponds—a task, it must be confessed, of some difficulty, when we consider the myriads of these fishes that are found in almost all our waters; but, perhaps, by watching the spawning grounds of the Gasterostei in the proper season much might be done, at least to lessen their numbers: as, for instance, by capturing the males on the nest, and the females when congregated for the deposition of their ova; while, by means of properly-constructed gratings, the fish might be nearly totally excluded from the ponds. I may as well mention a singular circumstance with reference to the distribution of this fish. There is a district in the north of Clare, around Feakle, where the fish, as far as I could learn, is utterly unknown, even by name, its place in the streams being taken by the Smooth loach (G. barbatula), called there Cailliagh Rhua—*i.e.*, red hags—and the gudgeon, which (generally a local fish) here literally swarms in the sandy rivers, even in the subterranean tourmines of Kiltannan. I was told by several persons, who knew the pinkeen well, that it did not exist

there; and a careful search on my own part, during six weeks sojourn, failed to discover it—a fact the more singular as a great part of the district is bog, in the pools in which, in some of the neighbouring counties, the smooth-tailed stickleback is plentiful; neither could I find the minnow there, though both perch and trout abound; and in Loughgraney I was told bream were found; but I did not see any myself. In my former notes on this fish I gave a list of the fishes of the Dodder. To these I may now add the dace (Leuciscus vulgaris), which has lately been introduced into the ponds connected with the river, into which latter they will probably eventually find their way.

Mr. Andrews said that every fact of interest bearing upon new features in the natural history of animals and plants were useful records, and it was the principle of this society, in all its scientific inquiries, to connect every information of practical importance. At a recent meeting Mr. Andrews had given a review of the harbour fish of the south-west coast, among which he had mentioned several species that were considered extremely rare, and of local occurrence on the coasts of Great Britain. He now exhibited specimens that frequented the harbours of Dingle and Ventry, and among them were fine specimens of the red mullet —Mullus surmuletus. No branch required more practical investigation than that of our marine ichthyology; and the numerous opportunities that Mr. Andrews had of forming accurate notes, proved to him that much additional information had been obtained of the marine fish of this country, beyond what had been noticed in Mr. Yarrell's work on British fishes. He had every respect for Mr. Yarrell, and considered his book a valuable reference; still, however, species had been described upon too slight grounds. Mr. Yarrell, probably, not having had the opportunity of examining recent specimens, or of being supplied with information of sufficient accuracy. The Labridæ, or Wrasses, present very varied features of markings and form, which have led to the describing of one species under those of Crenilabrus Tinca, C. Cornubicus, and C. Gibbus. Mr. Andrews had obtained numerous specimens in Dingle harbour, at different seasons, in all stages of growth, and he was perfectly satisfied that those several species could not be separated from that of C. Tinca Mr. Andrews exhibited a fine specimen of C. Tinca, with the black spot at the termination of the lateral line, at the base of the caudal fin, and which Mr. Yarrell considered to be the constant and distinguishable characteristic of C. Cornubicus. A small specimen of C. Tinca had also the same mark, and specimens possessing all the characteristics of C. Cornubicus were destitute of that mark. Mr. Andrews considered that the black mark was not strictly peculiar to either the character of C. Tinca or of C. Cornubicus, but was occasionally present or absent in both. This species is very plentiful in Dingle and Ventry harbours. It was named Cornubicus as local on the coast of Cornwall. The habits of these several named species are the same. Mr. Andrews also exhibited specimens of Crenilabrus Microstoma, taken in Dingle harbour. The Crenilabri, are separated from the Labri by the pectinated or toothed character of the preoperculum.

Dr. Kinahan exhibited a plant of Scol. vulgare (var. *marginatum*), found by him at Tinnehinch, county Wicklow, March 2, 1854, its first record as Irish. This variety (first discovered in England by Sir W. C. Trevelyan) is remarkable for having the epidermis on the back of the frond raised into a membraneous ridge or tuck, running in a wavy line along it, at some little distance from the edge of the frond; the fronds are scolloped and serrated along the edges, the sori either continuous over the ridge to the edge of the frond or stopping at it, when we find a second set of sori arising outside the hem; or, thirdly, the sori are only produced external to the hem. The form is further remarkable for having several modifications—firstly, that under consideration; secondly, a form named *bimarginatum*, in which there is a hem on both faces of the frond; thirdly, a form named *supralineum*, where the hem exists only on the upper surface of the frond; and, fourthly, in a form named *dubium* by its discoverer, G. B. Wollaston, Esq., by whom it was raised from seed, in which we find the free margin running along a frond with multifid apices. In all these forms we find an irregularly serrated margin to the fronds, showing that probably the deficiency of the substance at the edge of the frond and of the epidermis; or, taking another view of the case, the irregular

growth of the epidermis and of the venules and apices; proceed from the same cause. Dr. Kinahan illustrated his remarks with a series of specimens of the forms mentioned.

The Chairman then announced the ballot, when

Lord Clermont, of Ravensdale Park, and Edward P. Wright, Esq., were elected members; and Dr. Carte, of the Royal Dublin Society, rejoined the society.

Those who were formerly members, on being proposed by the council, can rejoin the society without payment of the admission fee. The meeting then adjourned to the 7th of April.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

JANUARY 21, 1854.

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

Mr. A. R. Hogan read the following paper from E. Waller, Esq., Corresponding Member,

ON THE LAND AND FRESH-WATER MOLLUSCA, OF FINNOE, COUNTY TIPPERARY.

The district under observation is comprised within, but not fully occupying, a circle of about one mile and a half radius, embracing part of the parish of Finnoe, and a small portion of Borrisokane, in the north of Tipperary. It lies within the great central mountain limestone formation, and is traversed by a small river which, a couple of miles farther west, falls into the expansion of the Shannon, called Lough Derg. The river-valley, about 170 feet above the sea, is composed partly of alluvial soil and partly of bog. When first examined by me, the river was sluggish and deep, the water nearly on a level with the banks, and flowing into drains abounding in various water plants, and thus favourable for the abode of water mollusca. The operations of the Drainage Commissioners have converted it into a shallow, rather rapid stream, running between deep banks, leaving the old drains completely dried up, and involving the loss of nearly all their mollusca—amongst them, Pisidium Henslowianum, in the only Irish locality where it has been hitherto noted. There are some other boggy and marshy grounds in the district, which is moderately planted, and contains one wood of considerable extent and age, called Borris Wood. The hills rise to an elevation of about 230 feet above the sea; the lower ones, generally covered deeply with gravel, the higher, having the limestone rock protruding.

I have followed the nomenclature and arrangement adopted in Gray's edition of Turton's Manual of Land and Fresh-water Shells—the work, I believe, most generally in use by collectors in this country.

Neritina fluviatilis. Abundant in the river.

Bithinia tentaculata. Very abundant in the river and drains, of the normal character.

Valvata piscinalis. Abundant; varying considerably in size and in elevation of spire. In one variety, the volutions appear angular, from being spirally cut by slightly elevated ridges, the angles of which are marked with white lines.

,, cristata. Abundant.

Arion ater. Numerous; black, and various shades of brown.

,, hortensis. Common. The variety 2 of Gray's Turton, β of Alder.

Limax maximus. Not uncommon.

,, agrestis. Common. I believe there are other Limaces; but not having paid sufficient attention when collecting them, I am not certain of the species.

Vitrina pellucida. Generally distributed, varying in hue, not exceeding one-fourth of an inch in diameter.

Helix aspersa. Very abundant. I found one specimen considerably longer in proportion and marked with five distinct bands.

,, nemoralis. Very abundant, and varying considerably in size, and in elevation of the spire. The lip of different colours, from pure white, through various shades of rose and brown, to nearly black. I have collected specimens corresponding very well with the figures in Turton, of H. nemoralis and H. hortensis, and with most of the figures in Brown, of H. nemoralis, hybrida, and hortensis. None were as small as the figure of hybrida in Gray's Turton. I have collected, at Manheim, on the Rhine, Helices, with black and white mouths, plain and variously banded, but all smaller than our hortensis, and some precisely like the figure of H. hybrida, in Turton, p. 11, fig. 130. I obtained, from the late Mr. Thompson, a specimen of Mr. Leyland's H. hybrida, from Halifax; it is smaller than the figure in Turton, and, at least in size, cannot be considered intermediate between nemoralis and hortensis, being very much smaller than either From having collected these shells in various parts of Ireland and in England, I think the mere shell will scarcely afford sufficient means of indicating different species; a specific difference in the animal would, of course, be decisive. For such purpose, the variation in the Vesicula multifida should be proved to be constant, by an extended examination of specimens from various localities. Even then, unless it could be shown to produce *sufficiently* distinct characters in the shell, it would not avail the collector or conchologist.

,, pulchella. Rare and local. I have obtained both the plain and ribbed varieties in high, dry grounds, and also in marshy situations.

,, fusca. Rare; in Borris Wood.

,, fulva. Rare; normal in shape.

,, hispida. Common; varying much in colour, height of spire, and closeness of hairs. Some of these shells may be H. sericea, but I could not satisfactorily draw a line separating some of the varieties of H. hispida from shells better answering the description of H. sericea.

,, concinna. I found this species, as determined by Mr. Thompson, on examination of the shells.

,, rufescens. Not uncommon; pale ash colour, and dark brown.

,, virgata. Pale ash colour, and white, with a single dark band; very abundant in one locality only, where I have reason to believe that it must have been recently, and I should say accidentally, introduced; and that I observed it very soon afterwards, when specimens could not be found beyond the range of a few yards, although, a few years after, they were so numerous, over whole fields, as to be crushed at every step. Helix ericetorum was plentiful in the same fields.

,, ericetorum. Extremely abundant over the whole district generally, with one or more brown bands; sometimes mottled with brown; rarely white, with transparent bands.

Zonites rotundatus. Plentiful, varying but little in form.

,, umbilicatus. Extremely numerous on dry walls and limestone rocks.

,, pygmæus. Very rare and local; at Kyle Park.

,, alliarius. Not numerous; obtained both of the horn colour and pale green. I have procured a few specimens of a larger Helix, nearly crystalline; they were shown to Mr. Thompson, and noted by him in his catalogue as intermediate in form between H. nitidula and H. alliaria; could they be H. glabra, of Studer—var. 2 of Gray's Turton?

,, cellarius. Common; generally distributed; not exceeding one-half inch in diameter.

,, purus. Not common, but found both hyaline and horn colour.

,, nitidulus. Common. I have found a few shells, smaller, whiter, and more transparent; not having seen any description of Mr. Gilbertson's H. helmii, I cannot say whether they resemble it.

,, radiatulus. Rather rare; occurring hyaline and horn-colour.

,, lucidus. Rare and local; at Finnoe.

Zonites crystallinus. Not uncommon.
Succinea putris. Not abundant.
,, Pfeifferi. Generally distributed; very abundant in some places. I never obtained any specimens which might seem to unite this shell with Succinea putris.
Zua lubrica. Abundant.
Achatina acicula. I obtained some shells in two or three localities on the roots of grass, and by removing a few inches of earth from the surface of the limestone rocks.
Pupa umbilicata. Very abundant; varying, in number of whorls, in size, colour, and transparency, and some being of the toothless variety. I found here, one shell with a second tooth, and a nearly similar one in the north of Ireland; I considered them as Pupa umbilicata.
Vertigo edentula. Not common; very local; at Kyle Park. The elongated as well as short variety is found.
,, pygmæa. Not uncommon; on walls and under stones.
,, palustris. Rare and local; at Finnoe.
,, pusilla. I procured two or three specimens of this rare shell at Borris Wood.
Balæa perversa. Not common. I met one shell with a tooth on the pillar lip.
Clausilia nigricans. Very abundant; exhibiting all the varieties noted in Gray's Turton.
Carychium minimum. Plentiful.
Acme fusca. Very rare. I obtained two or three of the pale variety at Kyle Park.
Limnæus auricularius. I found Limnæi, which, taking Turton's figure and description, I must range under this species. They are not so much expanded as some I have seen from other localities, or as some of the figures in Brown's Land and Fresh-water Shells.
,, pereger. This species is abundant in different parts of the district, where may be found the normal shell, and others representing the varieties ovatus, or lineatus and acutus. Near the mouth of the river, in Lough Derg, I have obtained L. lacustris, and from the stomach of a Gillaroo trout, taken in the same place, a Limnæus, having the spire quite flat, and some specimens with the spire very slightly elevated, approaching the ordinary form of L. lacustris. The flattened variety would be well described under the name of Convolutus. I believe I have observed, from this flat spired variety, up to L. auricularius, a series whose gradations are so close as to prevent any clear or well-defined separation.
,, stagnalis. Plentiful. In a small pond, at Finnoe, I obtained a few specimens about one inch and a half long. The shell thinner, the sutures deeper, and the volutions more rounded than in the common form, giving the shell a more graceful outline.
,, palustris. General and abundant; varying considerably, but not to an extreme degree, from the normal form.
,, truncatulus. Common, of the ordinary type. A smaller variety is found on stones at the edges of a spring.
Ancylus fluviatilis. A small number of these in the river and adjoining drains.
Velletia lacustris. Rare; on water-lilies in the river.
Physa fontinalis. Generally rare; abundant in one drain.
Aplexus hypnorum. Very rare, except in one small isolated pond, only a few yards in diameter, where it was in great numbers one season, previous to the complete drying up of the pond.
Planorbis albus. Very abundant.
,, lævis. Very rare. I found a few specimens in a small pond at Kyle Park.
,, imbricatus. Not numerous. In a pond, at Finnoe, and in drains. Some are the smooth variety, and some, though not amongst the smaller, answered very well to the figure of Planorbis cristatus in Brown's Land and Fresh-water Shells.

Planorbis marginatus. Very abundant, of the common form; some with a very slight line indicating the keel, and a few without any trace of it. Planorbis carinatus is found in the marl, and is the only marl shell which I have not found living in the district.

,, vortex. Abundant; rarely with the white rib inside the mouth.

,, spirorbis. Abundant; occasionally is seen with the white rib within the mouth.

,, nitidus. Rare; in one pond, at Finnoe.

,, contortus. Very abundant.

Cyclas cornea. Abundant; varying considerably in globosity and size.

Pisidium obtusale. Rare and local.

,, nitidum. Not uncommon.

,, pusillum. Abundant.

,, pulchellum. Common.

,, Henslowianum. Very rare and local. I obtained a very few specimens, in drains, near the river, now dried up. The shells scarcely exceeded one-eighth of an inch in length, and the laminar projections were not as prominent as they are represented in Mr. Jenyns's monograph. All these small Pisidia were determined by my friend, the late Mr. William Thompson, from shells sent to him, to Belfast. I found shells of all the species agreeing, pretty accurately, with the typical figures and descriptions of Jenyns; some belonging to his varieties, and some not easily reducible to them.

,, amnicum. Rare and local.

This small district thus possesses 66 of the 96 species recognised by Mr. William Thompson, in his Catalogue (Ann. and Mag. Nat. Hist. VI., p. 16, Sept. 1840), as being Irish. I might, perhaps, have added Limax flavus, Helix hybrida, Helix hortensis, and Helix sericea; but I would not introduce any species I was not perfectly certain of. It will be seen, that I obtained several additional species, at Finnoe, since 1840, by reference to Mr. Thompson's Catalogue, under the head of Finnoe.

My observations on these mollusca lead me to think that some zealous investigators of this branch of zoology, from the very natural desire of making its arrangement as accurate and minute as possible, have unnecessarily multiplied species which, independent of the error, much embarrasses those studying either the shells themselves, or the works written on them.

Dr. Lyon Playfair considered that such lists, from various localities, would be very valuable.

Professor Allman urged the necessity of local lists, this being the true way to arrive at the knowledge of geographical distribution, and that such knowledge would ultimately be of beneficial results.

Mr. J. R. Kinahan then exhibited specimens of a bat, taken in the County Kildare, and gave the following reasons for considering it to be a distinct species from the Vespertilio pipistrellus:—1st. The hairy fringe on the interfemoral. 2nd. The greater number of false molars in Natterer's bat. 3rd. The difference in shape of the trajus; in Natterer's bat long and pointed, in the pipistrelle short, and rounded at its extremity. 4th. The different colours; Natterer's bat being dark-greyish red on the back, silvery white on the belly; while the pipistrelle is a uniform light gray.

Mr. Kinahan, while referring these specimens for the present to Natterer's bat, pointed out differences between them and the description in Bell's British Quadrupeds, and also the specimen of this bat killed at the Scalp, in 1849. These were:—1st. The non-development, to any extent, of the sebaceous follicles of the nose. 2nd. The greater number of interfemoral nervous bands (a character which differs in almost all Mr. Kinahan's specimens). 3rd. The shortness of the spur of the heel. 4. The fringe being continued beyond the hind paw, half-way up to the last finger. 5th. The comparative shortness of the trajus.

The President did not consider this bat to be V. nattereri; it did not agree with that species as described by Demarest, or Baron de Sely's Longchamps. Its most

obvious difference from V. pipistrellus appeared to him to be the colour of its fur, but the observations of its habits, so well described by Mr. Kinahan, seemed to indicate a distinction of species. He urged further examination.

Mr. Hogan then read the second part of his

CATALOGUE OF COLEOPTERA, FOUND IN THE NEIGHBOURHOOD OF DUBLIN.

Cercyon depressum, *St.* Sea-coast, Baldoyle, &c.
,, littorale, *Gyl.* With the former.
,, obsoletum, *Gyl.* Local.
,, hæmorrhoum, *Gyl.* Roebuck.
,, laterale, *Gyl.* Local.
,, unipunctatum, *L.* Dunghills; flies about in warm spring days.
,, quisquilium, *L.* Roebuck.
,, melanocephalum, *L.* Portmarnock.
,, anale, *Pk.* Local.
,, bolitophagum, *Mm.* Moist places, in moss, &c.
,, atomarium, *F.* Roebuck.
Sphæridium scarabæoides, *F.* Common.
,, marginatum, *F.* Ditto.
Phalacrus æneus, *Ill.* Dodder banks.
,, corticalis, *Schön.* Taken by Miss M. Ball.
Ephistemus gyrinoides, *Mm.* Malahide.
,, confinis, *St.* Ditto.
Leiodes ferrugineus, *Schmidt.* Local.
,, thoracica, *St.* Portmarnock.
,, pallens, *St.* Local.
,, picea, *Ill.* Ditto.
,, arenaria, *Ste.* North Bull.
Colenis dentipes, *Gyl.* Local.
Clambus Armadillus, *Deg.* Malahide.
,, enshamensis, *St.* Do.
Corylophus cassidoides, *Mm.* Ditto.
Ptomaphagus truncatus, *Ste.* Sea-coast.
Catops sericeus, *F.* Dodder banks, Portmarnock, &c.
,, tristis, *Pz.* Ditto.
,, Morio, *F.* Ditto.
,, angustatus, *F.* Moist places, roots of trees, &c.
Necrophorus humator, *F.* Rather scarce.
,, vespillo, *L.* Common.
,, ruspator, *Er.* Taken by the late Mr. Tardy.
,, mortuorum, *F.* Ditto.
Oiceoptoma rugosa, *L.* Abundant.
Silpha opaca, *L.* Portmarnock.
,, quadripunctata, *Ste.* The Dargle.
Phosphuga atrata, *L.* Not common.
,, subrotundata, *Mm.* Everywhere.
Nitidula grisea, *L.* Kilruddery, &c., on bones.
,, depressa, *L.* Ditto.
,, discoidea, *F.* Ditto.
,, æstiva, *L.* On flowers of hawthorn, Umbelliferæ, &c.
,, silacea, *Hbst.* Ditto.
,, pusilla, *Ill.* Ditto.
,, obsoleta, *F.* Ditto.
,, bipustulata, *F.* Local.
Meligethes viridescens, *F.* On flowers of Sinapis, &c.
,, æneus, *F.* Ditto: var. cœruleus, *Mm.*, also occurs.
,, pedicularius, *Gyl.* Ditto.
Cateretes Urticæ, *F.* Not unfrequent.
,, pedicularius, *L.* Ditto.
Cychramus luteus, *F.* Local.
Micropeplus porcatus, *Pk.* Portmarnock.
,, staphylinoides, *Mm.* Ditto.
Trichopteryx fascicularis, *Er.* Dunghills.
,, grandicollis, *Er.* Ditto.
,, sericans, *Heer.* Ditto.
,, curtus, *Alib.* Ditto.
,, Kunzei, *Heer.* Ditto.
Anisarthria pusilla, *Gyl.* Malahide.
,, apicalis, *Gyl.* Local.
,, punctata, *Gyl.* Sea-coast.
Atomaria phæogaster, *Mm.* Local.
,, mesomelas, *Hbst.* Ditto.
,, nigriventris, *Ste.* Ditto.
,, fuscipes, *Gyl.* Ditto.
,, atra, *Hbst.* Ditto.
,, basella, *Ste.* Baldoyle.
Mycetæa hirta, *Mm.* Not unfrequent.
Sylvanus Surinamensis, *Ste.* In sugar-stores, &c.
Lathridius lardarius, *Deg.* Local.
,, transversus, *Ol.* Ditto.
,, minutus, *L.* Ditto.
Corticaria pubescens, *Ill.* On walls and windows.
,, gibbosa, *Hbst.* Ditto.
,, ferruginea, *Mm.* Ditto.
Byturus tomentosus, *Deg.* (B. Rosæ, *Scop.* 1763.) Local.
Typhæa fumata, *L.* Roebuck.
Cryptophagus scanicus, *L.* Dublin, on walls, windows, &c.
,, fumatus, *Gyl.* Local.

Cryptophagus Ulicis, *Ste.* Phœnix Park; abundant.
,, Abietis, *Pk.* Malahide.
Antherophagus pallens, *L.* Local.
Monotoma picipes, *Pk.* Merrion.
Anommatus obsoletus, *Shuck.* Rochestown, in decayed potatoes, by Mr. Molloy.
Rhizophagus ferrugineus, *Pz.* Mount Merrion Demesne.
Trogosita Mauritanica, *L.* Local.
Dermestes lardarius, *L.* Taken by Mr. Tardy.
Attagenus pellio, *L.* Lumber-rooms, &c., common.

Byrrhus pilula, *L.* Local.
,, varius, *F.* Portmarnock, &c., on grass.
Simplocaria semistriata, *F.* Ditto.
Hister cadaverinus, *Pk.* Common.
,, carbonarius, *Pk.* Ditto.
,, purpurascens, *Pk.* Taken by Mr. Tardy.
,, bimaculatus, *L.* One specimen in Hume-street, Dublin.
Onthophilus striatus, *F.* Roebuck, &c., not common.
Saprinus rotundatus, *Pk.* Portmarnock.
,, nitidulus, *F.* Ditto.
,, dimidiatus, *Pk.* Ditto.
,, æneus, *F.* Local.
Typhæus vulgaris, *Ste.* A dead specimen, at Killiney; of frequent occurrence in Co. Wicklow.
Geotrupes stercorarius, *L.* Scarce; the var. (?) foveatus, *Mm.*, is, however, abundant about Roebuck, &c.
,, putridarius, *Er.* Local.
,, sylvaticus, *F.* Ditto.
Aphodius erraticus, *L.* Phœnix Park; rare.
,, fossor, *L.* Roebuck, &c.
,, scybalarius, *F.* Not uncommon.
,, fœtens, *F.* Ditto.
,, fimetarius, *L.* Frequent.
,, ater, *Deg.* Roebuck.
,, sordidus, *F.* Ditto; very rare.
,, merdarius, *F.* Portmarnock.
,, prodromus, *Brahm.* Abundant.
,, contaminatus, *Hbst.* Ditto.
,, rufipes, *L.* Little Dargle. &c.
,, depressus, *Kug.* Phœnix Park.
,, marginalis, *Ste.* Common.
Ægialia globosa, *Ill.* Portmarnock.
Serica brunnea, *L.* Dodder banks.
Melolontha vulgaris, *F.* Near Rathfarnham; but I have not heard of its being found of late years.
,, Hippocastani, *F.* Roebuck; taken by J. Haughton, Esq.
Phyllopertha horticola, *L.* On wild roses in flower.
Adrastus limbatus, *Thbg.* Not unfrequent.
Dolopius marginatus, *L.* Ditto.
Agriotes obscurus, *L.* Ditto.
,, lineatus, *L.* Ditto.
Limonius cylindricus, *Pk.* Taken by Mr. Tardy.
Agrypnus murinus, *L.* Local.
Hypolithus riparius, *F.* Ditto.
Cryptohypnus tetragraphus, *Germ.* Dodder banks.
Ctenicerus tesselatus, *L.* Taken by Mr. Tardy.
,, cupreus, *F.* On long grass in meadows, but does not appear every year.
Aplotarsus testaceus, *F.* Local.
,, rufipes, *F.* Taken by Mr. Tardy.
Melanotus rufipes, *Hbst.* Taken by Mr. Tardy.
Athoüs hæmorrhoidalis, *F.* Abundant.
,, hirtus, *Hbst.* Local.
Cardiophorus testaceus, *F.* Ditto.
Atopa cervina, *L.* Somewhat local, and uncertain in its appearance.
Scirtes hemisphericus, *L.* Taken by Mr. Tardy.
Cyphon pallidus, *F.* Taken by Mr. Tardy.
,, marginatus, *F.* Local.
,, griseus, *F.* Ditto.
,, lividus, *F.* Taken by Mr. Tardy.
Lampyris noctiluca, *L.* Near Castleknock, by M. J. O'Kelly, Esq.
Telephorus pellucidus, *F.* Not common.
,, bicolor, *F.* Ditto.
,, flavilabris, *Fall.* Roebuck, &c.
,, thoracicus, *Ol.* Local.
,, nigricans, *Mlr.* Ditto.
Podabrus alpinus, *Pk.* Ditto.
Ragonycha melanura, *L.* Exceedingly abundant.
,, pallida, *F.* Local.
,, testacea, *L.* Taken by Mr. Tardy.
Malthinus biguttatus, *L.* Local.
,, brevicollis, *Gyl.* Portmarnock.

Malthinus minimus, *L.* Taken by Mr. Tardy.
Necrobia quadra, *Mm.* Local.
Ptilinus pectinicornis, *L.* College Park.
Ptinus fur, *L.* Roebuck, Donnybrook, &c.
,, crenatus, *F.* Ditto.
,, hololeucus, *Fald.* Common.
Anobium castaneum, *Kug.* Taken by Mr. Tardy.
,, striatum, *Ol.* Abundant.
Ochina Hederæ, *Mlr.* Dunsink.
Cis Boleti, *Scop.* In Boleti on trees.
,, nitidus, *F.* Not common.

Tomicus micrographus, *L.* Bray.
Hylastes ater, *Pk.* Near Rathfarnham; very rare.
Cossonus Tardii, *Cts.* Not nearer than Powerscourt.
Mecinus pyraster, *Hbst.* Portmarnock.
Gymnaëtron noctis, *Hbst.* Not common.
Cionus hortulanus, *Mm.* Taken by Mr. Tardy.
Calandra granaria, *L.* Corn stores.
,, Oryzæ, *L.* Ditto.
Nedyus assimilis, *Pk.* Local.
,, pollinarius, *Forst.* On nettles.
,, troglodytes, *F.* Baldoyle.
Ceutorhynchus Erysimi, *F.* Local.
,, contractus, *Mm.* Ditto.
,, Quercus, *F.* Ditto.
,, didymus, *Hbst.* Ditto.
,, sulcicollis, *Gyl.* Portmarnock.
,, subrufus, *Hbst.* Taken by Mr. Tardy.
Tychius picirostris, *F.* Portmarnock.
Rhinonchus Castor, *F.* Local.
,, pericarpius, *F.* Ditto.
,, quadrituberculatus, *F.* Do.
,, quadricornis, *Gyl.* Ditto.
Orthochætes setiger, *Germ.* Portmarnock.
Orchestes Quercus, *L.* Local.
,, Alni, *L.* Ditto.
,, Fagi, *L.* Glasnevin Botanic Gardens.
,, Rusci, *Hbst.* Taken by Mr. Tardy.
,, Salicis, *L.* Local.
,, Saliceti, *F.* Glasnevin.
,, stigma, *Germ.* Not common.
Balaninus Brassicæ, *F.* Ditto.
,, brunneus, *Mm.* Rare.
Anthonomus Ulmi, *Deg.* Glasnevin Botanic Gardens.
,, pomorum, *L.* Not common.
Hydronomus Alismatis, *F.* Ditto.
Grypidius Equiseti, *F.* Bray Commons; in meadows.
Pachyrhinus leucogaster, *Mm.* Local.
Notaris acridulus, *L.* Ditto.
Erirhinus schirrhosus, *Schön.* Ditto.
Dorytomus Tortrix, *L.* Ditto.
,, pectoralis, *Pz.* Taken by Mr. Tardy.
Hypera punctata, *F.* Dundrum, &c.
,, murina, *F.* Portmarnock.
,, nigrirostris, *F.* Ditto.
,, Plantaginis, *Deg.* Taken by Mr. Tardy.
,, Rumicis, *L.* Ditto.
Ellescus bipunctatus, *L.* Ditto.
,, scanicus, *Pk.?* Portmarnock.
Leiosoma ovatula, *Clv.* Not common.
Tanysphyrus Lemnæ, *Pk.* Rathfarnham.
Alophus triguttatus, *F.* Portmarnock.
Barynotus mercurialis, *F.* Frequent.
Merionus elevatus. *Mm.* Ditto.
,, obscurus, *F.* Frequent.
Leiophlæus nubilus, *F.* Generally distributed.
Otiorhynchus sulcatus, *F.* Local.
,, singularis, *L.* Ditto.
,, rugifrons, *Gyl.* Sandycove.
,, tenebricosus, *Hbst.* Baldoyle, on hedges.
,, atro-apterus, *Deg.* Malahide and Portmarnock.
,, scabrosus, *Mm.* Near Dundrum.
,, ovatus, *L.* Local.
,, niger, *F.* Ditto.
,, brunnipes, *Ol.* Roebuck, &c.
Trachyphlæus scabriculus, *L.* Taken by Mr. Tardy.
Molytes anglicanus, *Mm.* Portmarnock; rare.
Philopedon geminatus, *F.* Ditto.
Strophosomus Coryli. *Schön.* Local.
Sciaphilus muricatus, *F.* Ditto.
Sitona Regentsteinensis, *Hbst.* Ditto.
,, hispidula, *F.* Ditto.
,, lineata, *L.* Common.
,, canina, *Gyl.* Local.
,, grisea, *F.* Ditto.
,, tibialis, *Hbst.* Ditto.
,, lineella. *Bonsd.* Portmarnock.
,, fusca, *Ste.* Baldoyle, &c.; abundant.
,, subaurata, *Kby.* Ditto.

Polydrosus flavipes, *Deg.* Glasnevin Botanic Gardens, &c.; scarce.
,, micans, *F.* Taken by Mr. Tardy.
,, ptergomales, *Schön.* Upon beech-trees, early in summer.
Nemoicus oblongus, *L.* Local.
Phyllobius uniformis, *Mm.* Ditto.
,, argentatus, *L.* Frequent
,, calcaratus, *F.* Taken by Mr. Tardy.
Apion Craccæ, *L.* Bray.
,, violaceum, *Kby.* Local.
,, Hydrolapathi, *Kby.* Ditto.
,, frumentarium, *L.* Ditto.
,, radiolus, *Kby.* Ditto.
,, æneum, *F.* Portmarnock.
,, Carduorum, *Kby.* Local.
Apion rufiorstre, *F.* Ditto.
,, virens, *Hbst.* Portmarnock; abundant.
,, Kirbii, *Ste.* Phœnix Park.
,, flavipes, *F.* Local.
,, nigritarse, *Kby.* Ditto.
,, apricans, *Hbst.* Not unfrequently.
,, Pisi, *F.* Local.
,, miniatum, *Schön.* Malahide, &c.
,, subulatum, *Kby.* Not common.
,. vorax, *Hbst.* Ditto.
,, Ervi, *Kby.* Ditto.
,, assimile, *Ste.* Local.
Ramphus flavicornis, *Clv.* Phœnix Park; on hawthorn.
Rhynchites Alliariæ, *Pk.* Taken by Mr. Tardy.
,, Betulæ, *L.* Ditto.

In reference to some observations of Mr. Hogan,

Dr. Ball and Mr. Kinahan mentioned having found the cockchaffer (Melolontha vulgaris) frequently near Dublin; and Dr. Ball said that the glowworm (Lampyris noctiluca) had been brought from England to Dublin, and, some having escaped, might possibly still be in existence.

Mr. J. H. Lamprey exhibited a pair of the woodlark (Alauda arborea), which had been captured during the severe weather about the first of this month, in the Vale of Avoca, County Wicklow, and related some interesting particulars about them. This bird is so very local as to be almost ranked among our rare indigenous birds.

Dr. Ball exhibited a very fine specimen of the green woodpecker (Picus viridis); it is a bird of rare occurrence in Ireland, and this was the first well-authenticated case that had fallen under his notice; it was kindly forwarded to him by Thomas Batt, Esq., of Rathmullen, Derry. Dr. Ball then explained the curious structure of the tongue, enabling it to protrude it considerably in search of its insect prey.

Dr. Allman said it was one of the commonest of the woodpeckers in the south of England, and with its bright green colour added greatly to the beauty of the woods.

Mr. Wright mentioned that a specimen obtained in County Kildare was in the collection of Mr. J. Watters, and that it had been obtained as far north as Scotland.

Dr. Ball stated that he had just procured, for the Zoological Society, a living specimen of the short-eared owl (stryx brachyotus); and then the meeting adjourned to February 28.

FEBRUARY 11, 1854.

R. Ball, Esq., LL.D., President, in the chair.

Donations to Library.—Cuvier's Comparative Anatomy, edited by Dr. Macartney; and Huber on Bees, by the President.

Dr. Ball laid before the meeting a collection of fishes, crustacea, mollusca, &c., collected by Commander M'Clintock, in his voyage in search for Sir John Franklin. He regretted that he was prevented from entering as fully as he had intended into the description of this very interesting collection; at present he would content himself with calling attention to some of the most remarkable specimens, reserving for future occasions a more detailed statement. Amongst the fishes was a specimen of Cyclopterus spinosus found on the ice in 75½° north latitude; an Ammodytes lancea, taken at sea in Baffin's Bay; a Gadus callarius, having attached to the gills a Lernea which seemed distinct from the Lernea branchialis. Amongst the many interesting shells the large series of Buccinum Humphreysianum appeared to be particularly interesting to Irish naturalists. Some of the specimens were much

larger than any Irish specimens the President had seen, and he mentioned that he had obtained many specimens of this rare shell off the coast at Youghal, about thirty years since. In the collection was also a series of the Hypothyris (Terebratula) psittacea, a very rare shell on the British and Irish coasts. Dr. Ball directed attention to the fact, that several of the specimens produced, seemingly of species familiar to us, were yet of larger dimensions; thus the Velutina lævigata and Farcimia are greatly larger than are to be met with in this country; the Farcimia surpassing the large variety, or species, familiar to collectors of zoophytes, as much as that does the small ordinary form.

Dr. Ball also stated that some of the crustacea were probably undescribed, as he had not yet been able to identify them. He finally exhibited the skull of an Esquimaux, the most northern human remains found by Commander M'Clintock; cast of the horns of a musk ox, and referred to some birds in the University Museum, all the generous contributions of the gallant gentleman, who is now again on his arduous duties.

Mr. Walpole considered that he had seen as large specimens of the Farcimia, near the Saltees; and that the Buccinum Humphreysianum exhibited obscure undulations which he had not observed in Irish species.

Mr. Carte, Curator of the Museum of the Royal College of Surgeons, exhibited a specimen of Lepidosiren annectens. He had received the specimen from Mr. Brian, who had brought it from the Gambia. When it reached him it was enveloped in dry mud; having been incautiously placed in cold water, it perished. It lay coiled up, covered with mucus, in a sort of chamber in the mud; from its mouth there appeared to be a tube for respiration.

Mr. Carte called attention to some of the anatomical peculiarities of his specimen, which were strongly against its being classed with fishes. He exhibited some remarkably well-executed drawings of the specimen, and promised further to communicate to the Association on the subject.

The President had laid on the table the principal authorities in reference to the much disputed position of this most interesting creature, and concurred in the view Mr. Carte had taken.

The Rev. Joseph Greene exhibited some rare English Lepidoptera, among which the following species were included—

Notodonta dictæa.
,, dromedarius.
,, dodonea.
,, trepida.
Spælotis ravida.
Polymmatus argiolus.
Lithosia aureola.
,, miniata.
Sesia fuciformis.
Pœcilocampa populi.
Platypteryx unguicula.
Cerura furcula.
,, bifida.
Stauropus fagi.
Ceropacha or.
,, ocularis.
Ptilophora plumigera.
Spælotis pyrophila.
Spælotis præcox.
Cirrædia xerampelina.
Xanthia aurago.
,, citrago.
Hadena rectilinea.
,, cucubali.
Heliothis marginata.
Plusia inscripta.
,, interrogationis.
Catocala sponsa.
Eurymene dolabraria.
Lophobora sexalisaria.
Tephrosia consonaria.
Anticlea rubidaria.
Hemithea bajularia.
,, vernaria.
Pericallia syringaria.
Geometra papilionaria.

Some inquiries having been made as to the best method of killing Lepidoptera, the President and Dr. Allman suggested chloroform.

Mr. Greene considered bruised laurel leaves quite as efficacious, and said that they have the advantage of being always at hand.

Mr. Lamprey noticed that a specimen of the glossy Ibis (Ibis falcinellus) had been obtained by W. Doherty, Esq., at Bushmills, Coleraine. This bird is of comparatively rare occurrence in Ireland.

Dr. Ball, with the view of directing attention to the manner in which animal forms are represented in the different parts of the world, laid on the table specimens of Ibes, from America, Australia, Asia, Africa—seven species—the species under discussion being European. Amongst the specimens exhibited was a mummy of the sacred Ibis, in which the gizzard still remained, enclosing the food, which included amongst other things a large Paludina, swallowed on the Nile more than 2,000 years ago.

Mr. Lamprey again brought under the consideration of the Association the Charadrius, which had been before exhibited under the impression that it was the C. minor.

The President produced a number of species of the same bird from different localities; amongst others an authenticated specimen of C. minor, from the British Museum, one of the duplicates of Hodgson's collection. This bird was much smaller than the specimen in dispute, and agreed precisely with the descriptions of Yarrel, Temminck, &c. Dr. Ball reiterated the opinion he had before expressed, that this bird, killed by Mr. Lamprey, was only the young of the Charadrius hiaticula.

Mr. Hogan read the following—

NOTES ON THE LAND AND FRESH-WATER MOLLUSCA OF THE COUNTY DUBLIN.

The following notes are not intended to form a catalogue of the land and fresh-water shells found near Dublin, as their form might suggest; they merely contain my own experience, which has been almost confined to a district destitute of ponds or streams of any size, or of woods that might be expected to produce rare species; besides, that I have never attempted either to collect or study the slugs. Yet that even these observations may not be entirely without value, will be evident on comparing a catalogue recently published (in the "Zoologist," for 1853), which, though it includes seventeen species that have not fallen under my notice, does not record ten that appear among those here adverted to. In the nomenclature I have followed Gray's edition of Turton's "Manual of the Land and Fresh-water Shells of the British Islands."

Bithinia tentaculata. Glasnevin Botanic Gardens; in ponds, abundant.

Vitrina pellucida. Mount Merrion; scarce.

Helix aspersa. In great abundance everywhere; a curious variety, with the spire unusually elongated, which I took at Roebuck; was exhibited at a former meeting of this Association. Some years ago I found several specimens at Charlton, evidently destroyed, while in a torpid state, by a grub, which was alive in the shell; but whether it were that of a moth or a beetle (instances of both of which are known) I cannot say; the individuals captured did not come to perfection.

,, hortensis. Local; generally on walls.

,, hybrida. Of this species I possess a single specimen, taken by Mr. E. P. Wright, while in company with me, at the Glasnevin Botanic Gardens.

,, nemoralis. Very abundant, and with every variety in colour, as well as in the number and breadth of the bands; often without any.

,, pulchella. A specimen at Donnybrook.

,, hispida. Common in the usual localities.

,, concinna. Occasionally along with the latter.

,, depilata. Found among the two last species.

,, rufescens. Exceedingly abundant on walls about Roebuck, and very rufous usually. I have taken, on nettles, at Roebuck, a variety much more carinated than usual, and also the white variety which Gray's "Turton" states to be rare.

,, Pisana. On the sea-coast at Rush, so well-marked and so plentiful, that there can be no doubt of its identity, although Gray seems to distrust our claim to it.

,, virgata. Very common; I have taken the dark brown variety, with the single white band, plentifully on a wall, at Bullock Harbour, near Dalkey.

Zonites rotundatus. Abundant everywhere.
,, alliarius. Not uncommon.
,, cellarius. Occasionally found.
,, nitidulus. Common.
Succinea putris. Rather plentiful; I have taken remarkably fine specimens on the bank of the Dodder, at Firhouse.
,, Pfeifferi var. I believe this occurs occasionally with the last species; but I am inclined to think that it is not really distinct from it.
Bulimus obscurus. Dundrum, &c.; not unusual.
,, acutus. Abundant; principally on the sea-coast.
Zua lubrica. Very common.
Pupa umbilicata. Generally distributed.
,, marginata. Frequent, along with umbilicata; unless this be the toothless variety of that species alluded to by Mr. Waller, in his paper on the Finnoe mollusks. Gray mentions a toothless variety of marignata only, not of umbilicata.
Vertigo pygmæa. Mount Merrion; one specimen.
,, alpestris. Same locality; not more plentiful.
Balæa perversa. Abundant about Roebuck, both on walls and trees; among the latter I have found it chiefly on the elm.
Clausilia nigricans. Generally distributed; often on old walls.
Limnæus pereger. Abundant in all its ordinary haunts.
,, stagnalis. Ponds in Glasnevin Botanic Gardens.
,, palustris. Ditches at Rathmines; the specimens of unusually large size.
,, truncatulus. Scarce; at least not generally distributed. My specimens were taken at Charlton, the most distinct of them being peculiar to an old water-cask standing in a garden, but unfortunately removed since, to the destruction of the flourishing colony.
Ancylus fluviatilis. In a small stream at Rathfarnham.
Physa fontinalis. Rare; I have only found dead specimens.
Aplexus hypnorum. Local; but very abundant about Roebuck, and usually in clear, running streams, which would appear to be different from the experience of English collectors, as the locality given by Gray is "ponds and slow streams." If one might judge from the conformation of the shell, it seems peculiarly adapted to the former.
Planorbis carinatus. Glasnevin Botanic Gardens, I believe.
,, marginatus. Common.
,, vortex. In a ditch at Donnybrook.
,, spirorbis. Glasnevin, as well as I can recollect.
,, contortus. Two dead specimens at Charlton.
Cylas cornea. Common.
Pisidium pulchellum. A single specimen at Celbridge, on the bank of the Liffey. I have also taken one or two other species of Pisidium (one of them being amnicum) near Dublin; but have, unfortunately, allowed them to become mixed with specimens from other places.

Mr. W. Walpole mentioned that Balæa perversa had not been, in his experience, found in the locality stated by Mr. Hogan—namely, the elm; but was common on the beech.

Mr. Kinahan exhibited a lengthened series of specimens of H. nemoralis and hortensis, and hybrida, and made several observations on these varieties, the two first of which, at least, he looked on as species, owing to differences which he had found permanently pervading each in every locality where they were found.

Mr. Hogan considered that the depression of the spire was the principal distinctive mark of Helix hybrida.

The President observed that there was here a subject for philosophical inquiry; and urged that to malacology, rather than conchology, we should look for a solution of the difficulty. He then exhibited from his old collection some specimens which he considered typical of the species nemoralis and hortensis, some remarkable forms of the former, as well as unusual varieties of Helix aspersa. The meeting then adjourned.

MARCH 4, 1854.

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

The Librarian having acknowledged the following donations—viz., Scottish Fauna, 2 vols., by Josh. H. Lamprey, Esq.; and the Natural History Review, for January, 1854, by A. R. Hogan, Esq.—

The President stated that an addition to the Museum, consisting of a room of large dimensions, was nearly completed, and he hoped in a few months to display therein the fine collection of native marine zoology now in the possession of the University. He also mentioned that the Board, kindly complying with his request, had attached two additional rooms to the Museum; in these rooms the business of the association will be conducted in future.

Mr. E. P. Wright then read the following:—

NOTES ON THE OCCURRENCE OF RARE BIRDS IN IRELAND, FROM FEBRUARY, 1853, to FEBRUARY, 1854.

The late Mr. Thompson, of Belfast, had a number of individuals scattered throughout the length and breadth of Ireland, who communicated to him, from time to time, their observations and discoveries in Ornithology. The first appearance of the swallow—the first note of the cuckoo, and other summer visitants—the first discordant croak of the land rail, were all noted by them, and forwarded, with willing hand, to one whose "History of Irish Birds," was a fit place to deposit such information.

Surely, the publication of his work, or his own untimely death, should not hinder the still quiet accumulation of interesting facts in this branch of Zoology.

It is one of the objects of this Association to investigate the Zoology of Ireland; and one great means of doing this would be attained, if we could prevail on some of our distinguished corresponding members to make our transactions the rich storehouse of such facts.

I have put into scientific order the following notes of the occurrence of some of our rarer birds, which have either been communicated to me, as one of the Honorary Secretaries of this Association, been exhibited at our meetings, or have fallen under my own observations. I did this with the impression that single, unconnected facts are much more easily lost sight of than when they receive strength by addition to their numbers. I hope that, on the next occasion I may have the pleasure of doing so, I shall, through the kindness of our members, be able to increase my list fourfold. In order to show the distribution of the various species enumerated, I have quoted the first line from Thompson. In cases where the bird was exhibited at any of the meetings of the Association, I have mentioned so.

Falco œsalon (the Merlin). A specimen of this bird was forwarded to Dr. Ball, by Mr. Nicholson, of Balrath, county Kells, shot, eating a snipe. It was exhibited at one of our meetings. Mr. Davis, in one of his letters, says—"That he saw, in the hands of a person in Clonmel, a fine specimen of the common buzzard (Buteo vulgaris), but on tracing it *to the death*, found it had come from Wales, *in the flesh*. I mention this as an instance of how much care is required in receiving specimens from the preservers, lest we should add to our fauna, through their importations.

Scops aldrovandi (Scops-eared Owl), has been, at least, twice obtained in Ireland. Mr. T. W. Warren informs me that he has a specimen of this owl, shot in Hillsborough, by the Marquis of Downshire's gamekeeper, about March, 1853

Stryx brachyotus (the Short-eared Owl). This owl can only be announced with certainty, as a regular winter visitant.—Thompson. A living specimen was obtained by Dr. Ball, for the Zoological Gardens, Phœnix Park, in the month of February, 1853.

Phœnicura ruticilla (the Red Start), can only be noticed as a very rare visitant to Ireland. Mr. Davis informs me, that a specimen of the male red start has been procured at Waterford. It, or a similar bird, had occasionally been noticed in the yard attached to the house of T. J. Walpole, Esq., of that city, during the summer of 1852, and, on making its appearance in the early part of last year, was shot, by his brother, on the 27th of February, 1853.

Parus caudatus (Long-tailed Tit). This interesting bird, says Thompson, though not well known in consequence of its retired and wooded haunts, has long been recorded as indigenous to Ireland. I noticed a flock of these birds in Donnybrook, in the early part of last spring; they were from eighteen to twenty in number, and alighted on a horse-chesnut tree, within about three yards of my window, on the 17th of April, 1853. They were unaccompanied by any of the other Pari, and I had a good opportunity of observing their manners as they quickly searched every branch of the tree—uttering all the while their cheerful tweet. A few of the birds had the fine roseate hue on their breasts.

Montacilla flava (Rays Wagtail). According to Thompson, this bird can only be announced as a summer visitant to one locality—viz., Lough Neagh; and as of occasional and rare occurrence elsewhere. I observed a pair of these birds on the banks of the river Dodder, in the early part of the summer of 1853. The M. boarula was present at the same time, but even at a distance the difference was clearly discernible.

Alauda arborea (Woodlark), is a resident, though very local species.—Thompson. Mr. Lamprey exhibited a pair of these birds, at a former meeting of the Association, taken near the Vale of Ovoca, county Wicklow, during the severe weather which occurred about Christmas.

Fringilla montifringilla (Brambling). Is a frequent, if not a regular, winter visitant.—Thompson. In a letter received from Mr. Davis, on the 3rd of this month (March), he states, that a flock of the above birds are in the neighbourhood of Clonmel. They resort to one spot in a demesne about one or one and a-half miles from this (Clonmel), and are generally seen in the very tops of high beech trees.

Picus viridis (Green Woodpecker). A specimen of this very rare Irish bird was forwarded to Dr. Ball, by Thomas Batt, Esq., shot on the 12th of January, in Derry. This is one of the commonest of the English woodpeckers, and is found to the north of Scotland, although not mentioned by Jardine or Macgilivray, being enumerated in Dr. W. B. Backie's Historia Naturalis Orcadensis, as occurring in Zetland. Its stomach contained minute larva—doubtless taken from beneath the bark of trees. This is the third well-authenticated occurrence of this species in Ireland. It was exhibited at a former meeting of the Association..

Scolapax rusticola (Woodcock). A female specimen of this bird, with two young ones, was forwarded to Dr. Ball, in the month of May, 1853, by James Pim, Esq., from Monkstown, and is another instance of this bird breeding in our island, they are preserved, among the Irish collection, in the University Museum.

Crex porzana (Spotted Crake). Mr. T. S. Walpole has, in his collection, a specimen of this bird, shot at Kilbarry, County Waterford, some time in October, 1852; this was communicated to me in April, 1853, by Mr. Davis. This bird, says Thompson, can only be announced with certainty as an occasional, though, probably, a regular, summer visitant.

Charadrius morinellus (Dotterel) is very rarely met with in Ireland.—Thompson. In a letter from Mr. Davis, of the 26th October, 1853, he says, that on the 30th of last month, he had a dotterel sent him, shot on the hills near this town (Clonmel). This bird is very rare hereabouts; and Mr. T. W. Warren exhibited, at a meeting of this Association, a specimen of this bird, shot by Mr. Trumble, on one of the highest mountains in Donegal, it was in company with some golden plover (Squatarola cinerea).

Ibis Falcinellus (Glossy Ibis) is an occasional visitant, chiefly late in autumn or early in winter.—Thompson. By a paragraph in a local paper (the *Coleraine Chron.*), not always the safest guide in such cases, it would appear that a specimen of this bird has been obtained in that neighbourhood. I wrote to Mr. W. Dogherty, in whose possession the bird was, and have to thank him for the following particulars:—"It was one of six which were seen on the banks of the River Bush, near Bushmills, in autumn last, and the specimen in question was the only one procured out of the flock. It was kept alive for ten days, and fed on small fish; but, being wounded in the head, died at the expiration of that time. It is now stuffed; it appeared to be in full plumage; colour, approaching to a beautiful green; about the size of a curlew; legs very long, and bill long and curved."

Anser ferus, Gessner (Grey-legged Goose), is of occasional, but rare occurrence in Ireland. This bird, though said in former times to have been abundant in this country, must now be reckoned among the rarer of our Anatidæ. During the severe weather which prevailed towards the latter end of December, 1853, and the beginning of January, 1854, several of these birds were brought to Dublin, by the wild-fowl shooters. A very fine specimen was obtained for the Museum of the Royal Dublin Society, shot in Westmeath. The bean goose was also very abundent, but the specific difference appeared to be well known, as well as the difference in their value.

Anser Canadensis (Canadian Goose). This bird, according to Thompson, has, in a very few instances, been shot on parts of our coast. In a letter which I received from Mr. Davis, he mentions that a fine, and evidently a "pure wild specimen," was obtained by Dr. Harvey, of Cork, in the month of January last, shot on a river in the vicinity of that town.

Harelda glacialis, Linn (Long-tailed Duck). Robt. Warren, jun., Esq., kindly communicated to me the occurrence of this beautiful duck, in limited numbers, in Killala Bay, county Sligo. It is a regular winter visitant to that locality. They sometimes remain far into April, before taking their departure for the season.

Sula bassana, Briss (Solan Goose or Gannet). On the 26th of October, 1853, I received the following communication, in a letter from Mr. R. Davis, Clonmel:—"About two months since, I had a fine specimen of the gannet sent me, shot in Tramore Bay, August, 1853, which differed in plumage from any specimen I have yet seen or met with; in appearance it much resembled a great black-backed gull; it is now in the collection of Dr. Harvey, Cork. The following is a description of the bird:—Forehead, yellow white, which tinge shows in upper part of neck; crown and sides of head, brownish black, irregularly mixed with white; a narrow line of same colour down nape; sides of neck and breast, white, with some brown spots intermixed; flanks, mixed black and white, in equal proportions; all the upper parts—viz., back, wing, coverts, primary, and tail, &c., brown black, with very faint and slight remains of triangular white spots (hardly perceptible, except on close observation); remaining under parts, white; bill and legs, as in adult, but rather dull. I suppose this to be no uncommon variety, but merely the midway stage between youth and full age; but I have not noticed any description resembling it." Dr. Ball has, I believe, observed the same state of plumage in the gannets kept in confinement in the Zoological Gardens, Phœnix Park.

Sterna cantiaca, Gmel (Sandwich tern), is of occasional occurrence on the coast in summer and autumn.—Thompson. Mr. R. Warren informs me, that these interesting birds were rather late in making their appearance in Killala Bay, last spring, on account, perhaps, of the severe weather. They did not arrive until the 7th April. Although last year (1852) they were observed as early as the 23rd of March, he had not, as yet, ascertained their breeding haunts, although he thinks it cannot be far distant, as they fish throughout the summer in the bay.

Lestris Richardsonii (Richardson Skua), is occasionally procured on the coast.—Thompson. The following communication, in reference to this bird, for which I am indebted to Mr. R. Warren, would seem to cast a doubt on the statement of Mr. Watters, in his History of Irish Birds, that the L. Richardsonii was the rarest of Lestridæ. A brother of Mr. Warren's, residing at Bartra, in Killala bay, about a mile from Enniscrone, says, that some time in November, he witnessed the migration of some hundreds of species of Lestris; they appeared to come from the north-east, and went right across the country towards the south-west; they were, probably, L. Richardsonii, for on October 17th, 1851, I witnessed a like migration at the same time, and one, which I then shot, proved to be of that species. As well as I could judge of them on the wing, they appeared to be of all ages. The one I shot was immature. I was not before aware of the appearance of the Skua in such abundance on our coast.

Thalassidroma Leachii, Temm (Fork-tailed Petrel). A specimen of this petrel was obtained by Dr. Ball, for the University Museum, and exhibited at a former meeting of this Association. It was shot near the North-wall, during stormy weather, in the month of October, 1853.

In concluding these few notes, which are only a tithe of the rare birds which have

visited, for the last twelve months, our island, but which, few though they be, I thought better to lay before the Association now, than defer them for another year, in order that I might thereby add to their number. I wish to return my best thanks to Robert Davis, Esq., of Clonmel, and Robert Warren, jun., Esq., of Sligo, for forwarding, through me, to the Association, notes on such birds as came under their observations. I hope that I may be excused for wishing that other of our corresponding members will kindly follow their example, as I think it will tend to the increase of the knowledge of our native birds, to bring before the Association, each year, all the facts which can be procured concerning them during that period, together with notes, on the first appearance and time of departure of the summer visitants.

Dr. Ball then exhibited a very fine specimen of Mergulus alle, procured by Mr. Ogilby, in the County Tyrone, and shot thirty miles from the nearest sea. The allied species Uria troile, or willock, is sometimes captured on the land; and it is an old notion of the Irish that this bird cannot fly over land; it certainly seems to prefer flying round the head-lands, rather than crossing them, as eagles and sea birds generally do; probably it is unable to rise from the ground, as is the case with the albatross and some other birds.

Dr. Ball also exhibited a piece of decayed wood, of unknown age, containing some large specimens of Pholas crispata, trawled in Dublin Bay, near Lambay Island.

Dr. Carte exhibited specimens of the Teredo megotara, which he had found in great abundance in a piece of wood, covered with the Lepas anatifa, and washed ashore, near Merrion, during the stormy weather, in the early part of last month; for it he was indebted to the kindness of Dr. Ball.

Mr. T. W. Warren exhibited a very interesting series of the valves and pallets of Terido bipinnata, from his collection. They were given him by Mr. Gabbett, of Clare; and in the same timber he found specimens of Pholas striata.

Mr. Wright said that the finding of P. striata in company with T. bipinnata might be a proof of the latter not being indigenous; the former, according to Forbes and Hanley, not being so.

Mr. Walpole remarked that some of the pallets in Mr. Warren's collection were covered with fine striæ, which he had never before seen on any other pallets of Teredo, nor was it mentioned by Forbes and Hanley. It might, possibly, be a distinct species. Mr. A. R. Hogan then read the third and concluding part of his

CATALOGUE OF COLEOPTERA, FOUND IN THE NEIGHBOURHOOD OF DUBLIN.

Leiopus nebulosus, *L.* Rathfarnham, &c.; on chesnut trees.
Rhagium bifasciatum, *F.* Powers-court.
Strangalia elongata, *Ste.* do.
Grammoptera ruficornis, *F.* do.
,, lævis, *F.* Glasnevin, &c.; on Umbelliferæ.
Donacia cincta, *Germ.* Glasnevin Botanic Gardens.
,, crassipes, *F.* Taken by Mr. Tardy.
,, Sagittariæ, *F.* Portmarnock.
,, Proteus, *Kunz.* Glasnevin.
,, Lemnæ, *F.* Taken by Mr. Tardy.
,, linearis, *Hop.* Glasnevin.
Crioceris cyanella, *Ste.* Firhouse.
,, puncticollis, *Cts.* Do.
,, melanopa, *Ste.* Rathfarnham Park.
Cassida rubiginosa, *Ill.* Dodder banks.
Galeruca Tanaceti, *L.* Taken by Mr. Tardy.
,, Cratægi, *Dft?*
,, Nymphææ, *L.* Local.
,, Capreæ, *Ste.?* Do.
Haltica Lepidii, *Ent. Hft.* Glasnevin and Portmarnock.
,, Brassicæ, *F.* Taken by Mr. Tardy.
,, Nemorum, *L.* Local.
,, Rubi, *F.* Do.
,, cærulea, *Pk.* Phœnix Park; on flags.
,, ferruginea, *Schr.* Roebuck, Firhouse, &c.
,, flava, *Ste.* Local.
,, Helxines, *F.* Firhouse, &c.; on willows.
,, Oleracea, *L.* Dodder banks.
,, Modeeri, *F.* Portmarnock?

Thyamis tabida, *Ol.* On Senicio Jacobæa.
,, atricilla, *Ste.* Local.
,, ochroleuca, *Ste.* Killiney; on Ononis arvensis.
,, lurida. *Gyl.* Common.
,, Holsatica, *L.* Local.
Macrocnema Hyoscyami, *Ent. Hft.* Firhouse?
,, exoleta, *Ste.* Rochestown; taken by Mr. Molloy.
,, marcida, *Ill.* Portmarnock.
,, chrysocephala, *L.* Taken by Mr. Tardy.
,, rapæ, *Ill.* Dodder banks.
Chætocnema concinna, *Ste.* Local.
,, aridella, *Pk?* Rare.
Sphæroderma testaceum, *F.* Local.
,, orbiculata, *Mm.* Portmarnock.
Timarcha coriaria, *F.* Taken by Mr. Tardy.
Chrysomela polita, *L.* Local.
,, staphylæa, *L.* Do.
,, Banksii, *Ste.* Abundant about Roebuck, &c.
,, lamina, *F.* Roebuck, Clontarf, &c.; scarce.
Helodes Beccabungæ, *Pz.* Dodder banks.
,, auctus, *F.* Taken by Mr. Tardy.
Phædon marginella, *Ste.* Dodder banks.
,, Vitellinæ, *L.* Local.
,, Raphani, *F.* On docks; common.
,, cochleariæ, *F.* On cow parsnips.
Coccinella septem-punctata, *L.* Common.
,, variabilis, *Ill.* Do.
,, conglomerata, *Ste.* Local.
,, quatuordecim-punctata, *L.* Near Dundrum.
,, tredecim-punctata, *L.* Portmarnock? on willows.
,, octodecim-guttata, *L.* Taken by Mr. Tardy.
Scymnus discoideus, *F.* Portmarnock; very rare.
Rhyzobius litura, *F.* Baldoyle; abundant.
Cacicula pectoralis, *Ste.* Portmarnock; on dwarf willows.
Stene ferruginea, *Ste.* Taken by Mr. Tardy.
Tenebrio obscurus, *F.* Dublin; in stables.
Phylan gibbus, *F.* Portmarnock.
Crypticus quisquilius, *Pk.* Ditto.
Blaps mortisaga, *Ste.* Dublin; in cellars and stables.
Helops striatus, *Ste.* Taken by Mr. Tardy.
Lagria hirta, *L.* Portmarnock and Killiney.
Melandrya caraboides, *L.* Malahide; taken by Dr. Lloyd.
Anspis frontalis, *L.* Phœnix Park; on hawthorn flowers.
,, ruficollis, *Gfry.* Same locality.
,, obscura, *Gyl.* Ditto.
Proscarabæus violaceus, *Mm.* Roebuck, Merrion, &c.; very uncertain in its appearance.
,, vulgaris, *Ste.* Portrane sands.
Ischnomera melanura, *Ste.* Glasnevin Botanic Gardens; on Scrophulariæ.
Anthicus floralis, *F.* Powerscourt.
Scydmænus tarsatus, *Müll.* Taken by Mr. Tardy.
Pselaphus Heisii, *Hbst.* Malahide Hill.
Euplectus Karstenii, *Rchb?* Local.
Autalia rivularis, *Grav.* Portmarnock.
,, impressa, *Ol.?* Local.
Falagria sulcata, *Pk.* Ditto.
Calodera nigricollis, *Pk.* Malahide.
Tachyusa atra, *Grav.* Dodder banks.
Astilbus canaliculatus, *F.* Portmarnock, &c.; common.
Polystoma obscurella, *Ste.* Portmarnock and Malahide.
Callicerus obscurus, *Ste.* Portmarnock.
Bolitochara circellaris, *Grav.* Malahide; very common.
,, analis, *Grav.* Do.
,, socialis. *Pk.* Local.
Oligota subtilis, *Er.* Do.
Encephalus complicans, *Wood.* Portmarnock; rare.
Aleochara fuscipes, *Grav.* Not uncommon.
,, nitida, *Grav.* Portmarnock.
,, lanuginosa, *Gyl.* Local.
,, moesta *Grav.* Ditto.
Oxypoda opaca, *Grav.* Portmarnock.
Diglossa mersa, *Hal.* Baldoyle; for description of exact locality, &c., *vide* "Zoologist," 3,464. Subsequent experience has, however, convinced me that the insect is much more abundant than might be supposed from the account there given.
Tachyporus thoracicus, *Ste.* Local.
,, chrysomelinus, *L.* Do.

Tachyporus marginellus, *Ste.* Do.
,, Hypnorum, *F.* Everywhere.
Hypocyptus læviusculus, *Ste.* Portmarnock; on the bent grass.
Conurus pubescens, *Grav.* Local.
,, pedicularius, *Grav.* Killiney, &c.
Megacronus analis, *Ste.* Local.
Tachinus silphoides, *L.* On dung-hills.
,, marginellus, *F.* Local.
,, subterraneus, *L.* Phœnix Park.
,, elongatus, *Gyl.* Chapelizod glen.
,, rufipes, *Ste.* Not uncommon.
Creophilus maxillosus, *L.* On carcases.
Trichoderma pubescens, *De G.* Abundant.
Staphylinus erythropterus, *Ste.* Do.
,, castanopterus, *Ste.* Local.
,, æneocephalus, *Ste.* Do.
Goerius olens, *Müll.* Frequent.
Ocypus similis, *F.* Local.
Quedius tristis, *Grav.* Dalkey.
,, impressus, *Pz.* Portmarnock; common.
,, discoideus, *Ste.* Local.
Raphirus semi-obscurus, *Ste?* Do.
,, boops, *Grav.* Do.
Philonthus splendens, *F.* College Park.
,, politus, *L.* Frequent.
,, marginatus, *F.* Do.
,, sanguinolentus, *Grav.* Portmarnock.
Cafius xantholoma, *Ste.* Baldoyle, &c.; on the sea-sands.
,, fucicola, *Ste.* Killiney, &c.
Gabrius aterrimus, *Grav.* On the sea-coast.
Remus sericeus, *Ste.* Malahide.
Othius fulvipennis, *F.* Local.
,, melanocephalus, *Grav.* Do.
,, læviusculus, *Ste.* Do.
Xantholinus glabratus, *Grav.* Scarce.
,, punctulatus, *Pk.* Baldoyle.
,, linearis, *Ol.* Local.
Leptacinus parumpunctatus, *Gyl.* Dung-hills.
,, batychrus, *Gyl?* Local.
Lathrobium brunnipes, *Grav.* Phœnix Park.
,, fulvipenne, *Grav.* Do.
,, elongatum, *L.* Local.
Lathrobium multipunctatum, *Grav.* Do.
,, angusticolle, *Boisd.* A single specimen on the banks of the Dodder, near Firhouse.
Sunius ochraceus, *Grav.* Dodder banks.
Astenus augustatus, *Pk.* Malahide.
Rugilus rufipes, *Er.* Local.
,, orbiculatus, *Er.* Do.
,, affinis, *Er.* Do.
Stenus guttula, *Müll.* Dodder banks and Loughlinstown.
,, Juno, *Ste.* Common.
,, buphthalmus, *Grav.* Do.
,, nitidus, *Er.* Do.
,, speculator, *Er.* Do.
,, pumilio, *Er.* Do.
,, unicolor, *Er.* Do.
,, aceris, *Ste.* Do.
,, picipes, *Ste.* Do.
,, tarsalis, *Ste.* Local.
,, oculatus, *Grav.* Everywhere.
Bledius tricornis, *Hbst.* North Bull sands, &c.
Hesperophilus arenarius, *Pk.* Baldoyle and Portmarnock.
Phytosus spinifer, *Ste.* One specimen on Portrane sands.
Platysthetus morsitans, *Pk.* Local.
Oxytelus rugosus, *F.* Do.
,, nitidulus, F. Do.
,, piceus, *L.* Common.
,, sculpturatus, *Grav.* Do.
,, depressus, *Grav.* Do.
Megarthrus depressus, *Grav.* Do.
Proteinus atomarius, *Er.* Portmarnock; rare.
,, brachypterus, *F.* In putrescent agarics.
Phlæobium clypeatum, *Müll?* Local.
Omalium deplanatum, *Gyl.* On a window in Dublin.
,, rivulare, *Grav.* Common.
,, subpubescens, *Ste.* Phœnix Park, &c.; abundant on furze.
Deleaster dichroa, *Grav.* A single specimen, by the late Mr. Jas. Egan.
Trogophlæus pusillus, *Grav.* Dodder bank.
Thinobius longipennis, *Heir.* Do., near Firhouse.
Lesteva obscura, *Pk.* Dodder banks.

On the catalogue thus concluded there is little to remark, save the absence of many species usually common in similar localities, which constant observation during the past half-century has failed to discover, and few of which I think likely to be brought to light hereafter, notwithstanding Mr. Douglas's very encouraging remarks on "terra incognita." We have hardly anything to compensate us in the way

of species considered rare or local in other parts of the British isles, with the exception, perhaps, of Trechus labidosus, Heterocerus femoralis, Lathrobium angusticolle, Thinobius longipennis, and two or three more; even Diglossa mersa is no longer peculiar to the Irish coast, having been taken in large numbers on the coast of France, in 1852, by Messrs. Blanchard and Signoret, and in Scotland by M. Javet. In one genus only, have we more than the proportion of species that might be expected—namely, Cercyon, of the thirteen species of which, acknowledged as European, all have been found in Ireland, and eleven within the limits of the county Dublin.

That other collectors, however, of whose existence I may be as yet unaware, have taken more, and, possibly, remarkable species not known to me as occurring in the neighbourhood, I should not wish to seem to doubt; and I hope they will not fail to make their discoveries public, either by sending notices of them to the "Zoologist," or, if they prefer it, communicating them to me, for a future appendix. Thus may the very imperfections of my list tend to the advancement of science, and to the encouragement of new votaries to the study, who, if they would reap the highest and best fruits of their labours, will not forget, I trust—

> "To trace in nature's most minute design,
> The signature and stamp of power divine,
> Contrivance intricate, expressed with ease,
> Where unassisted sight no beauty sees.
> The shapely limb and lubricated joint,
> Within the small dimensions of a point;
> Muscle and nerve miraculously spun,
> His mighty work who speaks, and it is done;
> The Invisible in things scarce seen revealed,
> To whom an atom is an ample field."

So will the lover of entomology, whom the cheering fragrance of returning spring once more tempts to ramble forth from the scenes of his winter labours, soon find his way, as Cowper says (from whom I have just quoted):—

> "To regions where, in spite of sin and woe,
> Traces of Eden are still seen below;
> Where mountain, river, forest, field, and grove,
> Remind him of his Maker's power and love."

The Rev. Joseph Greene then mentioned that he had bred a specimen of Hipparchia Ægeria, on the 1st of March, from a pupa found on a blade of grass, near a poplar, in December last, and drew the attention of the meeting to its very early appearance—proving the singular mildness of the season.

The Association then adjourned to the 25th of March.

LITERARY AND SCIENTIFIC INSTITUTION OF KILKENNY.

FEBRUARY 15, 1854.

Dr. Browne, in the chair.

The usual business being transacted, the honorary secretaries announced that the auditors, appointed at the January meeting (Dr. Kearns and Robert Molyneux, Esq.), had given in their report, to the effect that the treasurer's statement of accounts was most satisfactory, leaving a balance in his hands of £11 18s. 10d.

The following donations were announced:—

Report of the Dublin Statistical Society; and Statistics of Australia, by the Dublin Statistical Society.

An Indian letter, folded in the shape of a neck-tie, intended to be sent by hand. It was composed of portions of the palm-leaf.

Thomas Leary, Esq., A.B., Kilkenny College, was admitted a member.

Robert Curtis, Esq., read a paper on "The evil effects of Intoxicating Liquors;" and Mr. Robertson read the following paper:—

THE PALMYRA PALM, DATE-TREE, AND SAGO PLANT.

I feel happy in being able to contribute to our Society's Museum, a curiosity lately forwarded to me from the South of India. In presenting it, I will avail myself of the opportunity to give some account of my donation, as I will thus be enabled to indulge my partiality to speak about "Trees and Plants," by offering a few remarks on two or three species of the palm tribe—a family of plants which has many claims upon our attention, particularly in a commercial point of view, as but few of its species are without some useful property.

The cocoa-nut and the date are valued for their fruit, which yield food, drink, and oil; the fan-palm and many others for their foliage, whose durability and hardness render it a good material for thatching; it is also used to form sunshades wherewith to screen the natives of tropical countries from the scorching rays of a vertical sun; again, the sweet juice of the Palmyra palm, when fermented, yields a sort of arrack, the favourite, but intoxicating liquor of the Indian; the pith of the sago palm abounds in nutritive starch, whilst other species supply, in their leaves and trunks, materials for cordage and elastic timber.

The antiquity of the palms is worthy of our notice; that they were amongst the first plants which were created is proved by the numerous remains of their fruit, leaves, and stems, which occur in the coal formations of northern countries. I exhibit two specimens of these fossil remains, one of them was found in the coal district of Slievardagh, in the county of Tipperary, it appears to belong to the order *Cycadeæ*, a class of plants which form a connecting link between the palms and tree ferns. The other specimen has been presented to me by Mr. Butler, of Woodstock, who describes it as being a part of the stem of the date tree (*Phœnix dactylifera*), of which more hereafter.

I cannot pass over the fact of the remains of palms being found in the coal formations, without stating, that this circumstance has given rise to much discussion on the probability of a great change of climate having taken place in these northern countries. The discussion of so important a subject requires too much scientific knowledge for me to undertake, but I may here briefly state, that the advocates of the above theory assume that the remains of the palms occasionally found in cold countries are not only tropical species, but that they grew in or near the localities in which they have been discovered in a fossil state. On the other hand, their opponents say that these remains may have been drifted from the tropical countries, or that they belonged to species now extinct, which were adapted to a temperate climate; at present, I believe, that the climate of Sicily is the coldest in which any palms have been grown in the open air.

That palm leaves were, at a very early period, used as a material for manuscripts, is evident from a passage in Niebuhr's History of Rome, when he says, in allusion to the sybilline oracles instituted by the last Tarquinius (B.C. 510): "From what little has been handed down, divulged, perhaps, after their destruction in the time of Sylla, they appear to have been written on palm leaves. The method of consulting was most probably by shuffling them, and drawing forth a leaf." As this use of the palm leaf is intimately connected with the little curiosity which I present; I will proceed with a description of it, in the words of my correspondent, who thus writes—"The little articles on the string are specimens of letters, which the natives of this locality (near Tuticoreen, Presidency of Madras) are in the habit of sending to one another; they are formed of the leaf of the Palmyra palm, and are called *Ola* or *Olas* by the natives. They are not intended to be sent through the post-office, but are conveyed by hand from one neighbour to another. The address is written on the outside, by means of a style. I would not advise you to open one of them, as most probably you would not succeed in folding it again."

Having been unable to procure a leaf of the Palmyra palm (*Borassus flabelliformis*), I will endeavour to give a brief description of the plant, which is said to be so called from Palmyra, the name of a celebrated city in the desert of Syria,

formerly a place of great importance, but now only a mass of picturesque ruins, which tell the melancholy story of its former splendour. Palmyra was also called, Tadmor, and, in the sacred book of Chronicles, it is described as having been built by Solomon. On the other hand, the city of Palmyra is said to have derived its name from the word palm, in consequence of this plant flourishing in its vicinity. The Palmyra palm is a stately plant, common in the islands of the Eastern Archipelago, and the southern parts of India. Its leaves are used in making fans and punkahs, and also in thatching; the fruit is eaten; the sap is drank in its natural state, and forms a refreshing drink, or is evaporated to make a coarse sugar; but, if fermented, it forms one of the intoxicating liquors of tropical countries; our intelligent associate, Mr. Molyneux, tells me, that he has often seen the natives of India drawing off the palm juice for this purpose.

My friend, Mr. Butler, thinks that these Indian letters are formed of the leaf of the date-palm (*Phœnix dactylifera*) and not of the Palmyra palm. Mr. Butler having forwarded a leaf of the former to me, I will give a short account of the plant, which fulfils a very important part in the economy of nature, its fruit being the almost only food of a large portion of mankind. The date tree is one of the best known, and, probably, the earliest known of the palms; it is the palm tree of Scripture, and was emblematic of Judæa, as is learned from coins.

"The extensive importance of the date-tree is," says Dr. Clarke, "one of the most curious subjects to which a traveller can direct his attention. A considerable part of the inhabitants of Egypt, Arabia, and Persia subsist almost entirely on its fruit. They make a conserve of it with sugar, and even grind the hard stones in their handmills for their camels. In Barbary, they form handsome beads of these stones. From the leaves they make couches, baskets, bags, mats, and brushes; the trunk is split, and used in small buildings, also for fences to gardens, and the stalks of the leaves for making cages for their poultry. Parts of the leaves are also twisted into ropes, which are employed in rigging small vessels. The sap of this species also yields the intoxicating liquor of which I have already made mention; by the withdrawal of the sap the stem is exhausted, becomes dry, and is used for firewood. Such being the importance and multiplied uses of the date-tree, it is not surprising that, in an arid and barren country, it should form so prominent a subject of allusion and description in the works of Arab authors, and have so many names in their language." About fifteen years ago, the finest date-tree in Europe was in the conservatory of the Earl of Tankerville, at Walton-on-Thames; it was then sixty years old, the stem seven feet four inches in circumference, and the leaves thirty feet long.

The last plant, to which I will direct your attention, is a very beautiful and interesting member of the Cycadeæ, I mean the sago palm (*Cycas revoluta*)* of Japan; where Thunberg† tells us it is held in such estimation, that it is contrary to the laws of Japan to take the trees out of it. The *Cycas revoluta* (of which I exhibit a leaf) is not, however, the only plant from which sago is procured; of late years a very fine sago has been brought from Brazil, supposed to be the produce of the *Mauritia flexuosa*, and some of the other magnificent palms of that country; a species of the date-tree, *Phœnix*, also yields an abundant supply of this flour, hence it is called *farinifera*, or flower bearing; there are other plants, also, of the palm tribe which yield sago, but an enumeration of them is unnecessary.

It will be more interesting to describe the process of preparing sago, which signifies, in the language of the Papuans, *bread*, since it forms the staple article of food to the inhabitants of the eastern Archipelago and other parts where the plants which yield it grow. Sago is a variety of starch, which nature has supplied to the plant for the use of the flowers and fruit, and is most abundant just before the appearance of the flour-bud, which is known by a whitish dust appearing on the leaves. At this time the stem is cut down, near the base, and then divided into pieces of five or

*The leaves of the date-tree and of the sago palm—which were exhibited at the meeting—were taken from plants growing in the conservatory at Woodstock, the seat of the Right Hon. William F. Tighe. The conservatory is circular, and was designed and executed in metal, by J. Turner, of Hammersmith, Dublin.

† Thunberg, a celebrated Dutch traveller and botanist, in honour of whom the pretty genus of stone plants, THUNBERGIA, was so called.

six feet in length. A part of the outer hard wood is then sliced off, and the workman coming to the pith, cuts across the longitudinal fibres and pith together, leaving a part at each end uncut, so that when it is excavated there remains a trough, into which the pulp is again put, mixed with water, and beaten with a piece of wood; the fibres being then separated from the pulp, float at the top, and the flour subsides. After being cleared in this manner by several waters, the pulp is put into cylindrical baskets, made of the leaves of the tree. The quantity yielded by one tree is very great. Five or six hundred pounds are not an unusual produce for one tree; and as the vegetation still remains after the tree has been cut down, a stem again springs up, which goes through the different stages of growth until it is fit for the axe.

The flour is rarely imported, granulated sago being the state in which it is commonly brought to Europe. To bring it into this state from the flour, it must be moistened, and passed through a sieve into a very shallow iron vessel, held over a fire, which enables it to assume a globular form. Thus, all our grained sago is half baked, and will keep long. Of this granulated sago there are two varieties, the common or brown sago, and pearl sago. It is insipid, but when well seasoned is much used as an article of diet for invalids and children—a coarse description of sago is sometimes employed in the feeding of calves. I have been unable to discover at what time sago was first introduced into these countries, but I have learned from men in business for the last thirty or forty years, that, during that time, the consumption of it has been increased very little. In conclusion, I may state, for the information of many, that there is a pretty numerous collection of very well grown specimens of palms in the Royal Dublin Society's garden, at Glasnevin; and to all who may be induced to visit those interesting and beautiful grounds, I can promise the greatest civility from the attendants.

THE

NATURAL HISTORY REVIEW.

Reviews.

GEODEPHAGA BRITANNICA. A Monograph of the Carniverous Ground Beetles, Indigenous to the British Isles. By John Frederic Dawson, LL.B. Coloured Plates. London: John Van Voorst. 1854. Price 12s. 6d.

THIS book may be reckoned as one of the many proofs of the advance of entomological science in these days. In the good old times, when entomology was considered a school of cruelty, or, at best, a sport for babes in understanding, the few men who had courage to pursue the study, and endeavour to reduce it to a system, had so much more on their hands than they could possibly manage, that it is no wonder that their early attempts were sometimes crude, or, at any rate, too sketchy and imperfect to stand the test of time and deeper investigation unchanged. The real wonder is that they did as much as they did, and as well; that they did no more and no better was the fault, not of themselves, but of those who, by spending their time in ridiculing instead of helping them, left them to struggle unaided through a work far too vast and complicated to be satisfactorily performed by a few. Times are now happily changed, and men are not only no longer ashamed of being entomologists, but think it worth while to devote to it their time, trouble, and intellect; and do not think it beneath them to investigate minutely one order, or even—as in the present case—one group of insects, instead of endeavouring to grasp everything at once. Something may be lost in sound, but the real interests of science are immeasurably the better for it. Therefore, such books as this, if carefully and ably written—and this is undoubtedly so—deserve a cordial welcome from the true lovers of entomology as a science, not as a pastime.

If too great simplicity were the prominent failing in some of the earlier systems of classification, Mr. Dawson is of opinion that, of late, the opposite

error has become rather prevalent—at least in the nomenclature and arrangement of the stirps, which is the subject of the present Monograph. To this opinion the publication of the present volume is, perhaps, principally owing, as appears from the opening sentences of the preliminary observations :—

"In consequence of a suggestion made to me by several of my entomological friends and correspondents, I have been induced to undertake, and, at length, to publish, a specific arrangement of the carnivorous ground beetles indigenous to the British Isles—a group to which I have paid much attention. No small amount of confusion appears to have existed in their nomenclature, which has arisen from the circumstance of an undue importance having been assigned to varieties, differing merely in size and colour, which have either been formed into imaginary species, or have been mistaken for others which have never been found in Britain ; the result of which has been that the total amount of actual species has been considerably overrated."

The value of this word "considerably" may be readily gathered from a comparison of Mr. Dawson's Tabula specierum with the corresponding portion of Stephens's Manual; in the latter of which we find, under "Stirps Geodephaga," 472 (or, deducting 23, included in parentheses, as improperly introduced into the British lists, 449) species, while in Mr. Dawson's list there are only 294 ; in other words, 155 species, or about one-third of the whole, have disappeared. Indeed the difference is still greater; for of the 294 species admitted by Mr. Dawson, about fifteen are introduced for the first time into the catalogue of the British Geodephaga; so that of Stephens's 449, no less than 170 are rejected by Mr. Dawson. Such a result may well seem startling; but, however much our national vanity may shrink from being thus roughly spoiled of so many of our fancied indigenous fauna, the sentence of condemnation would seem to have been not lightly pronounced—

"I have been unwilling," he says, "to reject any reputed indigenous species which I felt that I could reasonably retain, and yet, after full consideration, have been compelled to reduce their aggregate amount very considerably, either because many of them are evidently varieties of others, or because no sufficiently conclusive evidence exists to warrant their retention in the British Fauna. In the subfamily—Bembidides, particularly—I have been compelled to reject about two-fifths as mere varieties or immature examples, which may satisfactorily be resolved into some one or other of the remainder."

Thus, for example, Bembidium obtusum (Tachys obtusus, Steph.) is given as the type of a species, of which Tachys immunis, pusillus, and gracilis, of Stephens, are considered varieties, the distinction between them consisting mainly in different shades of colour in the elytra and legs, attributable to greater or less degrees of maturity, and in the greater or less depth of the foveæ at the base of the thorax. In the type there are two impressions on the third interstice of the elytra, which seem to be occasionally wanting in the varieties ; but the departures from the type are not

sufficiently important or uniform to justify the author in considering them distinct species. He specifies Tachys gracilis, Steph., as a "smaller example;" the dimensions, however, given for T. pusillus are less; those of T. gracilis corresponding with those of the type. Of the Cicindelidæ, of which Mr. Stephens admits six species, one Cic. sylvicola (first described as distinct by Mr. Curtis), is regarded as merely "a green example of C. hybrida;" so far as it can lay claim to being indigenous to this country, although "the original representative," "is by most entomologists considered a distinct species, and is a larger insect, but not found in Britain."

Perhaps we may be permitted to doubt whether still further investigation may not lead to the re-admission of some of the species rejected by Mr. Dawson; at any rate, it will be interesting, and possibly useful, to collect such gleanings of information about any of them as may tend, however slightly, to bring the question of their authenticity to a final issue. With this object in view, we will allude, for a moment, to a species, Nebria picicornis, included in a list, at page viii., of the Prel. Obs., as erroneously reported British. Mr. Dawson's note on it is as follows:—"Stated to have been captured by the Rev. F. W. Hope, in Longmont Forest. Its natural habitat is on the muddy banks of rivers and lakes, and the locality in which it is reported to have been found is so widely different from those which it naturally affects, that I am inclined to suspect that it has been introduced into the British Fauna by mistake." But we have been informed that another specimen, accurately answering to Mr. Stephens's description, and in length between $6\frac{1}{4}$ and $6\frac{1}{2}$ lines, was taken by Mr. J. Walter Lea and his brother, in 1847, near Oxford (not an unsuitable locality), and a note to that effect is made against that species in the margin of his copy of Mr. Stephens's Manual. As, however, owing to unavoidable neglect for a long time, the whole of the collection in which the insect was placed was subsequently destroyed by mites, it is, unhappily, impossible to subject the specimen to further investigation; so the report must, of course, be taken *quantum valeat*. But as the *locality* was the only objection to the reception of the insect on the previous testimony, and as the same difficulty can scarcely apply to this latter instance, it seems, at least, worth mentioning. Curtis says it was "first taken by Dr. Leach, near Ashburton, Devon."

But it is not only with respect to the number of indigenous species that Mr. Dawson comes before us in the light of a wholesale reformer; his treatment of the ordinarily received families and genera is scarcely more merciful. Of the six families into which the Geodephaga have been divided, he rejects four (the Brachinidæ, Scaritidæ, and Harpalidæ, of

MacLeay, and the Bembididæ of Stephens), as having been erected on an untenable principle, and not possessing characters sufficiently distinctive to entitle them to "a footing of equal importance with the Cicindelidæ and Carabidæ;" he thinks "that the most consistent and natural divisions will be found in Latreilles's two grand families, Cicindeletes and Carabici (p. ix. Prel Obs.)," which arrangement he has resumed under the terms Cicidelidæ and Carabidæ, dividing the latter into five subfamilies—but in a matter of such importance it will be better to let our author speak for himself. He says (p. ix. Prel. Obs.):—

"I have, furthermore, divided the latter (the Carabidæ) into five groups or subfamilies, according to the plan set forth by Mr. Westwood, in his 'Introduction to the Modern Classification of Insects,' with this difference, however, that I have transposed the third and fourth groups, considering it more desirable that the Harpalides should immediately precede the Bembidides; and the natural transition from Trechus to Bembidium be maintained through the intimate affinities which subsist between those remarkable insects, Aëpys marinus, Blemus areolatus, Lymnæum nigropiceum, and Cillenus lateralis; and I have placed Pelophila and the Elaphridea in their natural juxta-position with Nebria, though, by so doing, the foreign genus Homophron is farther removed from the Hydrocantharides; to which, at first view, and judging merely from its external structure, it would seem to be more nearly allied than it really is; in this arrangement I have, consequently, followed, under certain modfications, Dejean, Erichson, Heer, Redtenbacher, and, in fact, most of the Continental entomologists.

"The first group (Brachinides) comprises all the genera which were comprehended in the family Brachinidæ of MacLeay and Stephens, and corresponds with Dejean's subfamily Truncatipennes.

"The second group (Scaritides) corresponds with the Scaritides of Dejean, and the family Scaritidæ of MacLeay and Stephens.

"The third group (Carabides) corresponds with the Simplicipedes of Dejean, and comprises the Carabidæ of MacLeay and Stephens, and the Elaphiridæ of Stephens."

The characters given—"the anterior tibiæ entire, and not notched; the anterior tarsi being more or less dilated in the male," seem not exactly to correspond with those assigned by Stephens to the family Elaphridæ (Man. p. 4); "anterior tibiæ not palmated, without a notch on the side, but slightly notched at the apex; anterior tarsi *not* dilated in the males." But it is observable that in his description of the genera comprised under this family, there is not one instance of the anterior tarsi of the male being not dilated (the nearest approach being in Notiophilus "male with three basal joints of anterior tarsi "scarcely dilated"), so that they may fairly be characterised as "more or less dilated," according to Mr. Dawson's description; and the "slight notch" at the apex of the anterior tibiæ is not invariable, and cannot, therefore, be relied on as distinctive.

The fourth and fifth group, Harpalides and Bembidides, correspond respectively with the Harpalidæ of MacLeay and Stephens, and the Bembididæ, of Stephens.

There is yet one more deviation from the ordinary generic arrangement, which Mr. Dawson thus announces:—

"The modern subdivisions of genera having proved unsatisfactory, being sometimes founded on almost imaginary differences, at any rate far from constant, are altogether rejected, and I have merely inserted the names of the subgenera in brackets for the convenience of those English entomologists who have been most accustomed to Stephens's arrangement, without meaning to attach to them any importance otherwise."

Accordingly, about 35 genera, and one or two subgenera, of various authors, almost all of them contained in Stephens's Manual, are swept away at a breath.

On the whole, then, whether we regard the arrangement of the families, genera or species, according to Mr. Dawson's Monograph, the pervading spirit is that of determined compression. Thoroughly dissatisfied with the received arrangement, and continually complaining of the confusion into which it has been thrown, he has set himself in good earnest to simplify as much as possible. He has applied himself to his task with most laudable patience and assiduity, and has evidently turned to good account the great advantages of which he was possessed. The result of his labours is now before the entomological world, and even should it eventually be proved that he has occasionally judged rather too strictly, great thanks would be owing to him for his searching scrutiny of received opinions, out of which nothing but good can eventually come. Even were one-half only of his strictures to be finally established, it would be more than enough to justify the observation with which this notice opened, as to the great importance of each section of the science being separately and thoroughly investigated.

Having said so much of what Mr. Dawson has rejected, it is necessary that some notice should be taken of the new species which he has introduced, beautiful figures of which have been taken by Mr. Westwood, and with the dissections and several outlines, representing those external parts of the insects of certain closely-allied species, in which the "most material distinctions of character are to be found, as an additional aid in determining the differences between them," are made the subject of three admirably executed and valuable plates at the end of the volume. The number of "newly introduced" species, of which entire figures are given, is fifteen, distributed among the following genera:—

Dyschirius	2.	Now first introduced.	Stenolophus	1.	Now first introduced.
Badister	1.		Trechus	2.	
Calathus	1.		Bembidium	6.	Four species now first introduced.
Anchomenus	1.				
Harpalus	1.	Now first introduced.			

The seven species not marked as now first introduced are all recent discoveries in this country (except, indeed, Badister peltatus, which, under the name of Trimorphus erro, was first described by Mr. Newman in the Ent. Mag., and was inserted by Mr. Stephens in his Manual). *Calathus rubigena* was discovered by Mr. Haliday on several of the Irish mountains, which seem at present to have monopolized the honour, as no English or Scotch locality is assigned to it by Mr. Dawson. *Anchomenus quadripunctatus* was taken at Long Benton, in Northumberland, by Mr. Bold, of Newcastle-on-Tyne. *Trechus incitis*, a pair were captured by the author at Whittlesea Mere, in July, 1847. *T. lapidosus* (of which Blemus pallidus of Stephens is counted a var.) is reported very local; Ventnor, South Shields, Berwick-upon-Tweed, being the only English localities mentioned; while Mr. Haliday has again the honour of having discovered it in Ireland, on the shore at Holywood, and Mr. Hogan of taking it near Dublin.

Bembidium Clarkii was first discovered by the author, in 1848, in marshes, near Dorchester; it was taken, in the same locality, in 1852, and also on the shore of Pegwell Bay, near Ramsgate, on each occasion by the same gentleman. *Bembidium Schuppelii*, "two examples were taken, first by Messrs. Bold and Murray, on the banks of the Irthing, near Naworth Castle, Cumberland; and subsequently about a dozen more by Mr. Wailes, in the same locality. It has been taken occasionally also near Edinburgh." Of the species now first introduced, *Dyschirius impunctipennis*, was taken by the author near Weymouth. *D. jejunus* (an entirely new species, unknown on the Continent), was discovered by Mr. Bold, near Lanercost Abbey, on a sandy beach by the Irthing, in June. *Harpalus melancholicus* was captured near Swansea, in 1845, by Mr. Wollaston. *Stenolophus elegans* was taken in the Isle of Sheppy, in May, 1853, by the Rev. H. Clarke. *Bembidium obliquum* was taken by Mr. Bold, at Gorforth. *B. stomoides* was discovered also by Mr. Bold, between Lanercost Abbey and Naworth Castle, in June, 1848. *B. fluviatile*, a fine series, were captured by Mr. Hadfield, on the banks of the Trent, at Kelham. *B. callosum* was taken by Mr. Stewart, on Woking Common, in 1851.

Besides these species, of all of which entire figures are given, the following are recorded as now first introduced:—*Harpalus sulphuripes*, "now, for the first time introduced into the British Fauna, on the authority of an example taken near Bristol, which perfectly corresponds with specimens received from Paris. One of the insects, standing under the name *servus* in the Stephensian Cabinet, appears to correspond with this species." *Harpalus Wollastoni*—"Four or five examples of this species were cap-

tured by Mr. Wollaston, in May, 1852, at Slapton Ley, Devonshire; and as I have not been able to identify it with any recorded species, I have named it after the captor." *Stenolophus derelictus*—"This apparently unique insect was captured near London, probably at Plumstead, by Mr. F. Smith, of the British Museum, who kindly gave it me. It was returned to me from Paris as a species of Stenolophus unknown there."

It is gratifying to find recorded so many incentives to increased activity and diligence as this list affords; and we may remark, that every newly-discovered species is not only a valuable addition to our native Fauna, but a fresh instance of the manifold and wonderful working of God, for whose glory everything was created, and which never must be lost sight of in all researches and discoveries of science. If we forget to glorify God in his works, we fail to appreciate more than half their beauty and their real value.

We cannot close these remarks without expressing the pleasure with which we observe that Irish localities are assigned to not a few of the species valuable for their rarity, or for being very local in their habitats—a pleasure which we owe, in great measure, to the indefatigable and eminently-successful researches of Mr. Haliday. We subjoin, in addition to those already mentioned, a few examples, which may, perhaps, be interresting:—

Dyschirius obscurus. Lough Neagh. Mr. Haliday. The only known English specimen, was captured by a foreigner, and, consequently, is lost to this country.

Carabus arvensis. Local. Hills, near Belfast. Haliday.

C. clathratus. Extremely rare in England. "Near Dublin" (St. Man.) "Very abundant on the coast of Ireland" (Dawson).

C. auratus. Lough Bray.

Leistus montanus. Croagh Patrick. *Mangeston* and *Carran Tual.*

Nebria complanata. A single specimen, on Arklow sands.

N. borealis. Lough Neagh, Killarney, &c. Also in Scotland; but apparently not found hitherto in England.

Chlœnius holosericeus. "Extremely rare in this country—a single individual was taken by Mr. Haliday, near Athy, in Ireland."

Pterostichus aterrimus. Very local. Neighbourhood of Cork.

P. gracilis. Rare. Captured by Mr. Haliday, near Belfast.

Amara brunnea. Portmarnock.

Bradycellus cognatus. "A single specimen, captured by Mr. Haliday, on hills near Belfast."

Bembidium bruxellense. Captured in Ireland, by Mr. Haliday.

B. pallidipenne. Apparently very local. "Lough Neagh and Killarney."

In conclusion, we will only express our opinion, that Mr. Dawson has produced a very original and useful Monograph, and we hope that many other entomologists may be incited to follow his example, in still further and more rigidly scrutinizing either this or some other branch of the science. Mr. Dawson has shown us how much may be done with the Geodephaga, other sections would possibly prove not less fruitful in interesting and useful discoveries.

THE ENTOMOLOGIST'S COMPANION. By H. T. Stainton. Second Edition. Pp. 156. London: John Van Voorst. 1854. Price 3s. 6d.

THE title of this work, which we are glad to see has reached a second edition, might, perhaps, mislead those expecting to find it an introduction to entomology, in the general acceptation of the word; whereas it treats of a very small, though exceedingly imteresting portion of insects, the Microlepidoptera, particularly including the *Tineina*. This edition presents several new features, a summary of which we shall present to our readers. Besides copious instructions of the *how*, and *when*, and *where* to catch the micros, hints about rearing their larva, and a calendar of their appearing in the several conditions of imago, pupa, and larva, which were contained in the edition of 1852, we have as follows—Firstly, some fourteen pages devoted to the entomological localities in the neighbourhood of London, with the means of getting to them, and what to be found in them, fully detailed. To the London entomologist this will, we think, prove a welcome addition. Secondly, we have an account of ten days at Kilmur, with a trip to the Island of Arran. If our author would visit the north Islands of Arran, situated off the west coast of Donegal, in Ireland, we can, we think, promise him a harvest of his favourites not yet touched, without much of the inconvenient moisture he met with in Scotland; and we would be greatly disappointed in the resources of our country, if he did not find in it some insects whose names have not appeared in the pages of the "Entomologist's Companion." And, lastly, we have the Journal of a Microlepidopterist for the year 1853, which may fairly stand as a model of such things. In conclusion, we heartily recommend this little work to all our readers, but to none so much as to our Irish naturalists. Many discoveries, no doubt, will yet reward the diligent observer in England and Scotland; but nowhere, in our opinion, is there so much of the terra incognita as in Ireland. This volume should be found in every collector's possession; as a handbook they will

find it invaluable, and in the absence of a history of British Tineina, which we trust will soon be published, the only work on the subject they can safely have recourse to.

PROCEEDINGS OF BERWICKSHIRE NATURALISTS' CLUB. Vol. III. Parts 1, 2, 3, 4. 8vo. (Printed for the Members.)

IN these few pages we have a pleasing record of the proceedings of a small knot of Berwickshire Naturalists, during the years 1850-51-52-53; and as we read the able addresses, with one of which (delivered by the outgoing President) each number opens, we were much struck by the benefit that would accrue to science were such clubs more numerous. That whose proceedings are recorded in these pages, scarcely numbers one hundred members; but then they are men of the right stamp, and the addresses and proceedings which follow bear ample evidence of how judiciously their meetings have been conducted. The Club was founded, some one and twenty years since, by its present able and indefatigable secretary, Dr. George Johnston; and, to use the language of the address, delivered at its last anniversary meeting, "starting into life under the fostering charge of experienced and distinguished naturalists, it had scarcely an infancy; it first efforts were manly, and even its first contributions to Natural History took their place among the original authorities in scientific literature." We are glad to be able to testify that the promise of its earlier years have been steadily fulfilled, and that, unlike similar societies, it shows no symptoms of premature decay, but that its list of members contains many names, which are a guarantee for the ability and zeal which will characterize its future operations. It must be, indeed, most gratifying to its founder to have witnessed so worthy a scion attain its majority; and, we trust, he may be long spared to enjoy the beauties of nature himself, and to lead others to take an interest in those which surround them. The addresses contained in the numbers before us recapitulate, with a pleasing terseness, the results of the several field meetings of the Club during the previous year. The proceedings which follow are not exclusively devoted to the pursuits of the naturalist, but contain also some papers of interest to the local antiquary. Among the Natural History papers, we would wish to draw attention to a paper of Dr. William Baird, on *Entozoa*, with a list of those known to occur within the bounds of the Club, and also to a paper on the *Acarides* of Berwickshire, by Dr. G. Johnston, with specific characters, both of which will amply repay a perusal.

A Familiar History of Birds. By the late Edward Stanley, D.D., F.R S., Lord Bishop of Norwich. London: J. W. Parker. 1854. Sixth Edition. Price 3s.

We are glad to see that this very pleasing little volume has met with the encouragement it so deservedly merits; while the price at which it has been published is so very moderate, as to place it within the reach of all. Its object is rather to furnish the reader with rational and interesting facts than to treat the subject of ornithology scientifically. But at a period when the education of every class of the community is rapidly improving, and when the minds of the rising generation are in a state of advancement fitting them for that more perfect knowledge, which in the preparation of elementary books ought to be always kept in view, it is of importance that even the simplest work should be arranged and founded, in some degree, on scientific principles. We accordingly find in the opening chapters some tables of classification carefully compiled from Cuvier and Dumeril, which will prove a great assistance to the young naturalist. And though its pages are not of a nature to attract those who have paid attention to ornithology as a science, the very pleasing notes they contain on the habits of birds will render them a welcome companion during an idle hour.

A History of British Ferns. By Edward Newman, Member of the Imperial L. C. Academy, F. L. and Z. S. President of the Ent. Soc., London, &c. 3rd edition. London: John Van Voorst. 1854. With Engravings. Price 18s.

Of all Cryptogamic plants, perhaps, there are none so universally liked as the Acrogenic fern—from the lichen, that makes the ruined tower look so gray, so venerable, to the slime that on the stagnant pond charms the eye with its verdant greenness, there surely are none with which we are more familiar; while living, graceful and attractive objects, and when raised, after the lapse of ages, from the stony tomb, still elegant, they lose but little of their beauty. They are

> "——————— voices of the past,
> Links of a broken chain,
> Wings that bear one back to times
> That cannot come again."

Leaving the past for the present, we have in the volume now before us the history of those Ferns which inhabit Great Britain and Ireland, amply and faithfully recorded, and the knowledge acquired through many years' study of Mr. Newman's favourite plants, brought before us; so that though many

works on the subject have lately made their appearance, yet we think this one entitled to become the text-book with botanists, and a fit companion for the other works on British Natural History, as one of a series of which it is published. In all but name this work is a Monograph; and though future investigators may, and, doubtless, will discover some new things, yet, up to the present moment, all that can be said in elucidation of these objects is said; and patient research into works of other ages, has opened to us all that our ancestors—those fathers of Natural History—thought and wrote upon them. The labour and research exhibited in these pages in distinguishing species deserves our warmest praise, which, we are sure, will not be denied by any Pteridologist, who knows the perplexity caused by the various abnormal forms in ferns, and by the number of varieties falsely elevated to the rank of species. In the year 1690, the the author of the "Wisdom of God manifested in the Works of Creation," published his "Synopsis Methodica Stirpium Britannicarum," a work characterized by one of our most competent judges, Sir J. E. Smith, as one of the most perfect, systematical, and practical floras of any country. This synopsis contained forty-eight species of ferns, or less by two than the number recorded in the work before us, as being strictly British; of this number twelve are omitted as being varieties. The next addition will be found in the English Flora, by Sir J. E. Smith, who adds nine, of which six are rejected in the present work—four, Aspidium spinulosum, A. dumetorum, A. irriguum, and Cystopteris dentata, as having no claim whatever to be mentioned even as varieties; two, Cystopteris regia and Asplenium fontanum, as having been only found on stone walls; two additions are given by Sir W. Hooker, in his British Flora, Aspidium (Lophodium) rigidum, and Hymenophyllum Wilsonii (unilaterale), which are retained under new titles; and, at sundry times, and in various editions of his British Ferns, Mr. Newman has added nine species—thus making the number of species of ferns found in Britain to be fifty.

These fifty are arranged by Mr. Newman into three grades—first, those concerning whose identity there can be no doubt; secondly, the following four—Woodsia alpina, Cystopteris Dickieana, Ophioglossum lusitanicum, and Hymenophyllum unilaterale, which, though inserted in his pages as established species, still we find botanists, of acknowledged ability, doubtful as to whether they may not be varieties of kindred species; and, thirdly, Asplenium acutum, Polystichum angulare, Lophodium collinum, Amesium germanicum, Lophodium glandulosum, Lophodium uliginosum, Botrychium rutaceum. The claims of these latter to be species the reader will find fully entertained in these pages, under their respective titles.

With respect to A. acutum, they will see its right to rank as a British species ably and candidly discussed in that storehouse of Ferns, "The Phytologist," for February, 1854, No. 103.*

The difficulty of pronouncing finally will be understood on reading the last few lines, on the 164th page, where six various names are recorded as given to the one specimen of Lophodium uliginosum. As to the various varieties, each distinguished by some peculiar name, our author seems, in general, like old Parkinson, "to have wholly refused to set downe many descriptions of one herbe, but sometime degenerating; let one description, therefore, serve instead of many."

Having said so much of the number of British Ferns, which, after all the care and discrimination of Mr. Newman, can be hardly said to be yet settled, it behoves us to say something of the volume itself, which certainly does the publisher great credit, and, with its bright green and gold cover, looks almost as graceful as the ferns it treats of. Each fern has its history recorded under the following heads:—

Character, which contains the diagnosis of the genus and species.

Synonymes and Figures, in which the right of priority in nomenclature is strictly stated, and long familiar names disappear before those of older date. Let us hope that the present ones, though for a time distasteful, may be finally adopted, and that collectors may understand each other, and not speak in a foreign tongue.

Geographical Range.—Here we have recorded the localities and habitats, in England, Scotland, and Ireland, for the various species; and, perhaps, no volume, on any branch of British Natural History, has yet been published in which more attention has been paid to our native country, possessing as it does, forty-two of the fifty British Ferns, of which two have not been recorded as occurring elsewhere in the British isles; it has advantages for the Pteridologist, which Mr. Newman has not lost sight of, and ofttimes he thanks our botanists for kindness, and praises our country for its wild though romantic loveliness. Irish naturalists must feel they have not been passed by in perusing this volume.

Descriptions.—Which are well written. The chief characteristics recorded and explained so as to materially assist the learner.

Varieties.—Some of the most prominent of which are glanced at.

Culture.—In which we have the benefit of the author's large experience in this matter, and ample directions to keep these graceful denizens of our woods nearer hand, and constantly under our inspection.

* "The Phytologist," a monthly journal, price 1s., published by J. V. Voorst, Paternoster-row, London.

In conclusion, we would congratulate the author on the appearance of a third edition, which, though it wants the Equisetaseæ and Lycopodaseæ, still far surpasses its predecessors. Want of space has kept us from entering into what appears, even to ourselves, to be endless disquisition as to the rights of some forms to the rank of species; but so much has been written by men more experienced than we are, without finally settling the dispute, and the subjects themselves are so very candidly discussed in this volume, that we prefer sending our readers to the pages themselves, than adding one more to the already large list of disputants. The price of this volume—considering its increase in size—has been materially lessened; and we hope that every one who cares about the subject will, by securing a copy, help to defray the expense and trouble, which are, we regret to say, necessary consequences to ushering into life works on natural science, where they are the result of private enterprise.

A Narrative of Travels on the Amazon and Rio Negro, with an Account of the Native Tribes. By A. R. Wallace. Pp. 541. 8vo. London: Reeves and Co. 1853. Price 15s.

In our last number, when noticing Mr. Wallace's unpretending little work on the Palms of the Amazon Valley, we briefly alluded to the circumstances under which it was compiled, referring to his work on the Valley of the Amazon for a fuller narrative of the labours of a naturalist in an almost unexplored region. This narrative forms the volume now before us, which contains notes collected during four years' residence in this interesting and too little known district. It would be difficult to estimate how deeply science is indebted to wayside notes and jottings brought home by travellers; observations recorded as trivial, perhaps, at the time, often serve to illustrate or confirm a theory that, in the absence of such independent testimony, would have scarcely been hazarded, or would have been treated with silent contempt. The present age is eminently remarkable as an age of observation; and this tendency may, in some measure, have given an impulse to the energies of those who devote their prime to foreign travel, not with the mere design of spending a few years in the gratification of a vacant curiosity, but who go forth with prepared minds, eager to observe all that would be likely to advance the interests of science; and the result has been the production of a class of works of travel, unsuited, indeed, to the mere literary lounger, but in which the man of science, or of cultivated understanding, will take a deep interest, and which will not be dismissed

only to be forgotten, but be treasured alike for the observations in their pages, and the patient spirit of inquiry in which they were made. The volume of Travels on the Amazon and Rio Negro, by Mr. A. R. Wallace, now before us, is a well marked example of this class, and one that will amply repay a careful perusal. Written under circumstances of great discouragement, it nevertheless presents a mass of valuable observations, interesting to all true naturalists, as descriptive of a little known, though most luxuriant region.

Mr. Wallace, who was most desirous "of seeing with his own eyes all those wonders which he had delighted to read of in the narratives of travellers," was induced, by a perusal of Mr. Edwards' little book, "A Voyage up the Amazon," to start on the same route, purposing to pay his expenses by making collections in natural history; which we are glad to say, for the sake of scientific enterprise, he succeeded in doing. The pages now before us contain an account of how four years could be spent on the Amazon and Rio Negro; the first and last portions being nearly a transcript of his journals, while the intervening portion is merely gleaned from rough notes saved from the burning of the *Helen*, the ship in which his homeward voyage was made, and which caused the loss of all the notes made during two years, as well as the greater part of his collections and sketches.

The scene chosen for our author's labours was a most encouraging one for the naturalist to explore. Situated, as the basin of the Amazon is, in the Tropics, on both sides of the Equator, it surpasses in dimensions that of any other river in the world. The body of fresh water it empties into the sea is not only absolutely, but also, in all probability, relatively to its area, greater than that of any other river in the world. For richness of vegetable production, and fertility of soil, it is unequalled in the globe, and capable of supporting a greater population than any other of equal extent. From about 4^0 north latitude, to 20^0 south, every stream that flows down the eastern slope of the Andes is a tributary of the Amazon. Some idea, though a faint one, may be formed by imagining every river, from St. Petersburg to Madrid, uniting their waters into one large river. The true source of the Amazon our author, for several reasons, judges to be the Maranon; and, speaking of its extent, he says:—

"We find that, from its origin in Lake Lauricocha to its mouth, in longitude 50° west, its length, following the main curves, but disregarding the minuter windings, is 2,740 English miles. Its extent, in a straight line, from east to west, is about 2,050 miles; and from north to south its tributary streams cover a space of 1,720 miles. The whole area of its basin, except the Tocatius, which I consider a distinct river, is 2,300,000 English square miles, or 1,760,000 nautical ones; this is rather more than one-third of South America, and equal to two-thirds of all Europe. All western Europe could be placed in it without touching its boundaries, and it could contain all our Indian empire."

The tributary streams, watering this vast territory, are numerous, and present to the naturalist some very remarkable differences in the character of the vegetation on their banks, the animals that inhabit them, and even the very colour of their water. This last point of difference is so remarkable as to enable them to be classed in three great groups—*the white-water rivers*, *the blue-water rivers*, and *the black-water rivers*. To the first of these divisions the main stream of the Amazon itself belongs; and it would appear that its colour (a pale yellowish olive) is not entirely dependent on free, earthy matter, but rather on some colouring material, held in solution. All the rivers that rise in the mountains of Brazil belong to the blue or clear water class; of these the principal are the Tocatiús, the Xingú, and the Tapajóz. Above the Madeira the black-water rivers are first met with. Of these the Rio Negro is the most celebrated; it rises in 2° 30' N. lat., where its waters are much blacker than in the lower part of its course. The peculiar colour of these rivers would appear to be produced by the solution of decaying leaves, roots, and other vegetable matter.

The examination of the geological peculiarities of so vast an area, and the comparative rarity of natural sections falling under the observations of a single individual, is of but little value. It is, however, remarkable that Mr. Wallace was unable to find *any* trace of fossil remains, which prevents any geological age being assigned to the various beds of rock which occur. To the botanist, however, the riches of this district are most attractive. Mr. Wallace thus speaks of the vegetation:—

"Perhaps no country in the world contains such an amount of vegetable matter on its surface as the valley of the Amazon. Its entire extent, with the exception of some very small portions, is covered with one dense and lofty primeval forest—the most extensive and unbroken which exists upon the earth. It is the great feature of the country—that which at once stamps it as a unique and peculiar region. It is not here, as on the coasts of southern Brazil or on the shores of the Pacific, where a few days' journey suffices to carry us beyond the forest district and into the parched plains and rocky serras of the interior. Here we may travel, for weeks and months inland, in any direction, and find scarcely an acre of ground unoccupied by trees. It is far up in the interior, where the great mass of this mighty forest is found; not on the lower part of the river, near the coast, as is generally supposed.

"A line from the mouth of the river Parnaíba, in long. 41° 30′ W., drawn due west towards Guayaquil, will cut the boundary of the great forest in long. 78° 30′, and for the whole distance, of about 2,600 miles, will have passed through the centre of it, dividing it into two nearly equal portions.

"For the first thousand miles, or as far as long. 56° W., the width of the forest, from north to south, is about 400 miles; it then stretches out both to the north and south, so that in long. 67° W. it extends from 7° N., on the banks of the Orinooko, to 18° S., on the northern slope of the Andes of Bolivia, a distance of more than seventeen hundred miles. From a point about sixty miles south-east of Tabatinga, a circle may be drawn of 1,100 miles in diameter, the whole area of which will be virgin forest."

Forests our author regards as the characteristic of the *New* World, as

steppes and deserts are of the *Old*. One of the peculiarities of the Amazon forests is the variety of species of trees of which they are composed, "two individuals of the same species scarcely ever occurring together, except in certain cases, principally among the palms." Among the productions met with in these forests are the India-rubber *(Siphonia elastica)*, and the Brazil-tree nut; which latter is thus described:—

"The Brazil-nuts, from the *Bertholletia excelsa*, are brought chiefly from the interior; the greater part from the country around the junction of the Rio Negro and Madeira with the Amazon rivers. This tree takes more than a whole year to produce and ripen its fruits. In the month of January I observed the trees loaded at the same time with flowers and ripe fruits, both of which were falling from the tree; from these flowers would be formed the nuts of the following year; so that they, probably, require eighteen months for their complete development from the bud. The fruits, which are nearly as hard and heavy as cannon-balls, fall with tremendous force from the height of a hundred feet, crashing through the branches and undergrowth, and snapping off large boughs which they happen to strike against. Persons are sometimes killed by them, and accidents are not unfrequent among the Indians engaged in gathering them.

"The fruits are all procured as they fall from the tree. They are collected together in small heaps, where they are opened with an axe, an operation that requires some practice and skill, and the triangular nuts are taken out, and carried to the canoes in baskets. Other trees of the same family *(Lecythideæ)* are very abundant, and are remarkable for their curious fruits, which have lids, and are shaped like pots or cups—whence they are called 'pot-trees.' Some of the smaller ones are called by the natives 'cuyas de macaco'—monkey's calabashes."

Amid all the brilliancy of tropical vegetation seen under its favourable aspect, Mr. Wallace (whose pages bear ample evidence of his power of appreciating the beautiful) does not quite forget home scenes and home beauties, and he thus contrasts them:—

"There is grandeur and solemnity in the tropical forest, but little of beauty or brilliancy of colour. The huge buttress trees, the fissured trunks, the extraordinary air roots, the twisted and wrinkled climbers, and the elegant palms, are what strike the attention and fill the mind with admiration, and surprise, and awe. But all is gloomy and solemn, and one feels a relief on again seeing the blue sky, and feeling the scorching rays of the sun.

"It is on the roadside and on the rivers' banks, that we see all the beauty of the tropical vegetation. There we find a mass of bushes and shrubs, and trees of every height, rising over one another, all exposed to the bright light and the fresh air; and putting forth, within reach, their flowers and fruit, which, in the forest, only grow far up on the topmost branches. Bright flowers and green foliage combine their charms, and climbers with their flowery festoons cover over the bare and decaying stems. Yet, pick out the loveliest spots, where the most gorgeous flowers of the tropics expand their glowing petals, and for every scene of this kind we may find another at home of equal beauty, and with an equal amount of brilliant colour.

"Look at a field of buttercups and daisies—a hill-side covered with gorse and broom—a mountain rich with purple heather—or a forest-glade azure with a carpet of wild hyacinths, and they will bear a comparison with any scene the tropics can produce. I have never seen anything more glorious than an old crab-tree in full blossom; and the horse-chesnut, lilac, and laburnum will vie with the choicest tropical trees and shrubs. In the tropical waters are no more beautiful plants than our white and yellow water-lilies, our irises, and flowering rush; for I cannot consider the flower of the *Victoria regia* more beautiful than that of the *Nymphæa*

alba, though it may be larger; nor is it so abundant an ornament of the tropical waters as the latter is of ours."

We have extracted this passage, as affording an instance of the absence of exaggeration which pervades this volume. We regret that we cannot extract any passages from the able summary of zoology of the district, which presents some curious peculiarities of local distribution. The ethnological notes and vocabularies, which conclude the volume, are from the pen of Dr. Latham, and give still greater value to a work, which will be gladly read by all who are interested in the labours of a naturalist in the tropics.

My School and Schoolmasters. By Hugh Miller. Second edition. 8vo. Pp. 537. Edinburgh: Johnstone and Hunter. Price 7s. 6d.

In these pages we have the autobiography of an observant mind while passing through a chequered life—"a sort of educational treatise in a narrative form"—from the pen of one who owes much to his own exertions, and who is now reaping the harvest of a life of self-discipline and self-culture; honoured by all who have the privilege of his friendship, or can esteem his virtues.

Mr. Miller is the descendant of a long line of sea-faring men—skilful and adventurous sailors—some of whom had coasted along the Scottish shores as early as the times of Sir Andrew Wood, and the "Bold Bartons," and mayhap had helped to man that "verrie monstrous schippe, the Great Michael," that "cumbered all Scotland to get her to the sea." His father, "one of the best sailors that ever sailed the Moray Firth," was lost at sea, in the year 1807, when our author was only five years old; and from this period his recollections date. Though commencing so early, his impressions bear with them the stamp of sincerity, and are most interesting when taken in connection with the influence his earliest years appear to have exercised over his after life. When only five years old he was sent to a dame's school, where it was not until his sixth year, when his mind was called into exercise by a perusal of the story of Joseph, he made the greatest of all discoveries, "that the art of reading is the art of finding stories in books;" and from that moment a new era dawned on our author, and the embryo geologist collected a library in a box of birchen bark, about nine inches square, which he found quite large enough to contain a great many immortal works suited to his years, for

"Those intolerable nuisances, the useful-knowledge books, had not yet arisen, like tenebrious stars, on the educational horizon, to darken the world and shed

their baneful influence on the "youthhood;" and so, from rudimental books—books that make themselves truly such by their thorough assimilation with the rudimental mind—he passed on, without being conscious of break or line of division, to books on which the learned are content to write commentaries and dissertations, but which he found to be quite as nice books as any of the others."

From a very early period, one of his uncles (Alexander) appears to have exercised a very strong influence on his after life; and it is interesting to find that "*he* had a decided turn for natural history." Mr. Miller's collection still contains a murex which "Uncle Sandy" had transformed from the bank to his pocket, during the landing in Egypt, under Sir Ralph Abercrombie—for he was a sailor. In his twelfth year he was transferred to the grammar school of the parish, where, among other studies, he learned a good deal of "pig-anatomy," and "the *take* and curing of herrings," both of which he had ample opportunities of observing, and which his even then keen, intelligent eye did not neglect. The school, in its ordinary acceptation, was not where Mr. Miller was fitted to write the "Foot-prints of the Creator," or "The Old Red Sandstone;" his leisure hours were spent on the Cromarty beach, sauntering over the pebble beds, observing the component parts of the different rocks which lay strewed around; and totally deficient of a scientific vocabulary, by a self-devised system of notation he had learned to form an idea of the mineralogical character of the rocks he was studying. The self-reliant, thoughtful boy now was truly father to the man; such mental exercise was *true* education, and worth more, for all the *practical* purposes of life, than hours trifled away in profitless labour, where neither the head nor the heart are really engaged. We cannot loiter over the tempting narrative of the early days of the poet; for then he wrote verses; and naturalist; not even the description of the dreamer, "Francie," who certainly must have been a playmate and fellow-trifler of our own boyhood, may tempt us; nor will we pause to describe the never-to-be-forgot ten wonders of the "Doocot Cave," and the dreary nights the young votaries of science passed in it. If our readers take up "My School and Schoolmasters," and really can love or appreciate a truthful picture, they will not quickly lay it down; and when they do, visions of beauty will pass before their eyes which they would gladly realize. We must pass over a few years of the boy-student's life, spent with profit in the great school of nature, not because they do not furnish much material for reflection, as we have learned much in the perusal of their history, and we enter on a *new* school where young Miller found himself standing, face to face, with a life of labour and restraint. If we felt an interest in the education of his mind to this point, it is now deepened by our admiration of the manly, high-toned principle that led

him to adopt a life of labour. We doubt that out of Scotland a second Hugh Miller could be found; and, we feel assured, the history of such a mind cannot fail to exercise an influence for good on all who read it. The husband of one of our author's maternal aunts was a mason; and with him he agreed to serve a period of three years as apprentice. Soon after he became acquainted with the "Easie Lias," a deposit rich in organism, which are thus described:—

"These Liasic beds, with their separating bands, are a sort of boarded books; for as a series of volumes reclining against a granite pedestal in the geologic library of nature, I used to find pleasure in regarding them. The limestone bands, elaborately marbled with lignite, ichthyolite, and shell, form the stiff boarding; the pasteboard-like laminæ between—tens and hundreds of thousands in number in even the slimmer volumes—compose the closely-written leaves. I say closely written, for never yet did signs or characters lie closer on page or scroll than do the organisms of the Lias on the surface of these leaf-like laminæ. I can scarce hope to communicate to the reader, after the lapse of so many years, an adequate idea of the feeling of wonder which the marvels of this deposit excited in my mind, wholly new as they were to me at the time. Even the fairy lore of my first-formed library—that of the birchen-box—had impressed me less. The general tone of the colouring of these written leaves, though dimmed by the action of untold centuries, is still very striking. The ground is invariably of a deep, neutral gray, verging on black; while the flattened organisms, which present about the same degree of relief as one sees in the figures of an embossed card, contrast with it in tints that vary from opaque to silvery white, and from pale yellow to an umbry or chestnut brown. Groupes of ammonites appear as if drawn in white chalk; clusters of a minute undescribed bivalve are still plated with thin films of the silvery nacre; the mytiliceæ usually bear a warm tint of yellowish brown, and must have been brilliant shells in their day; gryphites and oysters are always of a dark gray, and plagiostomæ ordinarily of a blueish or neutral tint. On some of the leaves curious pieces of incident seem recorded. We see fleets of minute terebratulæ, that appear to have been covered up by some sudden deposit from above when riding at their anchors; and whole argosies of ammonites, that seem to have been wrecked at once by some untoward accident, and sent crushed and dead to the bottom. Assemblages of bright black plates, that shine like pieces of Japan work, with numerous parallelogramical scales bristling with nail-like points, indicate where some armed fish of the old ganoid order lay down and died; and groups of belemnites, that lie like heaps of boarding pikes thrown carelessly on a vessel's deck on the surrender of the crew, tell where *sculls* of cuttle-fishes of the ancient type had ceased to trouble the waters. I need scarce add, that these spear-like belemnites formed the supposed thunderbolts of the deposit. Lying athwart, some of the pages thus strangely inscribed, we occasionally find, like the dark hawthorn leaf in Bewick's well-known vignette, slim-shaped leaves coloured in deep umber; and branches of extinct pines, and fragments of strangely-fashioned ferns, form their more ordinary garnishing. Page after page, for tens and hundreds of feet together, repeats the same wonderful story. The great Alexandrian Library, with its tomes of ancient literature, the accumulation of long ages, was but a meagre collection—not less puny in bulk than recent in date—compared with this marvellous library of the Scotch Lias."

We sincerely regret that we cannot transfer to our pages more of Mr. Miller's history—how the working mason became accountant at a bank—married—became editor of the "Witness" newspaper, which his zeal and energy quickly raised to a high standing. Every page of his narrative abounds in description, valuable to the naturalist, proceeding, as they do,

from the pen of one who has been educated in a school, and under schoolmasters from whom we rarely meet with a pupil. We cannot, however, pass by one extract on the "Red Sandstone of Cromarty:"—

"A rich ichthyolitic deposit of the Old Red Sandstone lies, as I have already said, within less than half a mile of the town of Cromarty, and, when fatigued by my calculations on the bank, I used to find delightful relaxation to lay open its fish by scores, and to study their peculiarities as exhibited in their various states of keeping, until, at length, I became able to determine their several genera and species from even the minutest fragments. The number of ichthyolites which that deposit of itself furnished—a patch little more than forty yards square—seemed altogether astonishing. It supplied me with specimens, at almost every visit, for ten years together. Nor, though after I left Cromarty for Edinburgh it was often explored by geologic tourists, and by a few cultivators of science in the place, was it wholly exhausted for ten years more. The ganoids of the second age of vertibrate existence must have congregated as thickly in that spot, in the times of the Lower Old Red Sandstone, as herrings do now, in their season, on the best fishing banks of Caithness or the Moray Firth. I was for some time greatly puzzled to restore these ancient fishes, by the peculiarities of their organization. It was in vain I examined every species of fish caught by the fishermen of the place, from the dogfish and the skate to the herring and the mackarel. I could find in our recent fishes no such scales of enamelled bone as those which covered the *Dipterians* and the *Celacanths*, and no such plate-encased animals as the *Coccosteus* or *Pterichthys*. On the other hand, with the exception of a double line of vertebral processes in the *Coccosteus*, I could find in the ancient fishes no internal skeleton: they had apparently worn all their bones outside, where the Crustaceans wear their shells, and were furnished inside with but frameworks of perishable cartilage. It seemed somewhat strange, too, that the geologists who occasionally came my way—some of them men of eminence—seemed to know even less about my Old Red fishes and their peculiarities of structure than I did myself. I had represented the various species of deposit simply by numerals, which not a few of the specimens of my collection still retain on their faded labels; and waited until some one should come the way, learned enough, to substitute for my provisional figures words by which to designate them; but the necessary learning seemed wanting, and I, at length, came to find that I had got into a *terra incognita* in the geological field, the greater portion of whose organizms were unconnected with human language. They had no representatives among the vocables.

"I formed my first imperfect acquaintance with the recent ganoidal fishes, in 1836, from a perusal of the late Dr. Hibbert's paper on the deposit of Burdiehouse, which I owed to the kindness of Mr. George Anderson. Dr. Hibbert, in illustrating the fishes of the Coal Measures, figured and briefly described the Lepidosteus of the American rivers as a still surviving fish of the early type; but his description of the animal, though supplemented shortly after by that of Dr. Buckland, in his Bridgewater Treatise, carried me but a little way. I saw that two of the Old Red genera—*Osteolepis* and *Diplopterus*—resembled the American fish externally. It will be seen that the first-mentioned of these ancient ichthyolites bears a name compounded, though, in the reverse order, of exactly the same words. But while I found the skeleton of the Lepidosteus described as remarkably hard and solid, I could detect in the *Osteolopis* and its kindred genus no trace of internal skeleton at all. The Cephalaspian genera, too—*Coccosteus* and *Pterichthys*—greatly puzzled me; I could find no living analogues for them; and so, in my often repeated attempts at restoration, I had to build them up, plate by plate, as a child sets up its dissected map or picture, bit by bit—every new specimen that turned up furnishing a key for some part previously unknown—till at length, after many an abortive effort, the creatures rose up before me in their strange, unwonted proportions, as they had lived, untold ages before, in the primeval seas. The extraordinary form of *Pterichthys* filled me with astonishment; and, with its arched carpace and flat plastron restored before me, I leaped to the conclusion, that as the recent Lepidosteus, with its ancient representatives of the Old Red Sandstone, were

sauroid fishes—strange connecting links between fishes and alligators—so the *Pterichthys* was a Chelonian fish—a connecting link between the fish and the tortoise. A gurnard—insinuated so far through the shell of a small tortoise as to suffer its head to protrude from the anterior opening, furnished with oar-like paddles instead of pectoral fins, and with its caudal fin clipped to a point—would, I found, form no inadequate representative of this strangest of fishes. And when, some years after, I had the pleasure of introducing it to the notice of Agassiz, I found that, with all his world-wide experience of its class, it was as much an object of wonder to him as it had been to myself. 'It is impossible,' we find him saying, in his great work, 'to see aught more bizarre in all creation than the *Pterichthyan* genus: the same astonishment that Cuvier felt in examining the Plesiosaurus, I myself experienced when Mr. H. Miller, the first discoverer of these fossils, showed me the specimens which he had detected in the Old Red Sandstone of Cromarty.' And there were peculiarities about the *Coccosteus* that scarce less excited my wonder than the general form of the *Pterichthys*, and which, when I first ventured to describe them, were regarded by the higher authorities in Palæontology as mere blunders on the part of the observer. I have, however, since succeeded in demonstrating that, if blunders at all—which I greatly doubt, for Nature makes very few—it was Nature herself that was in error, not the observer. In this strange *Coccostean* genus, Nature *did* place a group of opposing teeth in each ramus of the lower jaw, just in the line of the symphysis—an arrangement unique, so far as is yet known, in the vertebrate division of creation, and which must have rendered the mouth of these creatures an extraordinary combination of the horizontal mouth proper to the vertebrata, and of the vertical mouth proper to the crustaceans. It was favourable to the integrity of my work of restoration, that the press was not waiting for me, and that when portions of the creatures on which I wrought were wanting, or plates turned up whose places I was unable to determine, I could lay aside my self-imposed task for the time, and only resume it when some new-found specimen supplied me with the materials requisite for carrying it on. And so the restorations which I completed in 1840, and published in 1841, were found, by our highest authorities in 1848, after they had been set aside for nearly six years, to be essentially the true ones after all. I see, however, that one of the most fanciful and monstrous of all the interim restorations of *Pterichthys* given to the world—that made by Mr. Joseph Dinkel, in 1844, for the late Dr. Mantell, and published in the 'Medals of Creation,' has been reproduced in the recent illustrated edition of the 'Vestiges of Creation.' But the ingenious author of that work would scarce act prudently were he to stake the soundness of his hypothesis on the integrity of the restoration. For my own part, I consent, if it can be shown that the *Pterichthys*, which once lived and moved on this ancient globe of ours, ever either rose or sank into the *Pterichthys* of Mr. Dinkel, freely and fully to confess, not only the possibility, but also the *actuality*, of the transmutation of both species and genera. I am first, however, prepared to demonstrate, before any competent jury of Palæontologists in the world, that not a single plate or scale of Mr. Dinkel's restoration represents those of the fish which he professed to restore; that the same judgment applies equally to his restoration of *Coccosteus;* and that, instead of reproducing in his figures the true forms of ancient Cephalaspians, he has merely given, instead, the likeness of things that never were 'in the heavens above, or in the earth beneath, or in the waters under the earth.'"

We have endeavoured to give our readers some idea of this most remarkable autobiography, in which is portrayed the working of a sensitive and observing mind in its passage through the great school of life. It is a book calculated at once to please and instruct all who are capable of reflecting on the aim with which it is written—to rouse to the important work of self-culture and self-government. Though there will be found in it the ordinary faults of an autobiography, still the absence of false sentiment and exaggeration must commend themselves even to the most

critical, and while the descriptions of scenery and pictures of Scottish life will interest the general readers, the man of science will be glad to have an opportunity of perusing the life-long education of one who keeps his eyes and mind open, though often pursued in a bitter school. To another class of readers it *might* prove beneficial—we mean those employed in the work of education; but we fear that long-cherished prejudices will prevent their being awakened to a sense of the true object of all education—self-government and self-culture; wanting which, the most "finished scholars" they can "turn out" will be but pieces of animated mechanism, unable to reason with judgment or act with independence.

THE MICROGRAPHIC DICTIONARY; A GUIDE TO THE INVESTIGATION AND STRUCTURE OF MICROSCOPIC OBJECTS. By J. W. Griffith, M.D., F.L.S., &c., and A. Henfrey, F.R.S., F.L.S., &c. 8vo. London: J. Van Voorst. Parts 1 and 2. Price 2s. 6d. each.

WE have here the promise of a want, long felt by the microscopist, being ably supplied. The progress which natural science has made in the last few years, while it has opened out new fields of research, has also created fresh difficulties to be overcome; and the task of lightening the toil of the eager and anxious student is one that requires considerable ability and discrimination to be pursued with success. In no country has the naturalist been provided with the materials for study in greater abundance than in our own; A series of British monagraphs has issued from the press of Van Voorst, each edited by a master hand. To all of these the "Microscopic Dictionary" promises to be an indispensable adjunct. No field can open out for the labours of the naturalist in which he may not expect to find some information in its pages. The hands into which the editorship has fallen form a sure guarantee for the ability with which it will be conducted, both its editors being men who, in addition to other qualifications, have had many years' experience in the use of the microscope, in the most varied fields of research; and the present publication may be regarded as, in some measure, the result of their past labours. The numbers now before us contain the introduction (which should be carefully read by all who intend purchasing an instrument), and a portion of the letter A; several carefully-executed plates illustrate each part—some of which are coloured. Before taking leave of this publication, which we purpose noticing more fully at a future time, we would wish to state the intentions of the editors as to the subjects to which its pages will be devoted—

"1. Instruction in the selection and use of microscopes, and of the various essential pieces of apparatus connected with them, a description of the methods of ascertaining the structure of the objects, which can only be studied by their aid.

"2. The characters, structure, and, as far as possible, the natural history of the genera and species of British animals and plants of microscopic dimensions, together with a description of the microscopic organs and appendages of animals and vegetables generally.

"3. An account of the elementary tissues of two great kingdoms of organized beings, with full information as to the methods to be pursued in this department.

"4. The distinguishing characters of the inorganic matters occurring in animal and vegetable fluids."

We need *now* only add, that this work will appear in monthly parts—price half-a-crown each, and that it is proposed to be completed in about 12 parts, and will be illustrated with about forty plates.

BOTANICAL LETTERS TO A FRIEND. By Dr. F. Unger. (Translated by Dr. B. Paul.) Pp. 116. 8vo. London: Samuel Highley. Price 5s.

THESE very attractive letters which are now issued in an English dress, as part of "Highley's Library of Science and Art," will, doubtless, be gladly hailed by many who could only be acquainted with them through the medium of a translation. Their author is already well known as the founder of a natural system of Fossil Plants, published in Endlicher's Genera Plantarum.

Though, we confess, they bear but too evident traces of being a translation, they are, nevertheless, pleasingly written, and form a most welcome addition to our stock of botanical text books. The views advanced are stated with a simplicity and clearness not often to be found in writers of the school to which Dr. Unger belongs, and, while some of the theories propounded will meet with but little favour from many British botanists, still a statement of them put forward in a popular form will be thankfully received. It was our intention to have presented our readers with a few extracts from the concluding letters which are most suggestive, but we refrain from a conviction of how disjointed any extract from a letter must necessarily appear to those who are unacquainted with the original. We would, however, refer them to the sketches of the "*Plant-world*," as contained in the 15th and 16th letters; here it is viewed under the heads of "*Local Distribution*" and "*Chronological Aspect*," as deserving of an attentive perusal, and likely to afford matters for reflection even to those who are disposed to question the views which are contained in them. The work is neatly brought out, and the wood cuts, which are numerous, greatly enhance its value to the student, from the strict accuracy of their details. Considerable praise is due to the exertions of the publisher of the series of which this forms a portion; and we will be much surprised if it does not meet with considerable support, if conducted at all equal to Dr. Unger's Botanical Letters, which we gladly recommend to our botanical readers.

Notices of Serial Publications.

ANNALES DES SCIENCES NATURELLES, ETC. Tome XX., Nos. 4 & 5. Paris: Chez Victor Masson.

Botanique.—Note sur la Galle des tiges du *Poa nemoralis*, par M. T. Prilleux (suite). Nouvelles observations relatives a l'accroissement en diamètre des arbres dicotylédonés, par M. A. Trécul; Vingt-deuxieme Notice sur les Plantes Cryptogames, récemment découvertes en France, par M. J. B. H. J. Desmazieres; Memoire sur la Formation des Feuilles, par M. A. Trécul. *Zoologie*—Memoire sur la famille des Ocypodiens, par M. Milne Edwards (suite); Note sur le genre *Hyœnarctos*, par M. Paul Gervais; Description óstéologique de l'*Anomalurus*, et remarques sur la classification naturelle des Rongeurs, par M. Paul Gervais; Analyse des observations des M. Müller sur le développement des Echinodermes, par M. Camille Dareste.

Zoologie.—Analyse des observations sur le développement des Echinodermes, par M. Camille Dareste (suite); Description de quelques espèces de Phoques et de cétacés, par M. Paul Gervais; Recherches sur l'ostéologie des plusceurs espèces d'Amphisbènes et remarques sur la classification des ces Reptiles, par M. Paul Gervais; Note sur le Glossololiga poireti et l'Euproctus Rusconij, par M. Paul Gervais; Nouvelles observations sur le developpement des vers certoïdes, par M. Van Beneden; Additions à la note sur le developpement des vers intestinaces, par M. Wagner. *Botanique*—Memoire sur la formation des feuilles, par M. A. Trecul (suite); Lichenes Algerienses novi, quos exposuit, W. Nylande, Dr. M.

THE ANNALS AND MAGAZINE OF NATURAL HISTORY, INCLUDING ZOOLOGY, BOTANY, AND GEOLOGY. No. 76, April; No. 77, May. 8vo. London: Taylor and Francis.

No. 76, April:—(Müller, Johannes) On the Structure of the Echinoderms (concluded); (Berkeley, Rev. M. J.) Description of a new species of *Closterium*, to which the specific name *Griffithii* has been given; (Layard, E. L.) Notes on the Ornithology of Ceylon (continued). Among these very interesting notes we were much struck with the account of the Basket-maker Bird (*Ploces Philippinus*, Linn.) which is pretty generally scattered through the islands. It breeds in June, fabricating the hanging nests which are so well known to naturalists. The male bird has a nest for himself, which is similar to that for breeding in, except that it has no gallery, and the chamber that contains the eggs in the one has no bottom in the other, so that the droppings of the bird—which always sits with its head towards the opening which replaces the gallery—fall through to the ground. The natives all state that the male bird conveys fireflies to its nest, and sticks them

to the side, by means of mud, for the purpose of illuminating its dwelling. Mr. Layard will not vouch, from personal observation, for this fact, but suggests that the patch of mud which the bird places on each side of its perch, may be used for the purpose of sharpening its bill; and that, perhaps, the husks of seeds, or the wing-cases of a stray beetle, left sticking upon it, may have given rise to the idea which the natives entertain. (Leighton, Rev. W. A.) Monograph of the British Graphideæ (continued); (Sedgwick, Rev. Professor) A reply to two statements published by the Palæontographical Society, in their volume for 1853; the one appearing to accuse the University of Cambridge of illiberality in the administration of the Museum; the other reflecting on the character of Professor M'Coy. This dispute arose from a passage in one of the publications of the Palæontographical Society, in which the editors—MM. Edwards and Haime—would lead their readers to infer that "they had personally made an application for certain Palæazoic fossils in the Cambridge Museum, which had been rejected; that this rejection was in disadvantageous contrast with the liberal conduct of all other public bodies to which they had applied; that their loss on account of this rejection was the less because Professor M'Coy had (since) published and figured (*First Cambridge Fasicules, May*, 1851) nearly all the species of which they were anxious to have the loan; that the Professor had made an unfair use of their first part of British Fossil Corals (*i.e., Tertiary and Cretaceous Corals, as published in* 1850); and to cover his plagiarisms, he had misdated a portion of his own labours, and virtually stated what was not true." These are grave charges, which we have stated in Professor Sedgewick's language, and to which the letters of Professors Sedgwick and M'Coy are in answer to. (Greville, R. K.) Notice of the occurrence of *Desmarestia Dresnayi* on the coast of Ireland. This alga, the occurrence of which was already noticed by us, was collected towards the close of last year, near the mouth of Lough Foyle, in the north of Ireland, by William Sawyers and —— Morrison, Esqrs., and communicated by the former gentleman to Professor Balfour, by whom specimens were placed in Mr. Greville's hands for examination. Dr. Montague pronounced it to be identical with the alga found by him at Port St. Sebastian, in 1823, and published by him in "Annales des Sciences Naturelles," for 1842, p. 251, t. 7, f. 2, under the name *Desmarestia pinnatinervia*. Dr. Montague obtained only a single specimen, scarcely more than four inches high, fully two inches wide, and truncate. M. Crouan has likewise met with it, but rarely, at Brest, and regards it as a variety of *Desmarestia Dresnayi* of Lamouroux, described and figured in the "Dictionnaire des Sciences Naturelles," tom. xiii., p. 105. Professor J. Aghard, the most recent authority, in his Species, Genera et Ordines Algarium, refers both alga to varieties of *Desmarestia liguilata;* but still includes D. pinnatinervia among his "Species inquirendæ." The Irish plants, now described, would appear to form an intermediate link between these two forms. They have a slender, well-defined stipes, half an inch long or more, a linear lanceolate front, from 12 to 18 inches long, and 2 to 4 inches broad; margin more or less sinuous or dentate. A very fine but perceptible nerve runs from base to apex, from which lateral ones, opposite and frequently forked, are given out at intervals of half an inch; these, which in dried specimens are somewhat inconspicuous, terminate in the marginal denticulations; colour, in fresh state, that of a *Lamminaria*, but with a thinner substance. (Williams, Thomas) On the Mechanism of Aquatic Respiration, and the Structure of the Organs of Breathing

in the Invertebrate Animals. We postpone any notice of this paper till its conclusion, as we find it is likely to lead to some controversy from the pen of Mr. George Newport, who, in a letter to the editors of the "Annales," expresses "his surprise and regret at such a mass of erroneous statements;" and states his intention of endeavouring to remedy the injury which these errors are likely to do to science by their promulgation. In the meantime, those who take any interest in this subject should give Dr. Williams's papers an impartial perusal, as they evidence considerable care and attention, and will, no doubt, prove most suggestive to the inquirer. (Wright, Thomas) Contributions to the Palæontology of Gloucestershire. A description of some new species of Echinodermata, from the Lias and Oolites. Bibliographical Notices—(Unger, Dr. F.) Botanical Letters; (De Selys-Longchamps, M. E.) Synopsis de Calopterygines, Brussels, 1853. Proceedings of Societies—*Royal Institution of Great Britain*—(Owen, Professor) On the Structure and Homologies of Teeth. *Zoological Society*—Specimen of *Echiodon Drummondii* (see Yarrell, Brit. Fishes, vol. ii., page 417), found on the shore of the harbour of Valentia, Co. Kerry, after a violent storm from the west, which occurred on 23rd of January last. (Scott, A. W.) On Cystosoma Saundersii of Curtis and Westwood. *Botanical Society of Edinburgh.* Miscellaneous—(De Tchihatcheff, M. P.) On Vegetation of Mount Argæus, in Cappadocia; (Gray, Dr. J. E.) On genera *Volutella* and *Cymbiola;* (Kingsley, G. H.) On *Notamea bursaria;* (Reave, Lovell) On a new species of *Helix*, from Van Dieman's Land; (Martens, M.) On Colours of Plants.

No. 77, May:—(Sclater, P. L.) Synopsis of the Fissisostral family, *Bucconedæ;* (Tyther, Capt. R. C.) On Fauna of Barrackpore; (Wright, Thomas) Palæontology of Gloucestershire (continued); (Bowerbank, J. S.) Reply to statements of Professor Sedgewick. This letter, from the honorary secretary of the Palæontographical Society, which, though firm, is still courteously written, clearly shows, that the conversations respecting "the Cambridge Fossils" was regarded by those engaged in the Palæontographical Society's memoir, as a refusal to render them available for the purpose of that society. We deeply regret that there should be even an apparent want of courtesy shown by one naturalist to another, and the more so as it was, in this case, shown to one who was not a fellow-countryman. We, however, hope that the matter may still be so explained, as to prove that it was not intended to obstruct the efforts of those labouring for the Palæontographical Society, when anxious to present its members with as a complete a monograph of the British fossil corals as materials existed for doing. We cannot conceive what purpose museums were ever intended for, unless to preserve, in a collected form, and to render available, under the most liberal regulations, to the student, all their treasures; and we would hope, that no narrow-minded policy would prevent the, we must say, most reasonable request of M. Milne Edwards being acceeded to, if made, not to *individuals*, but to the "Board of Auditors," or whoever else may be the governing body of the Cambridge Museum. The correspondence that has taken place will do, we are assured, considerable service, by teaching Museum Curators and University Professors that the opportunities placed at their disposal by their position, were never intended for exclusive use, or as means of personal aggrandizement, but that others have, under proper regulations, an equal right to share in them. (Leighton, Rev. W. A.) Monograph of British Graphideæ (continued); (Berkeley, Rev. M. J.) Notices of British Fungi; (Gray, J. E., Ph. D.)

A Revision of the Arrangement of Bivalve Shells (*Conchifera*); (Gray, J. E., Ph. D.) On Reproduction of lost part of an Operculum, and of its probable Restoration when entirely destroyed. Proceedings of Societies—*Linnean*—(Yates, J.) On inflorescence of *Cycas revoluta* and *Macrozamia spiralis*; (Clarke, J.) On the parasitic habits of *Rhinanthus Crista-galli*; (Newport, G.) On the Reproduction of the lost parts in Earthworms. Three specimens of Earthworms were exhibited, in which the lost parts of their bodies had been reproduced, as formerly proved by the experiments of Bonnet and Spallazani, to take place in these animals. One of the specimens was still living. These specimens possessed some interest from the fact of reproduction in Earthworms, and other annelids having been recently denied. In a report on the British *annelida*, by Dr. F. Williams (in the Report of the British Association, &c., for 1851), after mentioning the statements made by Bonnet and Spallazani, as quoted by Professor Owen, the following statement occurs:—"On the authority of hundreds of observations, laboriously repeated at every season of the year, the author of this report can declare, with deliberate firmness, that there is not one word of truth in the above statement." "Dr. Williams," Mr. Newport adds, "must have been unfortunate in his statements, since it is no uncommon thing, at this season of the year, to find earthworms with a large proportion of the body restored. (Hooker, Dr. J. D.) On *Hodgsonia*, a new and remarkable genus of *Cucurbitaceæ*; (Burton, G. B.) Notice of several species of Bats, captured in England last autumn. The species referred to are *Vespertilio serotinus*, *V. Daubentonii*, var. *emarginatus*, and the typical *V. Daubentonii*. Of *V. serotinus*, three specimens were captured at Chartam, near Canterbury, in August last, where it appears to be the common bat of the neighbourhood, although Mr. Jenyns, to whom the specimens were submitted, states that he has seen but two other English specimens. Their flight is graceful, but somewhat heavy; and appeared to be limited to about an hour after sunset. They seem to affect the neighbourhood of high trees and shady places. *V. Daubentonii*, var. *emarginatus*, was captured on the banks of the Stour; and *V. Daubentonii* in the church-tower of Christ Church, Hants. (Hogg, J.) Notice of the appearance of Myriads of a species of *Aphis*, in the North of England, in the autumn of 1852; (Seeman, B.) Remarks on Sarsaparillas. *Miscellaneous*—(Gray, Dr. J. E.) Occurrence of *Runcina Hancockii* in pools, left between the rocks at low tide, in Belmont Cove, Weymouth, but only on tufts of *Hypnea purpuracens*, which were infested with *Diatomacea*, which induces Dr. Gray to believe that they feed on these parasitic plants; (Dareste, M. Camille) Note on Colouration of Waters of Chinese Sea. In this note is recorded the occurrence in a sample of water from the Chinese Sea (taken at a time when it was coloured to a great extent red and yellow) of *Trichodesmium erythræum*, which Ehrenberg described as the cause of the red-colour assumed by the Red Sea at certain periods.

THE QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE. No. 7, April. 8vo. London: S. Highley and Co. Price 4s.

(Roper, F. C. S.) On the Diatomaceæ of the Thames; Report of the Microscopical Society (*Fourteenth Annual Meeting*). We purpose, in our next number, drawing attention to this document in detail, when speaking of the advance of Microscopical science. (Wenham, F. H.) Theory of the Illumination of Objects

under the Microscope, with relation to the Aperture of the Object Glasses—a paper of great interest to the practical observer. (Hepworth, John) On the Fly's Foot (*Musca domestica*); (Allman, George Jas. A.) On the *Involution Theory* of the Starch Granule. This paper leads to the following conclusions:—1st. That the Starch Granule consists of a series of lamellæ, in the form of close, hollow shells, included one within another, the most internal enclosing a minute cavity, filled with amorphous (?) amylum; that the concentric striæ visible in the granule indicate the surfaces of contact of these lamellæ; and that the so-called nucleus of Fritzsche corresponds to the central cavities. 2nd. That while the lamellæ all appear to be identical in chemical constitution, yet the internal differ from the external in consistency, or other conditions of integration. 3rd. That the order of reposition of the lamellæ is *Centripetal*. 4th. That while the Starch Granule is thus a lamellated vescicle, it cannot be included in the category of the true vegetable cell, from which it differs, not only in the absence of a proper nucleus, but in presenting no chemical differentiation between membrane and contents. Translations; Notes and Correspondence, &c.

Zoologist. No. 138, April; No. 139, May; No. 140, June. 8vo. London: Van Voorst. 1s. each number.

Within the last three months the following, among other articles, have appeared:—

No. 138, April:—(Birkbeck, Robert) Notes on the Birds of Italy and Sicily, made in 1853; (Wourse, W. E. C.) Suggestions for ascertaining the Cause of Death in Birds and Animals; (Ashford, Charles) List of Fresh-water Mollusks found at Ackwork, Yorkshire; Notices of New Books; Proceedings of Societies, &c.

No. 139, May:—(Smith, Rev. Alfred Charles) On the Manner in which Parent Birds occasionally remove their Eggs and Young; a very interesting Paper, evincing much patient observation on a comparatively little known subject. (Spicer, J. W. G.) Notes on Hybrid and Gallinaceous Birds; (Rodd, E. H.) Occurrence of the American Stint (*Tringa pusilla*) near Penzance; (Gordon, Rev. George) List of Mollusca found in the province of Moray, and the Moray Firth; this Paper is a continuation of the Fauna of Moray, previously appearing in the pages of the "Zoologist," &c.

No. 140, June:—(Slaney, W. H.) The Corby Crows and the Rooks; (Smith, R. H. S.) List of Land and Fresh-water Mollusks, found near Sevenoaks, Kent. In this list, which we have reason to believe was originally communicated to the Dublin University Zoological Assocation, we see by the author's remarks on Helix nemoralis and H. hispida, that he is not "an humble convert" to the views of modern Malacologists. (Hogan, A. R.) Catalogue of Coleoptera found in the neighbourhood of Dublin. We are glad to see this list of Dublin Coleoptera—the second which has ever appeared; nor is its value at all diminished by the high authority on which many of the species are recorded. We hope its publication will serve to increase the diligence of Irish entomologists, as we are disposed to believe that many species found in the district are not as yet enumerated, of which we hope soon to see a supplemental list. Notices of New Books; Proceedings of Societies, &c. For the list see Proceedings of Dublin University Zoological Association, pp. 32, 88, and 98, as given in our reports of its proceedings.—Eds.

PHYTOLOGIST. No. 155. 8vo. London: J. Van Voorst. Price 1s.

April:—(Mudd, William) Account of the Lichens of Cleveland. Proceedings of Societies—Linnean—Inflorescance of *Cycas revoluta* and *Macrozamia spiralis*; Observations on the Parasitism of *Rhinanthus Cristi-galli*, and its injurious effects on growth of barley. These observations were made in a field, in the parish of Debden, Essex, consisting of about 170 acres, principally a clayey soil, such as is usually called heavy land; 30 acres were under barley, and of these about 10 were destroyed by this plant. The *Rhinanthus* (according to Mr. J. Charke, by whom their memoir was read) effects this injury by the fibres of the roots attaching themselves to the fibres of the barley, on which they form small, round tubers, or what may be more appropriately termed spongioles, which embrace the fibres so effectually as to suck the juices of the plant, so as to starve it, and, in most instances, ultimately destroy it. These spongioles are formed of a cellular tissue. The ordinary method employed to destroy weeds, by a summer fallow, does not avail, as the *Rhinanthus* does not grow in clean earth. The other method of destroying weeds, by green crops in rows, is equally unsuccessful, as it does not grow among green crops. As it is an annual, it should be pulled up before it seeds; and as it grows on a clay soil, and to no great extent, except in a wet season, the land should be effectually drained. (Hooker, J. D.) On the Genus Hodgsonia; (Henfrey, A.) Remarks on the Eye—spot of Infusoria and Microscopic Algæ. Dublin Natural History Society; Botanical Society of Edinburgh—(Balfour, Dr.) On the Pollen of *Zamia horrida*. The pollen, he stated, to be, in its ordinary condition, elliptical, with a groove in one side, resembling very much a grain of wheat in appearance. The groove is formed by the folding inwards of the edges of the pollen grain, which, when fully expanded, under the action of water, becomes completely spherical. When water is applied, under the microscope, to the elliptic pollen-grains of Zamia, the two edges of the groove are seen to unfold and spread, so as to produce the circular grain; when allowed to dry, the grain resumes the circular grooved condition. It is difficult to say which is the characteristic form—the one being the dry state of the pollen, while the other is the moist condition. (Brown, Rev. Thomas) Muscology of East Court of Fife, including a variety of *Muium affine*, not previously found in fruit in Britain, besides several other unusual species; (Sanderson, J. S. B.) Note on the Supposed Antheridia of the Rhamneæ; (Lawson, G.) On the Anatomical Structure of Coniferæ and other Gymnogens; (Moore, Thomas) On *Ophioglossum lusitanicum*. The existence of this curious little plant, in Guernsey, was first discovered, in the January of the present year, by Mr. Wolsey, who met with it above the rocks, bordering on Petit Bot Bay, in that island. One remarkable feature of the plant, is the early period of the year at which its growth is made. By the middle of January, Mr. W. found the fronds fully developed; and the fronds, no doubt, perish early in the spring. It is not improbable that a diligent search might be rewarded by its discovery in the western counties of England or Ireland. Its early development and decay should be borne in mind by those who undertake the search. Greenwich Natural History Club—The President, George Burk, Esq., exhibited a series of leaves of the Bramble (*Rubus fruticosus*), which he had received from the Midland and Southern Counties of England and Jersey, and which were affected with a disease almost as general as the potato disease. The cause of this disease was a

microscopic fungus, the *Erigma* (*Phragmidium*) *bulbosum*, of Berkley; when magnified, it exhibited the appearance of a pedicle, supporting sometimes three, sometimes four (never more than four) sporidia, surmounted by a kind of button, representing an imperfect sporidium. The specimens of Erigma, examined by Mr. Curry, on Rosæ, generally possessed eight sporidia.

Hooker's Journal of Botany. No. 63, April; No. 64, May. 8vo. London: Lovel Reeve. Price 2s. each.

No. 63, April:—(Hooker, Sir W. J.) On the "Argan" Tree of Morocco (*Argania Sideroxylon*). This tree, or shrub, but very little known to European botanists, is highly esteemed by the Moors for its *useful* properties. Through the exertions of Lord Clarendon, seeds and living plants were procured for the Royal Gardens at Kew.* These were accompanied with a descriptive letter from H. Grace, Esq., of Mogador. From this letter it appears that the plant, which attains a great age, is propagated mostly by seed, which is well watered till it shoots; after this, there is no further care required. When from three to five years old, it bears fruit, which ripens between May and August. When the fruit ripens the cattle are driven to the trees, which are beaten with a long pole, and the ripe fruit which falls is quickly devoured. In the evening, when the flocks are driven home, they commence to chew the cud and throw out the nuts, which are collected every morning, and opened by the women and children, who use a stone for the purpose. The kernels are then parched in a common earthen vessel, ground in the ordinary handmills, and the flour put in pans and kneaded, with a little cold water, until the oil supervates, which is used for many domestic purposes in lieu of olive-oil; the cake, in which much oil remains, is used to fatten the cattle. Plates of the flowering specimen of the Argan, and various forms of the fruit, accompany this paper. (Spruce, Richard) Journal of a Voyage up Amazon and Rio Negro, continued; (Bentham, George) Florula Hongkongensis (continued); (Roe, J. S.) Report of Journey of Discovery, Western Australia (continued); Botanical Information; Notices of Books.

No. 64, May:—(Berkley, Rev. M. J.) Decades of *Indian* Fungi (continued), with 2 plates; (Harvey, W. H.) Three new Algæ, from shores of Ceylon—*Vanvoorstia spectabilis*, *Claudea multifida*, *Martensia fragilis*. The genus Vanvoorstia, just founded, and which is closely allied to Claudea, has been, with great propriety, dedicated to the well-known natural history publisher. (Roe, J. S.) Report of Journey of Discovery into Western Australia (continued); Botanical Information, &c.

The Naturalist: conducted by B. R. Morris. No. 38, April; No. 39, May; No. 40, June. 8vo. London: Groombridge and Sons. Price 6d. each number.

No. 38, April, 1854:—Habits of the Fox; Rare Animals, &c., occurring in Aberdeenshire; House Sparrow; Woodcock, remarks on; Birds occurring near Richmond, Yorkshire; Coleoptera round Exeter; Land and Fresh-water Mollusca; Miscellaneous Notices; Proceedings of Societies—Yorkshire Naturalists'

* Plants have been successfully raised from seed in the Gardens of the Royal Dublin Society.—Eds.

Club; Alnwick Botanical Society, by the report of which we are glad to see that it is proposed to publish its transactions annually, commencing at the close of the present year with a "Flora of Alnwick," a step which ought to be followed by similar societies, one of whose first objects should always be the careful preparation of local faunas and floras, as in that way can we alone hope to form a correct estimate of the distribution of species. Natural History Society of Glasgow, containing a very interesting note, by C. W. Peach, Esq., of Wick, in answer to the ordinary assertion, that "the large *Medusæ* preyed on fishes for food;" from his observations made on *Cyanea aurita* and *C. capillata*, or *C. inscripta*, of Peron, it would appear that the small fishes rush, when attacked or alarmed, under the umbrella among the tentacula, taking shelter in the large folds connected with the ova, and remaining there till the danger had passed, when they would emerge, and sport and play about their sheltering friend. So closely would they lie when under the umbrella, on seeing danger, that some young whiting were, at different times, taken into a bucket with their shelter, and when permitted to rest for a short time, they would come out and sport again as in the sea. These observations would cause us to doubt the fish-eating propensities ascribed to these water-framed creatures, and open up a most interesting field of observation for our sea-side naturalists, which, no doubt, they will avail themselves of. Retrospect; Querist.

No. 39, May, 1854:—Man attacked by Polecats; Feathered Residents in, or Visitants to, the grounds of Terrick House; Birds occurring near Richmond, Yorkshire; Birds, local names of, in North Riding of Yorkshire; Ornithological Notes; British Evergreens; Miscellaneous; Proceedings of Societies—Royal Society of Edinburgh; Observations and Discussions on the Structure of the "Torbanehill Mineral, as compared with various kinds of coals," by Professor Bennet. Dr. B. was clearly of opinion that the Torbanehill mineral was a substance distinct from coal, and not to be confounded with it by any one who paid a strict attention to the microscopical character of the two substances. Coal, he believed to be formed by coniferous wood, and the structure which coal exhibited under the microscope accorded with this idea, but in the Torbanehill mineral the wood fibres of Conifera were not seen. He particularly referred to certain bodies of a circular form, which were seen in transverse sections of all true coals, when examined under a high magnifying power. These bodies he considered to form the true marks of coal, and he never found them wanting in any specimens of true coal. But in the Torbanehill mineral they did not occur, and their absence showed it not to be a kind of coal, but a mineral having a different origin." In the discussion which followed, several members took an active part. Professor Balfour, who spoke at considerable length, was of opinion that the Torbanehill mineral was "a cannel coal nearly allied to brown Methill, formed from Acrogenous plants, containing scalariform tissue, and an abundance of yellow gas, giving matter apparently the altered contents of cells." Professor Gregory approved generally of the observations of Professor Balfour, and proceeded to the chemical aspect of the question, and expressed his conviction that the general chemical characters of the mineral did not differ in any essential particular from Methill, and, perhaps, some other kinds of undoubted coals. Dr. Wilson called attention to the affinity that existed between the Torbanehill mineral and bituminous shale. Dr. Douglas Maclagan inquired of Dr. Bennett, with regard to the

structural peculiarities observed in brown Methill and Torbanehill coals, which led him to conclude that the Torbanehill mineral was not a coal, while the brown Methill was the scattered vessel on which he relied being found in both. To this Dr. Bennett replied, that in the case of the brown Methill coal, the structures alluded to formed the organic basis of the coal, which was not the case in the Torbane mineral where they were purely accidental. Dr. Fleming considered the remarks of Dr. Wilson on bituminous shale as an attempt to draw attention away from the real subject under discussion, and, in reply to Dr. Bennett's statement, that "coal could not be formed of cellular tissue, without the intermixture of vascular to a large extent," mentioned, from his own observation, the formation of a bed of peat, many feet in thickness, by a single cellural plant, having no vascular tissue whatever, *Tricortomum lanuginosum*. Dr. Greville was desirous of correcting a misapprehension of some of his evidence at the trial, in regard to the yellow bodies seen in the Torbanehill mineral; he was far from saying that they were *actual cells in their normal condition;* but, in his own mind, he was perfectly satisfied that the mineral had a vegetable basis. Seeing there was so much difference of opinion on this subject among scientific men, he thought it a great comfort to those of them who had been examined on the trial, that the decision was not founded on *their* evidence. Retrospect; Querist.

No. 40, June, 1854:—(Donaldson, George) The Craig of Ailsa; (Edward, T.) List of Raised Echinodermata, of Banffshire; Notes on British Swallows; (M'Intosh, J.) Injurious Insects—No. 1., The Earwig, Forficula auricularia; Miscellaneous Notices; Reviews; Proceedings of Societies; Retrospect.

Journal of Industrial Progress. No. 4, April; No. 5, May; No. 6, June. Edited by W. K. Sullivan. 8vo. Dublin: W. B. Kelly. Price 1s. each.

The connection of industrial progress with the labours of the naturalist is much closer than is generally imagined, and the pages of this journal fill a blank long felt and acknowledged in Irish literature. With industrial resources richer than most countries, Ireland has long been neglected by the man of wealth and enterprise; the causes which led to so unfortunate a result does not fall within our promise to comment upon; but we trust, from the appearance of such a periodical, and the ability with which it has been conducted, that a brighter prospect is now opening out in the development of its resources. The zeal and energy which characterize our fellow labourers, will quickly prove, even to the most sceptical, that habits of observation are of importance, even in an economic point of view; and before long we will see their importance more justly appreciated in any schemes of education which may emanate, either from our universities or those schools which may be regarded as preparatory to them.

Among the papers of interest to the naturalist in these numbers will be found one on the artificial breeding of the Leech (Hirudo-medicinalis).

Proceedings of Societies.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 8, 1854.

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

Dr. Andrews read a paper on the "Composition and Properties of Ozone." After taking a general view of the elementary bodies, and of the chemical relations, and referring to the remarkable fact, that three of the most widely-diffused in nature—oxygen, hydrogen, and nitrogen—are known only in the gaseous form, and, therefore, cannot be referred, with certainty, either to the group of metallic or of non-metallic elements, Dr. Andrews proceeded to describe the singular property possessed by some bodies of existing, at the same temperature, in different physical states, and which has received the name of allotrophy. Sulphur and phosphorus were cited as furnishing remarkable examples of the allotrophic condition. The latter has been obtained recently in the form of a red, opaque body, altered by exposure to the air, and requiring a much higher temperature to inflame it than ordinary phosphorus. Ozone is, probably, an allotrophic variety of oxygen, and is the only instance known of the allotrophic state occurring in a gaseous body. Recent experiments have, however, thrown some doubt on the identity of oxygen and Ozone, and appears to indicate that, at least, some varieties of Ozone contain hydrogen as a constituent. Dr. Andrews entered very fully into the discussion of this question, and described some experiments in which he has been for some time engaged for its elucidation. Ozone is characterized by its peculiar odour, its bleaching properties, its power of decomposing such salts as the iodide of potassium, and the facility with which it is decomposed, as well by the action of heat as by contact with certain chemical bodies. It is produced under a great variety of circumstances—as in the slow oxidation of some bodies in air or in oxygen, in the decomposition of water by voltaic action, and in the passage of an electric spark through oxygen gas. The chemical affinities are very powerful, and if it could be obtained in quantity, it would, probably, admit of many valuable applications to the arts. In reference to the latter view, its bleaching properties were particularly referred to. It has been found in minute quantities in the atmosphere, where its presence is, probably, due to electrical action; and it has been supposed to exercise an important influence on the spread of epidemic diseases; but such views Dr. Andrews considered to be, at present, altogether conjectural.

MARCH 22, 1854.

Robert Patterson, Esq., President, in the chair.

Mr. Joseph J. Murphy read a paper on "The Mountain Chains of Asia and Europe, in their Physical and Political Relations." Remarking that geographical structure has its laws as well as organic structure; he described the greater part of these Mountain Chains as constituting one connected system of nearly parallel chains, stretching east and west, and turning their steepest sides to the south. The southern chains of this system are the highest—among them are the Alps and Himalayas. From the south side of this system of parallel chains other chains

strike off nearly at right angles, and, running out into the sea, form the Peninsulas of Spain, Italy, Greece, Arabia, Hindostan, and Further India. He then mentioned the great Mountain Chains running east and west, and the deserts of Central Asia, as forming a natural barrier between the wandering tribes of Northern Asia and the civilized nations of the south; in our times, between the Russian Empire and British India; and concluded by observing that Russia, notwithstanding its barbarian character in relation to the south and west, is doing good service to the cause of civilization in Northern Asia.

APRIL 5, 1854.

GEORGE C. HYNDMAN, Esq., in the chair.

Mr. Patterson read a paper on the "Uses of Animals to Man." The paper commenced with a brief extract from Smith's "Wealth of Nations," in which it was pointed out that man, in a savage state, was a being absolutely dependant for his existence on the inferior animals. This dependance continued, in a greater or less degree, as he advanced in civilization, and still continues to a very considerable extent, although, in many cases, the animals may be regarded more as objects of luxury than of necessity. The use of animals, as furnishing food to man, was illustrated by numerous examples from the vertebrate and invertebrate kingdoms in nature; also their furnishing raiment, either in the shape of furs and skins, or in that of wool and silk, to be afterwards spun and woven. For various arts they supply us with feathers, hair, horns, teeth, oil, and tallow, as well as with many substances for medicinal purposes—several important branches of trade depend entirely upon such supplies. In agriculture, their importance is most manifest; not only are they indispensable to the farmer when living, but their dead bodies are valuable in their flesh and bones for manuring the land. As objects of luxury they furnish delight to the sportsman, in hunting, fowling, and fishing; as sanitary police, from one kind preying on another, the accumulation of noxious creatures is prevented. They add beauty to the landscape, which would be very tame, indeed, without the addition of animal life; and the contemplation of such a variety of living beings, all fulfilling the intentions of the great Author of Good in each department of animal nature, has the effect of improving the moral nature of the observer, and of developing a pious feeling.

APRIL 12, 1854.

ROBERT PATTERSON, Esq., President, in the chair.

Mr. William Millen read a paper on "The Rare Plants found in the neighbourhood of Belfast." The following is a list:—Anacharis alsinastrum, cystopteris fragilis, triticum junceum, lysimachia nummularia, rubus saxatilis, epilobium angustifolium, orobanche rubra, ruppia rostellata, potamogeton pectinatus, potamogeton gramineus, equisetum Mackaii, equisetum Drummondi, equisetum hyemale, artemisia campestris, carduus acanthoides, erodium cicutarium, radiola millegrana, peplis portula, listera nidus avis, erodium moschatum, hippuris vulgaris, chara hispida, chara translucens, myriophyllum spicatum, statice spathulata, statice armeria, carduus tenuiflorus, medicago falcata, lathyrus aphaca, senecio viscosus, silene noctiflora, sinapis tenuifolia, vicia bithynia.

DUBLIN NATURAL HISTORY SOCIETY.

APRIL 7, 1854.

ROBERT CALDWELL, Esq., M.R.I.A., in the chair.

The minutes being confirmed,

Mr. Andrews presented to the Society a copy of Ralf's beautiful work on the British Desmidiæ, and by Mr. Williams, from Mr. Edward Dombrain, four speci-

mens of the Siskin (Carduelis spinus), which were shot in the county Wicklow. Mr. Andrews said that there were several other donations which he hoped to record on the next night of meeting.

Mr. Ffennell, Inspecting Commissioner of Fisheries, was then called on for his paper

ON THE ARTIFICIAL PROPAGATION OF THE OVA OF THE SALMON, AND THE PROGRESS OF THE EXPERIMENTS NOW CARRYING ON.

Mr. Ffennell said that he had received the notice of his paper being on the list for this evening. At the last monthly meeting of the Society he was unavoidably absent on public duty, and he had now but very recently returned from London, where he had been hastily summoned. He was, therefore, not so fully prepared as he could have desired on the subject, and he regretted much that he had not been able to collect, so far, sufficient material, to render any paper of the kind of importance; in fact, the experiments were not yet forward enough to give the full statistics he had from time to time been collecting, from the parties who were in different parts of the country, employed in such operations, and he would, as the season advanced, submit to the Society the progress made by them in those experiments. In whatever light this subject may be considered, it was one of vast importance, in a national point of view, and in the great value of its commercial tendency, and, therefore, valuable as to its economy, and its practical utility to man. In Ireland, these experiments were new and novel, and no knowledge had yet been obtained as to the results of their practical usefulness. He felt the necessity of bringing those inquiries before the Society, as those who were engaged in the experiments were practical men, without scientific knowledge, and who, therefore, laboured under the difficulty of not being able to solve any new features that presented, that a knowledge of the natural history of the animal, and the aid of science might explain, and, consequently, enable them to take advantage of. He (Mr. Ffennell) did not understand the subject of the fisheries scientifically, but he had been practically engaged for many years. He was a practical man, but he was fully sensible of the importance of the study of natural history; and that science must promote practical knowledge. The aid of those who made practical science their study would be of great value in carrying out the work of public or official bodies. Without such knowledge, in the infancy of such undertakings, failures must be expected. The great interest created in the progressive growth of the salmon fry, which were daily seen by the public in the Exhibition, and of the explanation of their artificial development from the ova, induced a Doctor Merron, Professor of Anatomy in one of the London colleges, to come over to witness, and to learn the system that had been pursued throughout, as he was much interested in the proceedings of a company that had been formed for the object of conveying the ova, and stocking the waters of New Zealand, where, although a climate almost similar to that of England, salmon were not found in its rivers. The Messrs. Ashworth were the first to introduce the artificial propagation of the ova of the salmon in this country, and there were now several parties that had taken up the subject, and were carrying on such operations—Mr. Doherty, at Bush-mills; Mr. Cooper, of Markree, at Ballina, in Mayo; at Galway, by the Ashworths; and at Lismore, in the Blackwater, by the Board of Conservators of the Fisheries. When the results of all their experiments (of which he regularly received reports) were perfected, he would feel most happy in submitting them fully, and in detail to the Society. The Messrs. Ashworth had not been so fortunate this year in obtaining the quantity of impregnated ova as in the first year. The habits of the fish must be more studied to insure certain success. On the grounds in the Cong river, where the salmon were in the habit of spawning, the Messrs. Ashworth, at the latter end of November last, at the time they considered the fish to be in a fully-developed state for spawning, took a quantity of fish for the purpose of obtaining the ova for artificial impregnation, and they were surprised to find that all the fish taken were male salmon. Mr. Foley, at Lismore, who has charge of the salmon fishery in the Blackwater, experienced a similar result, on the 1st of February last. He was anxious to obtain the fish for a similar purpose, but not a single male fish was captured—they were all females, and full of ova.

The facts were—the male salmon always ascend the rivers at the approach of the spawning season, before the females. They repaired to the spawning beds, where they knew the females would come, waiting their arrival; the desires of the male fish being accomplished, they selfishly deserted the females, returning to the sea, and leaving the females on the beds to complete the operations of spawning—hence the causes why the male fish were always to be found in the commencement of the season on the spawning grounds, and in the latter part of the season the meeting only the female fish. Mr. Ashworth's experiments had, in some degree, failed this year. Much attention was also required in the transport of the ova. Some had been sent to him from Galway, this year, in damp moss, and, although the ova had been placed in a most favourable deposit-bed, had altogther failed. Mr. Ffennell was happy to say, that all the little fish shown in the Exhibition were lively and well, and had wonderfully grown. The ova he had obtained during the last spawning season, and which he had been watching the development of at the Custom-house, had very recently produced the young fry, and they were to be seen in numbers sporting among the gravel, with the yolk still attached. The period of the ova coming to maturity to the extrication of the young fry was 80 days. He wished that any of the members and their friends would call, and he would be most happy to show the whole process of the experiments. He was glad to say, that under the aid of the Board of Public Works, he had formed a salt-water inclosure at Kingstown, where there was a regular flow of the tide, and of sufficient depth, and where he proposed, at the proper season (this month), to transport the young fry, and he was sure that plenty of natural food would be found there for them, brought in by the tide. In fact, as he had been so successful in the growth of the young fry in the fresh water, he fully anticipated their more complete development in the salt water, and that he could be able, at the end of the season, to produce salmon of many pounds in weight; and he saw no reason why such enclosures might not be generally practised, and that the estuaries and inlets of our coasts might be converted into fish parks as naturally as enclosures are formed into deer parks. He hoped the Society would excuse his not being prepared with a paper, but he would, before the session was over, lay very full statistics before it.

The Chairman said, that it was unnecessary for him to make any remarks on the importance of such a subject; its value was well known. He would, as Mr. Ffennell had, in so complimentary a manner, alluded to the usefulness of the Society in such investigations, put the question to the members to offer their opinions upon the subject.

Mr. Williams begged to propose a vote of thanks to Mr. Ffennell, for the great interest of the communication made by him, which, being seconded by Doctor Farran, was unanimously responded to.

Mr. Andrews, as one of the honorary secretaries, said, that he considered it due from him to thank Mr. Ffennell for the kind manner in which he came forward to give this statement, particularly as his time had been so occupied by his public duties. He had followed Mr. Ffennell throughout, and saw, step by step, how important were such operations, and how valuable the results, to the extent at present witnessed. He considered that Mr. Ffennell deserved the highest credit for so perseveringly carrying on those experiments, and which may probably result in great public benefit. The re-stocking of our rivers with valuable fish by artificial means, must, for food, and in a commercial point of view, be enormously beneficial. That excellent philosopher, the late Sir Humphrey Davy, who was a good, practical fisherman, suggested the practicability of conveying the ova of the more valuable kinds of fish of the Continental lakes and rivers, and propagating them in the barren waters of other countries. The difficulty of transporting the impregnated ova in a healthy state to remote distances is now comparatively trifling. To keep the water in the tanks of as cool and even a temperature as possible, and the water pure by the growth of acquatic plants, particularly the Charæ, are all that seem necessary for the safe preservation of the ova. In about ninety days the young will be liberated from the capsule, and for, at least, thirty days more the fry will be independent of nourishment, until the vitelline-sac is absorbed. Thus, in the present days of quick transit, the ova could be transported to our remotest colonies in that state, requiring but little attention, before the time of reaching their destination. The temperature

of the water more or less influenced the earlier or the later development of the ova. The ova deposited in the beds of some rivers did not produce the fry for 120 to 130 days. Mr. Samuel Gurney, jun., of Carshalton, had successfully impregnated and distributed the ova of the fine trout of the river Wandle, and had also introduced the trout of other rivers of England to the Wandle. He had successfully sent the ova to New Zealand; and the trout of the Wandle were now flourishing in the rivers of that country. Valuable experiments in science might be worked by the enclosure (where practicable) of a salt-water inlet at the mouth of a river in which the ova would be propagated, and allowing the fry, according to instinct, to take their course to the salt water. Mr. Andrews did not clearly understand Mr. Ffennell as to the habits of the salmon on the spawning beds, nor did he concur in such views. Our northern and eastern rivers appeared to produce earlier fish than our western rivers. Much depended on the temperature of the waters, and those rivers connected with extensive lakes have a much higher temperature than Alpine rivers. Mr. Andrews did not think that the periods of spawning were the same in all rivers; that there were early periods as well as late periods of spawning, and that clean fish are earlier in some rivers, and of a later run in other rivers—that in some rivers in Wales and in Scotland, salmon are in prime marketable condition very early in the season, and the greater part of the year—such as the Usk in Wales, and the Kirkaig in Scotland. Mr. Andrews noticed the instance of the River Caragh in Kerry, where years since he had seen the salmon in abundance and in the primest condition in the month of January. In the Slaney, that he had often fished, he had seen salmon in prime condition in October. The River Bandon he had heard was a late spawning river, and that salmon were in good condition late in the season. He could notice many cases in the western rivers relative to the habits of the salmon, and he certainly was of opinion that a difference existed in some lakes and rivers with regard to the periods of the condition of the fish.

Mr. Ffennell said he did not agree with Mr. Andrews; he, however, was aware that prime fish had been obtained in the Caragh in the month of January, and at periods when they were not in condition in other rivers; but he supported the views of the same periods of the close season throughout the country—that in England, Scotland, and Ireland, the periods of spawning were uniform, and that no differences as to the season occurred.

Mr. Andrews asked Mr. Ffennell when he supposed the clean fish, known to occur in the Caragh, in the month of January, spawned.

Mr. Ffennell said that the fish remained in the lake throughout the summer, and spawned the following November.

Mr. Williams put the question, did those fish remain in the fresh water throughout the year?

Mr. Ffennell said they did.

Mr. Andrews could not believe that salmon could be in a healthy condition for spawning in November, remaining in the fresh water throughout the summer.

Mr. Ffennell said he was responsible for the opinions he put forward, as they were all grounded upon his own actual observations.

Mr. Andrews said he had intended making some observations upon the Sygnathidæ, or pipe-fish family, and particularly with reference to the habits and spawning states of Sygnathus typhle. The lateness of the evening would prevent his entering into the remarks at present. Mr. Andrews had obtained, in Dingle Harbour, the two varieties of S. typhle, known on the shores of Finland, in the Baltic and the Cattegat. It was there denoted Tongsnallor, on account of their quick motions among algæ. Many of our harbour fish, on the west coast, were identical with those on the shores of Finland, and many that we reject are used by the poorer classes in Russia. Sand smelts, which in Russia are termed Snetky, are thrown into brine, then dried in an oven, being placed on straw to prevent their being burnt; these, with other fish similarly dried, are made into soup, thickened with barley grits, and form the food of the lower orders in the Isle of Cronstadt. Minnows and gudgeons are dried in a similar manner, and sold at twenty-five copecks per lb.—a copeck is the eleventh part of a penny. These are used with salted peas and beans by the poorer classes during the protracted winters, and in the long fasts prescribed by the Greek religion.

Dr. Kinahan then read a paper

ON THE ABNORMAL FORMS OF FERNS.

When, on a previous occasion, I called the attention of this Society to the subject of abnormal forms among the ferns, I stated my suspicion that some general law or laws would be found governing them in their entirety, as a class, and thereby enabling us to group them. I then laid before you a sketch of the groups into which, in conformity with these supposed laws, forms might be divided. This scheme, crude at that time, has, thanks to the contributions of specimens by friends, and additional opportunities of examination afforded to myself, since been confirmed in most of its details, so that the following may be set down as established:—1st. That the aberrant forms of ferns obey certain fixed laws of form. 2nd. In accordance with these laws, that they may be divided into two great groups, bearing certain relations to each other, similar, and yet perfectly distinct. 3rd. That these great groups may be subdivided into parallel subgroups, each subgroup in the one representing a subgroup in the other, totally irrespective of generic or specific distinctions. To examine and illustrate these laws will be my task to-night. First, a few words to remove a misapprehension which I find many labour under with regard to former remarks made on this subject. It is not the object of this scheme to establish new species—far from it; with species, as such, it has nothing to do, solely dealing with the morphology of the plants under consideration, totally irrespective of species or genus.

These two great classes, as was before stated, possess strong analogies both to one another and within themselves, yet are perfectly distinct, never running into or producing one another, though we may find a group of the one class in accidental combination with one of the other. These two groups, for which I proposed the names, variety, and subvariety, will be found to possess the following distinctive characters:—Variety is universally a permanent aberrant form, affecting all the fronds of the plant—*i.e.*, uniform; under all circumstances of cultivation preserving its distinctness, and occurring generally in isolated plants; if fruitful, often producing its own form. Subvariety, an aberrant form, seldom permanent under cultivation, affecting only a few fronds, often occurring in numerous plants of a district, and from its spores producing the normal form—this is sometimes permanent under cultivation, but never uniformly so. The essential difference between these two classes then, in brief, is—variety, a permanent, uniform monstrosity, and subvariety, a monstrosity not necessarily permanent nor uniform—*ex. gr.*, in Lomaria spicant, var. *ramosum*, every frond each year dichotomously rounded at the apex, while Lom. spicant, subvar. *multifidum*, though much resembling it in general character, has some years all the fronds dichotomous, other years, perhaps, a single frond dichotomous, and other years none at all—in fact, in this the great difference consists between the two divisions; in the first, the monstrosity depending on some radical change in its nature, once imprinted on the plant is nearly indelibly so, extending often even to the produce of the spores (as we see in some monstrous forms of Athyrium), while in the subvariety, the monstrosity depending on some mere local or climatal influence, is liable to change as these are modified or removed. It is not meant to be asserted that varieties will not sometimes change under cultivation into another seemingly different variety, or that the spores will not produce plants of the normal type, but that this much may be taken as proved—that variety never changes into subvariety, or subvariety into variety; therefore, the statement put forward, to the effect that variety *ramosum* is but a form of subvariety *multifidum*, is based on error. Another grand distinction between the two, in a state of nature, is, that seldom or never do we find the variety in more than one or two plants at most, while the subvariety is often found more or less pervading the plants of a district—*ex. gr.*, there is a little stream glen at the base of the greater Sugarloaf, where L. spicant, subvariety *multifidum*, may always be found, some years every plant bearing fronds more or less divided, in other years you will only get single plants so affected, while the variety *ramosum* was found affecting only a single plant. The same might be said of the variety *ramosum*, and subvariety *multifidum* of Ath. incisum; and all varieties found in collections will be found to have had their origin from a few isolated plants found

in various localities. There are some characters, the uniformity of which, of primary importance in considering genera and species, are but secondary in considering variety—such as character of venation, division of frond, fertility; these are variously modified, according to the type of variety or subvariety, and, of course, to a certain extent, modify it in return. More generally we find the variety barren than the subvariety, but this may arise from some mistake of manipulation in cultivation. Indeed, for my own part, I believe most varieties may be made to produce fertile fronds, at least in the two forms under consideration to-night.

All the groups thus formed are capable of general definitions, though it must not be expected that this general definition will detail every minute feature of variety found in the many analogous forms necessarily included under it, any more than the definition of species describes every minute feature of the individual plants comprised, these being of little importance, provided the general characters are adhered to. To each of these groups a name is proposed to be given, by which it may be known, so that, for most species, it will suffice to quote this name to show what the form of the variety is. When two or more distinct forms of the same variety occur under a species, it will be but necessary to mark them in some way, as with Greek letters, &c., after each, and describe the salient points of difference. *Ex. gr.*, under Ath Filix fœmina, we find three forms of a variety which we will call *ramosum*; these could be thus described—Ath. Filix fœmina, var. *ramosum* (three forms).

A, rachis branched; pinnules decurrent; apices of segments curled. B, rachis split into numerous linear segments; pinnæ contracted; apices of pinnæ split into linear segments, tasselled. G, rachis and pinnæ multifidly crisped at apices, and tasselled. This is the only species in which the forms of this variety cannot be referred to one description, and when the species of Athyrium are definitely arranged, possibly the forms will be found to belong to different species. (*Vide* second part of paper.) To enter into all the subvarieties and varieties would detain you too long. I shall, therefore, content myself with one of each, taking those which are the commonest, and which, fortunately, also happen to be the most fully worked out. These are—var. *ramosum* and subvar. *multifidum*. These both consist in a repetition of the various parts of the normal frond—this is a true duplicature, not a mere modification of other organs such as we see in double flowers. Every part of the aerial organs is found doubled; some more commonly than others. In simple fronds we find it in the stipe, the rachis, and the apex of the frond. In compound fronds, in addition, it is also found in the pinnæ and the pinnules—in fact, it may be found in every axis of the plant, primary, secondary, tertiary, &c. It is also found in the sori, though more difficult to demonstrate, as in some forms of Phyllitis scolopendrium; I met, myself, with a wild specimen of Trichomanes speciosum, which I now show; when I got it almost all the thecæ were in pairs.

Perhaps it is wrong to call the organs doubled, as they are not strictly so all through, but arise single, and then split into two, obeying a law of nearly universal occurence in nature, in accordance with which we find that the aberrant forms of the higher groups copy closely the normal type of those below them; thus, the dichotomy, which obtains in these forms, is the normal state of some, at least, of the Lycopodiaceæ—*ex. gr.*, Selago, and is also seen in the seed lobes of some exogens.

Some have proposed to separate into different groups the forms placed at the head of these groups—*i.e.*, where the division affects the stipe, but this appears contrary to analogy. They ground their opinions chiefly on its rarity of occurrence among species, but even they allow that it is not a constant character; we will find it is rare, but not so rare as either the division of pinnule, or sori, or thecæ; and if we do not make any distinction between the rachis and stipe—which division, after all, is an arbitrary one—we will find the form not so rare at all—in fact, the nearer we go to the apex of the primary axis, the commoner will we find this division; and it is what might be expected, the modifying causes not having an opportunity to develop their action till the frond is partially developed, for if it acted previously, we would have two fronds instead of one. If we examine a simple frond we will find this well shown, as the rarest specimens are those divided deeply, and the commonest those having merely the apex split, often multifidly so. The

subvariety is much commoner some years than others; the rule I have not yet satisfactorily established, and, therefore, I shall content myself with enumerating the species, leaving it to some other hand, or some other time to explain the laws. The variety *ramosum*, as, indeed, may be said of all varieties, is uniform, much rarer, and is found in fewer species than the subvariety. It is thus defined:—Variety, *ramosum;* constant; stipe, often bifid or multifid; rachis, do., do.; segments rounded at edges and apices; confluent often curled and crisped; veins generally terminating in a lash of branches; generally fruitful. Examples—Phyllitis scolopendrium, var. *ramosum* (auc.); Lomaria spicant, var. *ramosum* (Mei); Athyrium Filix Fœmina, var. *ramosum* (three forms)—Alpha, Beta, Gamma (as before), &c. All these forms are allowedly fruitful.

The variations of this form are numerous, from the simple, curled, almost undivided apex of one form of Ph. Scolopendrium, to which the name Crista galli has been given, up to the extreme divisions seen in the forms of Phyll. Scolopendrium, var. *multifidum*. The subvariety *multifidum* is very extensively represented; out of the twenty-four genera of British ferns, enumerated by Newman, being recorded in all but seven—viz., Adiantum, (*vide* list at end), Pseudathyrium, Hemestheum, Cystopteris Woodsia.* It runs through every stage from simple lobing of the apex of the frond, or of the ends of the pinnæ or pinnules, down to the division of the stipe itself. In some species it is very common, in others very rare. Character—Subvariety *multifidum;* not uniformly constant; stipe sometimes dichotomous; rachis bifid or multifid; segments, following usual outline of frond, confluent or distinct, never curled or crisped; midvein terminating in a point at apex of each segment; generally fruitful. Examples of group—Ph. scolopendrium, subvariety *multifidum;* Lomaria spicant, subvariety *multifidum;* Ath. Filix fœmina, subvar. *multifidum*. There can but one form of this occur, and we can, hence, easily distinguish in description what axis of the plant is affected, using X to represent the primary, and Z the secondary, &c., axis; if thought proper, marking the divisions of the rachis as X 1, the division of the stipe as X 2. The same divisions might also be made in the variety; but they are particularly well shown in the subvariety (vide list).

The form Z is most striking in compound fronds; but even in simple fronds something, to say the least, strongly analogous is to be found, at all events, in the variety in a form of Phyl. scolopendrium, called endivifolium by its discoverer, Mr. Young; and also, though in a less degree, in the form named undulatum or crispum, which is said to be merely a degenerated form of *ramosum*. (*Vide* second part.) In Mr. Young's plant, we find the veins prolonged and thickened, and almost converted into branches, rendering the fern multifid along its edges. The same form is also seen in a more exaggerated state in another form, also forwarded me by G. B. Wollaston, Esq. (thanks to whose kindness I am enabled to illustrate this subject so well by specimens); he calls it *Digitatum*. In it we find regular midribs proceeding from the main midrib, and giving the frond a regular branched pinnatifid appearance, yet manifestly but a modification of the ramose type. Indeed, for any one wishing to study these two forms there can be no better species than Scolopendrium.

The subvariety *multifidum* is, as might be expected, found in many foreign genera and species. I show specimens of Mohria thuri fraga, and an exotic Asplenium and Polypodium, thus affected. The system pursued in naming these forms has been, when practicable, adopting the name given to the forms when first described, choosing the most typical. These were, in the two classes, considered Phyll. Scol. *ramosum*, and *multifidum*. For the first it has been suggested to use cristatum. This, though a most expressive and applicable name, was considered inadmissible, as being borne by a species; if Newman's name of Lophodium callipteris is generally adopted for the species under consideration, this form should be called *cristatum*.

I lay before you a list of the species in which these two forms occur, with their synonymes, as far as I have been able to trace them, so that you can judge of the

* Newman figures a frond of Woodsia ilvensis, which appears to be *multifidum*.—Brit. Ferns, p. 137. Second edition.

extent of them for yourselves; many other species, doubtless, will be found to partake of these characters when the subject is more attended to. I also show you specimens of many of them, mostly gathered by myself, and hope, at a future meeting, to state a few more facts connected with the subject, and to bring before you other classes which are as well defined as this.

LIST OF SPECIES OF BRITISH FERNS.

Variety Ramosum (Cristatum); and Subvariety Multifidum.

[Explanation of Marks—Species in brackets, not recorded as Irish, thus [(Woodsia)]. Marked thus, (?) I am in doubt concerning. X 1 shows rachis divided; X 2, stipe, do. do.; Z, pinnæ, or pinnules.]

Adiantum Capillus Veneris (Linnæus).
X 2, cultivated plant from Ireland; G. B. Wollaston, Esq.

Eupteris aquilina (Newm.); subvar. multifidum (Mei); Phyt., 1853, p. 1,036; X 1 and 2, scarce; Z, rare (a diminutive specimen from top of Three-rock Mountain, County Dublin; has rachis divided to within half an inch of ground). Not very uncommon about Ballinteer, in this county.
England: G. B. Wollaston, Esq., Epping Forest (Kin).

Lomaria spicant (Desv.); subvar. multifidum (Mei); Phyt., 1853, pp. 892 and 1,036. X 1 and 2, rather rare; Z, rare. Clare and Dublin; very fine at foot of Great Sugarloaf, County Wicklow; generally grows in moist situations. Kerry: W. Andrews, Esq.
England. Figured Deakin, Fl. Br., p. 52. Very fine specimens of Z forwarded me by G. B. Wollaston, Esq., as bifidum. Jersey, M. Piquet. Phyt., 1853, p. 1,135.
Var. *Ramosum* (Mei);* Phyt., 1853, pp. 892 and 1,036; proc. Dublin Nat. Hist. Soc., 1853. Lough Breagh, County Wicklow.

Notolepeum Ceterach (Newm.); subvar. multifidum; Phyt., 1853, p. 1,036. X 2, rare. Specimen, from Lucan, co. Dublin, given me by W. H. Luscombe, Esq.
England: G. B. Wollaston, Esq.

Phyllitis Scolopendrium (Newm.); subvar. multifidum (Ray). X 1, very common; X 2, rare; Z, rare. The commonest of the group in Ireland (Mack. Flor. Hib., 343); very fine near Chapelizod, County Dublin.
England, common—vide Newman's British Ferns, &c. Synonyms. Lobatum; ramosum. Jersey, M. Piquet, ut antea.
Var. *Ramosum* (Mei); England (Newm. Br. Ferns, 289, &c.). I am not aware of the extreme form having been found in Ireland. Undulatum, by some called crispum, has; fine specimens of it from Colin Glen, Belfast, were shown to me by A. Crawford, Esq., and form Birenniforme (W.) given me by W. H. Luscombe, Esq., from Dublin.
Syn. Ramosum (Moore, 179); multifidum (ib.); crispum, No. 176; dædalea (Koch); Crista Galli (Wol.); Digitatum† (Wol.); Undulatum? Endivifolium Young (vide remarks), furcatum (Wol), Birenniforme (Wol).

Amesium Ruta muraria (Newm.); subvar. multifidum (Mei); Phyt. ut antea. X 2, very rare. Dublin and Louth. A specimen also given me by W. H. Luscombe, Esq.
England: G. B. Wollaston, Esq.
Var. *Ramosum* (Mei) (?); England. Forwarded me by their discoverer, G. B. Wollaston, Esq., by whom they were named cristatum.‡

Asplenium viride (Lightf.); subvar. multifidum (Mei). X 2, rare.
England: G. B. Wollaston, Esq.
Syn. ramosum (Linn.) (?).

* Barren fronds, multifidly dichotomous; segments of apex confluent at their edges, and curled; veins terminating in apices in lash of branches. Fertile fronds, hermaphrodite, branched; their apices similar to barren fronds, 1854.

† *Crista galli* (Wol.), apex of frond entire, curled on itself, and resembling a cockscomb, *Digitatum* (Wol.); secondary midribs arising from main midrib; divisions multifidly crisped and continous with main portions. *Birenniforme* (Wol.), apex of frond kidney-shaped; midrib running along inner edge of segments.

‡ *Cristatum* (Wol), primary divisions of frond, split and curled at their apices.

Aspm. Trichomanes (Linn.); subvar. multifidum (Mei). Phyt. ut supr. Local; scarce. Very fine and abundant at Quin Abbey, County Clare, in 1852; many plants nearly uniform, but not permanent.

England (Moore Brit. Ferns, 164): G. B. Wollaston, Esq.

Syn. monstrosum (collectors).

Var. *Ramosum* (Mei).

England: discovered by G. B. Wollaston, Esq.

Simply multifidly crisped at apex.

Syn. cristatum (Wol.).

Aspm. marinum (Linn.); subvar. multifidum (Mei). Phyt. ut supr. X 1 and 2, rare; Z, very rare. Ardmore, County Waterford. A curious little specimen from Dunlicky, County Clare, has the pinnæ biserrate, and the stipe cleft.

England: G. B. Wollaston, Esq., forwarded me as ramosum.

Aspm. Adiantum nigrum (Linn.); subvar. multifidum (Mei), ut antea. X 1 and 2, not uncommon; Wicklow, Waterford; sometimes nearly uniform.

England: G. B. Wollaston, Esq.

[Aspm. Lanceolatum] (Huds); subvar. multifidum (Mei). Phyt., 1853. M. Piquet.

Var. *Ramosum* (Mei)? Described to me as occurring with the stipes uniformly bifid; never seen, therefore, inserted in doubt.

[Aspm. fontanum (Br.)]; subvar. multifidum (Mei). Phyt. ut supra. Common in cultivated plants. X 1 and 2.

Phyt., M. Piquet. Channel Islands.

Athyrium molle (Roth); subvar. multifidum (Mei). Phyt. ut sup. X 2. Clare.

Ath. incisum (Newm.); subvar. multifidum (Mei) ut supra. X 2 and Z, scarce. Clare, Wicklow.

England: G. B. Wollaston, Esq.; as multifidum, and also in combination with subvar. truncatum as ramosum.

Var. Ramosum (Mei)—vide remarks. Three forms; A rachis branched; pinnules decurrent; apices of segments curled. Fruitful. Query, Ath. molle, var. *ramosum*.

Ireland—Antrim, Mr. A. Smith. Scotland—Hill of Oran, Sir W. C. Trevellyan. Syn. crispum, Moore Br. Ferns. Smithii of gardens.*

B. rachis, split into numerous linear segments; pinnæ contracted, apices similar to apex of frond, pinnæ decurrent, apices tasselled. Fruitful. Joyce Country, Mr. R. Gunning. Query, Ath. convexum, var. *ramosum*. Fig. Newman's Brit. Fern. Syn. Ramosum (Moore's Brit. Ferns, page 141).—Vide note.*

G rachis and pinnæ multifidly crisped at apices; sparingly fruitful. Query, Ath. incisum, var. *Ramosum*. Killarney (Ogilby), Wicklow (Newman), Clare (Mei Phyt., 1853, page 893, very abundantly fruitful), England, Chatsworth (J. Bain). Syn. viviparum (Steele), multifidum (Moore), furcatum (Gardens).

Polystichum angulare (Newm.); subvar. multifidum (Mei). Phyt. ut antea. X 1, rare; X 2, not uncommon in Co. Dublin; Z, very rare; a fine specimen of the three forms, obtained April 2, 1854, in King William's Glen, Co. Louth, had seven out of twelve fronds multifid; one had five branches arranged in a cup-like form on apex of fronds, which was two feet high.

England: G. B. Wollaston, Esq.

Polys. aculeatum (Newm.); subvar. multifidum (Mei). Phyt. ut antea. X 2. Specimen, Gort, Co. Galway.

Polys. Lonchitis (Newm.); subvar. multifidum (Mei)? Miss A. Gissing. Phyt., 1854, p. 81.

Lophodium Fœnesecii (Newm.); subvar. multifidum (Mei). Phyt. ut antea. X 1 and 2, Z, rare. Ardmore, Co. Waterford.

England: G. B. Wollaston, Esq.

Loph. multiflorum (Newm.); subvar. multifidum (Mei); ut ant. X 1, 2, and Z very rare.

Loph. Filix Mas. (Newm.); subvar. multifidum (Mei). Phyt. ut antea. X 1, 2, Z, common. Found also in a form, said to be Erosum of Schkuhr.

England: G. B. Wollaston, Esq.

* Var. Laciniatum in combination with Ramosum.

[Var. *Ramosum* (Mei). England, Cornwall; fruitful. Syn. cristatum (Moore, Br. Ferns, p. 109).

Lophodium fragrans (Newm.); [subvar. multifidum, Wol.]
England: G. B. Wollaston, Esq.

[Loph. spinosa] (Newm.); subvar. multifidum (Wol.).
England: G. B. Wollaston, Esq.

Gymnocarpium Phegopteris (Newm.); subvar. [multifidum (Wol.)]; specimen communicated by G. B. Wollaston, Esq. In combination with subvar. Sinuatum (Mei) q. v.

Cystopteris fragilis (Newm.); var. multifidum (Mei).
England: G. B. Wollaston, Esq.

[Cystopteris Dickieana] (Sims); var. multifidum (Mei).
Cultivated plants, Col. Bot. Gardens.
Cultivated plants, G. B. Wollaston, Esq.

Ctenopteris vulgaris (Newm.); subvar. (multifidum) (Mei); ut antea. X 1 and 2, common; Z, rare. Fig. Newm. Br. Ferns, p. 111. Clare, Wicklow, Dublin; occurs here generally in only one frond of a plant.
England: Newm. Brit. Ferns. G. B. Wollaston, Esq.
Syn. bifidum (Moore); proliferum (ib.); multifidum (col.).

Trichomanes speciosum (Wilden); subvar. multifidum (Mei); ut antea. Z. One frond in cultivated plant.

Hymenophyllum Tunbridgense (Smith); subvar. multifidum (Mei). A fine specimen of X 2, among plants of this fern brought from Killarney, by James Haughton, Esq., jun., 1853.

Hymen. Wilsoni; subvar. multifidum (Mei). X 2; Killarney. G. B. Wollaston, Esq. Dr. H. Allchin. Very fine.

Osmunda Regalis (Linn); subvar. multifidum (Mei). Z, very rare. I have seen but one specimen; on a plant brought from Killarney, by Professor R. W. Smith.

Botrychium Lunaria (Smith); subvar. multifidum (Mei).
Ireland: X 2; Mack. Flor. Hib., 346, and Kilnasantan, 1854.
England: Newm., Br. Ferns. T. Buchanan, Esq. G. B. Wollaston, Esq.
Syn. Ramosum (auct).

Lunaria minor ramosa (Ray).

Ophioglossum vulgatum (Linn); subvar., X 2, multifidum (Mei).
Ireland: Kilnasantan, 1854.
Newm. Brit. Ferns. Deakin's, Flor. Brit., p. 33.
Syn. Ramosum (auct.)

BRITISH SPECIES REPRESENTED IN FOLLOWING:—

	Multifidum.	*Ramosum.*
Adiantum	One species.	Not represented.
Eupteris	One ,,	Not represented.
Lomaria	One ,,	One species.
Notolepeum	One ,,	Not represented.
Phyllitis	One ,,	One species.
Amesium	One ,,	One species.
Asplenium	Six* ,,	Three species; two doubtful.
Athyrium	Two ,,	Three species (?)
Polystichum	Three ,,	Not represented.
Lophodium	Five ,,	One species.
Gymnocarpium	One ,,	Not represented.
Cystopteris	Two ,,	,,
Woodsia?	One ,,	,,
Ctenopteris	One ,,	,,
Hymenophyllum ...	Two ,,	,,
Trichomanes	One ,,	,,
Osmunda	One ,,	,,
Ophioglossum	One ,,	,,
Botrychium	One ,,	,,

Genera unrepresented—Pseudathyrium, Hemestheum, Allosurus, Gymnogramma.

* Including Fontanum as British.

Owing to the lateness of the hour the remaining papers were postponed.
R. P. Maxwell, Esq., Groomsfort, Bangor, was elected a member of the Society.
The meeting then adjourned to the 12th of May.

MAY 12, 1854.

Dr. CROKER, M.R.I.A., in the chair.

The usual introductory business having been disposed of, the following donations were submitted to the Society by the Honorary Secretary, William Andrews, Esq.:—Journals of the Geological Society of Dublin, for 1852, '53, '54, from the Society; Proceedings of the Royal Society, March and April, 1854; Anniversary Addresses to the Entomological Society, London, presented by the President, J. O. Westwood, Esq., F.R.S.; and the Natural History Review, Nos. I. and II., by the Editors.

Mr. R. P. Williams presented to the Museum specimens of game fowl from Ceylon, for the first time exhibited in Ireland. The cock was a bird imported direct; the hen bred from him and a hen, also an imported bird. Mr. Williams begged to call attention to the peculiarity of this breed, which differs in the carriage of the tail, from all the known varieties of domesticated poultry. In the varieties with which we are acquainted the "planes" of the tail are brought together, and carried erect over the back, the "sickle" feathers covering them on each side; while in the Cingalese the tail is carried on a level with the back, as in the wild species, the long feathers of the tail drooping so as to sweep the ground when the bird stands erect, the feathers of which are much narrower and more abundant than those we are accustomed to, and turn outwards at the extremities. The breed is also peculiar from having no wattles, and the throat naked for about one-fourth of its length; the comb is very small, and indented, resembling the Malay. Mr. W. alluded to the many theories as to the varieties derived from domestication of the wild breeds, 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, and to which it bears some resemblance in the points referred to, but particularly in the carriage and formation of the tail. He also presented, beautifully preserved in a case, the skeleton of the long-eared bat—Plecotus auritus.

Mr. R. J. Montgomery presented the nest and eggs of the long-tailed titmouse, Parus caudatus, and the eggs of the little grebe, Podiceps minor; he also presented the nest of the cole-titmouse, Parus ater. This beautifully-formed nest he met with at the foot of a tree; but it was placed so far in from the aperture, that he had to excavate 3½ feet before he reached it. With regard to the nest of the little grebe, he mentioned that, at Beaulieu, in the county of Louth, the bird had been for several years in the habit of breeding under the bank at the edge of the water; but the nest having been frequently destroyed by rats, the bird had formed it at a distance of thirty yards from the bank, attached to the stem of aquatic plants. It had, however, broken adrift, and he found the nest with the eggs floating about the pond.

Dr. Kinahan begged to present a specimen of the common shrew, Sorex rusticus (Jen.), found dead at Donnybrook, county Dublin; at the same time he called the attention of the Society to two bats presented by him—one obtained in the county Clare, in 1852, presented February 10, 1853, and referred, in doubt, to Vespertilio Daubentonii; the other obtained in the county Kildare, in 1853, and presented at the December meeting of the same year as V. Natterери, though, at the same time, pointed out as different in some respects from the description of that bat. He now called the attention of the Society to them for the purpose of correcting an error of nomenclature into which he was led, and which he has been enabled to correct through the kindness of Professor Bell, who carefully examined the specimens, and states that the bat captured in Clare is Ves. mystacinus (Leisl.), a species new to Ireland, and a species the resemblance of which to Dr. Kinahan's specimen he had himself before called attention to. The other bats Professor Bell refers to V. Daubentonii, a species captured some years ago in Londonderry, but no Irish specimens of which were until now extant. Dr. Kinahan had carefully compared,

as far as possible, his specimens with those in the British Museum, and entirely coincided with Professor Bell's judgment, and begged to congratulate the Society on possessing such a fine series of Irish bats—as their collection now included V. Nattereri, V. mystacinus, and V. Daubentonii, of which the two first were as yet unique as Irish.

The thanks of the Society having been given to the several donors, Mr. Andrews read a letter from William Compton Domville, Esq., dated London, expressive of the usefulness that the "Natural History Review" would be to the Society, and that he had placed the proceedings upon the table of the Zoological Society of London.

Mr. Andrews noticed the great interest of the collection in the grounds of Santry House, formed by Mrs. Domville, and which contained many rare birds among the waders and natatores, in the finest condition and plumage. The arrangement extended over a space of five acres. It is hoped that any of the members that have the opportunities of obtaining living specimens would assist Mrs. Domville by adding to her collection.

Dr. Farran then gave his paper on

HELIX PISANA AND ITS LOCALITIES.

He said, I consider a favourable opportunity occurs in presenting a few specimens for the acceptance of the Society, of bringing forward a notice of the beautiful and extremely local shell, Helix pisana, or, as it was formerly designated, "Cingenda." I am particularly anxious that this record should be identified with the proceedings of our Society, and that the vagueness of its recognition as an Irish shell should be reduced to a certainty. I am led to this by having lately read in Mr. Gray's edition of "Turton's Manual of Land and Fresh-water Shells of the British Islands," the following observations relative to Helix pisana:—"It is one of the most beautiful of our snails, and extremely local; it is common in the South of Europe and Northern Africa, but is not found in the northern countries; Wales may be considered its northern limit. According to Montagu, no mean authority, it is one of our most rare species; he only found it in one place—on the land west of Tenby, where it is confined to a small space; and Mr. Rackett has found it at St. Ives, in Cornwall." Mr. Gray concludes by observing, "It has also been said to be found near Dublin." If from fifteen to twenty miles be meant as "near Dublin" I can answer, with perfect safety, that such is the case. In early life I frequently visited the strand of Knockangin, about a mile and a half north of Balbriggan, in pursuit of wild fowl, which were abundant there at certain seasons. On one of these visits, fatigued with watching for the flight of the game, I sat down on the grassy bank bounding the tide; my attention was soon attracted by the appearance of numbers of a beautiful snail. Being an inexperienced conchologist at the time, I thought the best thing to be done was to bring them under the notice of those better acquainted with the subject. Accordingly, filling my pockets with them, I presented them to my lamented friend, the late James Tardy, an enthusiastic naturalist, to whom we are all indebted as giving the first impulse to natural history in Dublin. Mr. Tardy subsequently brought the shell under Doctor Turton's notice, and I had the pleasure, in a short time afterwards, of pointing out the locality to Mr. Tardy. I regret to say, that on visiting Knockangin on Monday, the 3rd of April last, I found that the cuttings of the Drogheda Railroad had completely obliterated the favourite locality of this shell; and where, before this occurred, I could have obtained them in any number, a couple of dozen of rather inferior specimens were my only reward; however, I should say they may be procured "longo intervallo" at Laytown, Bettystown, and up to Drogheda; those places being continuous with Knockangin may be considered as one locality—and, except this, we have no authentic record of any other in Ireland. The late Mr. M'Alla informed me he had seen the shell in Bunowen, one of the extreme points of Connemara, but he did not exhibit a specimen; and my friend, Mr. Andrews, has lately informed me that he has had the shell from Kerry. Reasoning by analogy, both those localities would be very likely to produce it, as they contain many species of plants, molluscas, and shells found on the southern shores of Europe.

Connected with this shell I should allude to a singular fact—the impossibility that exists of preserving the animal when taken from its native soil, at least so far as the experiment has been tried. I collected twenty dozen of the finest and most vigorous specimens for the late Butler Bryan, Esq.; half of those he distributed on his property in the county Meath, and the remainder in the demesne lands of Ferns, county Wexford, the scene of his appaling murder. Mr. Bryan distributed them himself, assimilating the soil as closely as possible to their own, but without success—he wrote me that the experiment was a total failure, but he was determined to give it a more extended trial on a future occasion. I tried the experiment at Feltrim, near Malahide, with the same results, although I succeeded in rearing Helix pomatia, or edible snail, in a degree. I most carefully watched them, but within a month or two they invariably declined and melted away. The last locality I placed them in was Portmarnock, one in every respect similar to their own. Here failure again occurred. Whether they were picked up by the naturalists who frequented this interesting spot, or that the *locale* was unfavourable, I cannot say, but I could not again find them; that they never increased is quite evident. In referring once again to Knockangin, I should observe, that it was on this strand where Scalaria Turtoni was first noticed, and which was named after Doctor Turton, who had done so much to elucidate the science of conchology.

Dr. Kinahan laid before the Society a series of specimens obtained near Baltrae, on the north side of the Boyne, in March last, in company with Mr. Montgomery. On that occasion he traced the shells about a mile north of the Boyne. Dr. Kinahan corroborated Dr. Farran's statement of their extreme local occurrence, the slip on which they were found in many places being only a few hundred yards wide. Some of the finest were obtained on the south side of the Boyne; many of them were pure white, or bearing translucent instead of coloured bands. Dr. Kinahan had at this present time, alive and thriving, specimens taken in Meath, so far back as the latter end of March. The young shells were many of them carinated, and among the specimens were some equalling in size Continental specimens in the British Museum.

Mr. Andrews said that the thanks of the Society were due to Doctor Farran for his notes on this beautiful shell, and for the perfect series he now presented to the Society. Some years since, when making a botanical ramble in the county of Kerry, he (Mr. Andrews) found a number of specimens of Helix Cingenda, firmly attached by a kind of deposit, or incrustation, to the leaves of the yellow water-iris —with these, on the same plant, were found specimens of Succinea putris. The animal of H. pisana is of a pale ash colour, with eyes intensely black; but the shells present such variableness of character—some yellowish and white, altogether wanting the bands—that he communicated with the late eminent zoologist, William Thompson, expressive of the views that ardent zoologists might entertain of forming specific differences, for sometimes the labour was great in separating varieties, or in proving their affinities. Mr. Andrews read Mr. Thompson's reply, dated April, 1845:—"You did well not to trouble yourself about the species of the shells, for it is a most critical study, and I should be most sorry now to spend the time on it that I once did. The species is most interesting, being Helix pisana (H. Cingenda), hitherto known only in one locality."

Doctor Kinahan then gave his paper

ON THE ABNORMAL FORMS OF FERNS (CONCLUDED).

Since I last had the honour of addressing you, I have, through the kindness of its owner, had the opportunity afforded me of examining a most extensive collection both of growing plants and dried specimens in the possession of G. B. Wollaston, Esq.; this has enabled me to add several species and even genera to the two divisions treated of at our last meeting. The genera are Cystopteris and Adiantum, to the subvar. *Multifidum* (including under them three species), to which Hymenophyllum Wilsoni, is also added by him. To the number of species in the variety *Ramosum* (Cristatum), I have not obtained any additions; but in his collection may be found a most perfect series of forms illustrative of this monstrosity,

and well worthy of study, exemplifying in a beautiful manner every gradation of it in almost all the organs of the plant, from the mere simple renate division of the frond, up to the extreme forms of division recorded on the last day. To-night I propose to conclude the subject, by considering the analogies of the remaining abnormal forms of Filices.

Since I first attempted this arrangement, so many additional species of these have been brought forward, that without any difficulty we can accomplish a division only hinted at then—viz., separate them into four classes—*i.e.*, two varieties and two subvarieties, instead of one of each. For these I intend to suggest names other from those used on that occasion, as there were many objections to the names then used. The first, comprised under my old name Cambricum, I mean to call Dissectum, the subvariety I call Sinuatum still, but limit its definition: Dissectum variety; frond generally more developed than normal; edges both primary and secondary, crenately or irregularly lobed and symmetrical; segments rounded at ends; their edges curled, and crisped, and confluent; generally barren; nervures terminating within leafy expansion and distinct throughout their whole course. Examples —As Trichomanes, var. incisum; Cten. vulgare, var. Cambricum (Linn.). (This division includes so much of my variety Cambricum as had the parts of the plant in excess.) Sinuatum, subvar.; frond mostly more luxuriant than normal; segments irregularly lobed and serrated, pointed, and distinct, generally unsymmetrical; outline pointed and distinct; fruitful; nervures terminating within leafy expansion. Examples—As Trichomanes, subvar. Sinuatum (Mei); Cten vulgare, var. Hibernicum or Mackaii (Auct.). These forms are essentially modifications of a secondary axis (generally the veins and venules, which we find multiplied and divided, but not symmetrically as a whole), and consists in the excessive unsymmetrical development of some one or other. It is often difficult to separate this variety from the variety Ramosum (Cristatum), especially in simple fronds; but we have a valuable guide in one character which prevails almost through the entire—the barrenness of the frond—a character so universal in the class, it might almost be adopted as distinctive. In some species this may be explained by the modification the veins undergo; the vein, which should be merely forked and bear the spore case, becoming branched and barren, as is seen in Ctenopteris vulgare. The number of species in which it is found is rather limited, though, doubtless, if investigation be made, others will turn up. The subvariety is fertile, the same modification not taking place in the venation. There is a great latitude of modifications in the forms composed under Sinuatum, from the simple irregularly crenate frond up to divisions as well marked as those with which you are familiar in the Polypodium cambricum of Linnæus. Under this group we find an illustration of a previous observation, that a subvariety and a variety are sometimes found in accidental combination, with this limit, that, as far as I know, the parallel subgroups are never found so. For example, you will find variety Dissectum in combination with subvariety Multifidum, but never Dissectum in combination with Sinuatum, or Ramosum (Cristatum) in combination with Multifidum. How far varieties combine with one another I am not prepared to state.* The next subgroup comprises the latter portion of my old Cambricum, or that in which the parts of the original type are found contracted. For this and its subvariety it is proposed to use the names Laciniatum and Truncatum—both names suggested to me by Mr. Wollaston. They consist essentially in the absence of some organ or part of the plant, and bear the following definition:—Laciniatum, variety; frond less developed than normal, often reduced to a mere midrib; pinnæ and pinnules contracted, often reduced to a mere line, or absent; epidermis, normal or puckered, sinuated and thickened at its margins, often ending in a hem within the edge of the frond; edges of the frond generally waved and cut; nervures generally produced beyond, or else terminating abruptly in the margin of the leafy expansion; outline linear, not curled or crisped; veins often very irregular in

* The varieties are found combined with one another. The following are examples—Vars. Cristatum and Laciniatum, in Ath Filix Fœmina R. Gunning's variety. The same vars. in Phyl. Scolopendrium Guernsey form, but vide list. Subvarieties obey the same law—ex. gr., Lophodium Filix mas. Ramosum (Wol.) is subvar. multifidum combined with subvar. sinuatum, &c.

their distribution, often crossing one another in their course;* generally fruitful. Examples—Pol. Angulare (var. strictum—K.); Phyl. scolopendrium, var. marginatum (Wol.), Truncatum, subvariety—frond contracted; segments either lobed or reduced to a mere midrib; generally symmetrical; the apices of the pinnæ and pinnules often truncated, and then unsymmetrical; nervures as in laciniatum; generally barren. Examples—Am. ruta mura, subvar. truncata (K.). These groups, especially the variety, present a most extraordinary variety of forms, agreeing all in the one character of absence of some normal part of the fern. They appear to be divided into several groups, according to the element affected, but unfortunately we do not always find the same element affected two successive years. The general type of the class is always adhered to, one year the deficiency occurring in one set of elements, and the next, perhaps, in another; however, when the substance of the frond is present, we find it cut and lobed, though sometimes it is entirely wanting. The following, or, in fact, any of the elemental parts of the fern, may be wanting. The green colouring matter, the frond variegated and lobed on the edges, as Ph. Scol., var. subvarigatum (Wol.); Aspl. A.N., var. variegatum (W.). The substance of frond; either in part the frond lobed in various ways; or entirely the pinnæ and pinnules or frond itself reduced to mere lines, as Pol. Ang., var strictum (Kin.). The epidermis deficient in some way, its edges scalloped and tucked, often pitted and thickened; the apices ending in a spur of fibres, as in the forms marginatum, &c., of Phyl. Scol. and Lomaria spicant, var. marginatum (W.). In fact, every conceivable variety of deficiency occurs, and renders the study of numerous examples of this class necessary for the comprehension of the whole. This variety is much less permanent under cultivation than either of the others, but still sufficiently so to be distinguished from the subvariety. Some of its forms are most beautifully symmetrical, in so much that they have been mistaken for species, as the Polystichum, found at Kew, with angularly linear leaflets, which bears the name of Angustatum, and has the habit of producing bulbillæ† in the axils of its leaves; a habit also of a beautiful example of this group exhibited by me before your Society, in 1852, in a plant of Pol. angulare. The Kew plant, or, at least, those plants shown me as such, I believe to belong to Pol. aculeatum, an opinion I know at variance with the generally received one. The preceding remarks, also, in a great measure, apply to the subvariety, in which we find the same irregularities of form—the same occasional symmetrical arrangement of parts—the same tendency to a viviparous reproduction.‡ The subvariety in this group is, however, much seldomer fertile than the variety; it is also very often uniform, but never permanently so. The laciniate subgroup varies more under cultivation than any other, but always keeps sufficiently near to the type to be recognised easily from any other, except the subvariety Truncatum, between which and it some confusion exists at present, principally arising from the groups not having (owing to its ugliness) been as much studied as the Ramose or cristate type, but, doubtless, after a little more examination, it will be found as well defined as that group. I have prepared a list of all the forms that appear to belong the groups mentioned to-night, but can look on them as, to a certain extent, imperfect, as, doubtless, forms belonging to other groups are mixed up with them, owing to a want of specimens and information about the plants. Indeed, I think, the class themselves are, to a certain extent, only provisional, containing within them, probably, the nucleus of other classes. My object has been to collect together all the abnormal forms, and, as far as possible, group them; how far or how naturally this has been done it must remain for others to judge. A few words about a point of nomenclature. When a variety and subvariety are found in conjunction it is proposed to call the form by the name of the variety, merely adding after it, "in combination with subvar., &c.;" when two varieties or subvarieties are conjoined, either to name it after that best marked, or make a similar addition to that above, or to call it after both, as we speak at present of "red and white" roses, &c. To the names used some may, and, doubtless,

* As in Ph. Scolopendrium polyschides (Ray) which possesses a netted venation.

† This habit of producing bulbils is found in two other species of British ferns—viz., Am. Ruta muraria, where the fronds are generally multifid and fruitful, and in Phyl. Scolopendrium (Galway, Dr Allchin), where the fronds are normal and fruitful.

‡ Seen in Polyst. Angulare, vide also Newm. Brit. Ferns., Ed. 3rd., Polystich Ang. varieties.

will, object. If the scientific world in general, or even the majority of them, choose to adopt others, I am content, provided that there be unanimity as to the names chosen, and to the definitions of these names thus chosen. Thus, gentlemen, I have ended the task proposed for myself of collecting and grouping these abnormal forms; how far I have succeeded it is not for me to judge. Doubtless, improvements and alterations can be suggested, but, I doubt, that many of importance, as regards these six groups, will be made. Forms may be removed from groups into which they are, at present, unwillingly placed (as Am. R. M., var. dissectum, which is fruitful, and evidently belongs to some form of Ramosum (Cristatum); the forms, with confused venation, at present included under Laciniatum, which, probably, belong to some form of Ramosum), into others to which they should belong, but, as I stated before, I believe the types will remain intact. On physiology I have scarcely touched, my sole object having been the collecting and grouping of those strange and varied forms whose study is of almost equal importance with that of the limitation and definition of species, since by it I am convinced much light can be thrown on the other. Any further information or explanation concerning this subject I have in my power, I will gladly impart to those desiring it, and thankfully receive additional information, either regarding the forms enumerated, or any others unknown to me at present.

There is another large group of forms on which I have not touched—those to which I gave the name of subforms on a former occasion. These I have not studied sufficiently to say anything either new or practical about. Dr. Kinahan illustrated these remarks by numerous specimens of the forms mentioned, and by plants of the following unrecorded forms:—Phyl. scolopendrium, var. *Laciniatum*, apex of frond normal, basal half of frond contracted and serrated unsymmetrically, fruitful, venation in apical portion of frond confused—neighbourhood of Drogheda, County Louth, March, 1854; Phyl. scolopendrium, var. *Laciniatum* (?), frond irregularly lobed, venation very much confused, barren—Donnybrook, County Dublin, December, 1853; Am. Ruta Muraria, var. *Laciniatum* (?), fronds symmetrical, contracted, fruitful—King William's Glen, County Louth, April, 1854; Am. Ruta Muraria, subvar. *Truncatum*, fronds irregularly contracted, leaflet reduced to a mere midrib—Marlay, County Dublin, 1853.

LIST OF SPECIES OF BRITISH FERNS.

Varieties, Dissectum and Laciniatum; and Subvarieties, Sinuatum and Truncatum.

[Explanation of Marks.—Not recorded as Irish, thus [Woodsia]. "Marginate" the Epidermis on surface of frond raised in a hem and scalloped along edge.]

Eupteris aquilina (Newm.); subvar. sinuatum (Mei). England, Epping Forest (Kin. 1854), in combination with multifidum (Mei).
Var. laciniatum (Mei).
England: G. B. Wollaston, Esq.
Subvar. Truncatum (Mei). England, G. B. Wollaston.
Syn. depauperata* (Wol.), often combined with multifidum.
Lomaria spicant (Des.); var. dissectum (Mei). Barren.
Ireland—Glenmacnass, Co. Wicklow (Phyt. 1853, pp. 892 and 1,037).
England—Ambleside (Francis' Synopsis); Tunbridge Wells, G. B. Wollaston, Esq.
Syn. strictum (Francis) heterophyllum.
Subvar. sinuatum (Mei). Ireland—Clare, Dublin (Phyt. ut supra).
England: G. B. Wollaston, Esq.; often combined with multifidum.
Var. [Laciniatum (Mei)]. England, G. B. Wollaston, Esq.
Syn. lancifolium† (Wol.), marginatum‡ (Wol.).
Subvar. Truncatum (Mei). Ireland—Clare and Dublin.
England: G. B. Wollaston, Esq.

* Depauperata, pinnæ reduced to contracted rounded segments.
† Barren fronds contracted, often lanceolate simply serrate. Fertile fronds, sometimes reduced to linear spike.
‡ Marginatum (Wol.), frond marginate and serrated.

Notolopeum ceterach (Newm.).
Subvar. sinuatum (Mei). Ireland—Galway, Waterford.
England: G. B. Wollaston.
Phyllitis Scolopendrium (Newm.).
Var. dissectum (Mei); Undulatum (?); barren. Ireland—Belfast. A. Crawford, Esq., England.
Subvar. sinuatum* (Mei). Phyt. ut antea. Dublin.
Var. laciniatum (Mei). Ireland—Tinnehinch, County Wicklow (1). Phytol., 1854, 1,087. Nat. Hist. Review, p. 83. Galway (7), Dr. Allchin. Donnybrook, Dublin (9) (Kin.). Louth (10) (Kin.).
England—Somersetshire, Sir W. E. Trevelyan (1). Kent, G. B. Wollaston (1 & 5). Dorsetshire, G. B. Wollaston (8). Yorkshire (ib.) (3), Ray, &c. Guernsey (4), Dr. Allchin.
Synonymes marginatum (1) (Moore 174) [supralineum (2) (ib. 179)] [bimarginatum (3)] [multiforme (4)] [dubium (5)] [mucronatum (6)] [truncatum (7)] [subvariegatum (8)]. Polyschides (Ray)—vide Newm. Brit. Ferns, &c., cornutum (6).†
Subvar. Truncatum (Mei); not uncommon; Dublin.
Amesium Ruta Muraria (Newm.).
Var. dissectum (Wol.); fruitful; possibly belonging to var. ramosum—*vide* remarks antea.
Louth (Kin.).
England: G. B. Wollaston, Esq.
Var. laciniatum (Mei); Ireland—Louth (Kin); described at end of paper.
England (?)—Kent and Surrey; G. B. Wollaston.
Syn. proliferum (Wol.)? Plant proliferous. Vide note, page 152.
Subvar. truncatum (Mei). Marlay, Co. Dublin.
Asplenium adiantum nigrum (Lin.).
Var. Laciniatum (Mei).
England: G. B. Wollaston; variegatum.‡
Subvar. Truncatum (Mei). Louth.
Asplenium Trichomanes (Linn.); var. dissectum (Mei).
England—Yorkshire.
Syn. incisum (Auct.). (Newm. Brit. Ferns; Deakin, Fl. Brit., 74; Moore, 162.)
Subvar. sinuatum (Mei). Clare (Phyt. 1853, p. 1,037).
Asplenium marinum.
Var. dissectum (Mei)? Warrington (Mr. Shaw)—*vide* Francis' Synopsis, page 46.
Subvar. sinuatum (Mei). Ireland—Waterford.
England (Deakin, Fl. Brit., p. 70). Moore, Br. Ferns, 160.
Asplenium lanceolatum (Lin.); var. laciniatum (Mei).
England: G. B. Wollaston, Esq., as strictum.
Athyrium Filix fœmina, var. dissectum (Wol.).
Ireland: communicated by G. B. Wollaston, beautifully cut.
England—Kent, Wollaston ut antea.
Synonymes dissectum (Wol.); prœmorsum§ (Wol.).
Subvar. sinuatum (Mei). Ireland—Clare; rare.
Variety laciniatum‖ (Mei). Ireland—Clare.
England—Tunbridge Wells, Kent; G. B. Wollaston, Esq.

* Margins of fronds split into squared segments.

† (3) Bimarginatum (Wol.), frond marginate on both surfaces; edges irregularly crenato-serrate; Yorkshire. (4) Multiforme (Wol.), frond marginate on both surfaces much serrated; upper surface of frond scaly; apex cristate; Guernsey. (6) Mucronatum, outline of frond, undulated; crenated; the midrib projecting and forming a fibrous hook; Yorkshire. (5) Dubium, frond marginate on upper surface; apex of frond cristate (seedling raised by G. B. Wollaston). (7) Truncatum, (Wol.) apex of frond, reniform and marginate; edges unserrated, ending in fibrous hook; Galway, Dr. Allchin. (8) Subvariegatum, frond variegated; margins crenato-serrate; apex sometimes cristate. 11 as (7) edges serrated. Dr. Allchin. Ireland. (9 & 10) vide end of paper.

‡ Variegatum, frond variegated and irregularly serrate. G. B. Wollaston.

§ Prœmorsum, frond cut unsymmetrically; barren. G. B. Wollaston.

‖ The form found in Mayo, by Mr. R. Gunning (vide first part of list), is probably this form combined with cristatum.

Synonyms Erosum (Wol.), in combination with subvar. multifidum.
Subvar. Truncatum (Mei). Clare.
England: G. B. Wollaston.
Polystichum Angulare (Newm.); var. laciniatum (Mei).
Dublin (Kin.); Phyt., 1852 and 1853, ut antea.; barren. L. Foot, Esq., on authority of Robert Ball, Esq., LL.D.
Syn. viviparum (Mei), strictum (Mei)—*vide* Dub. Nat. Hist. Soc. Proc.
Subvar. Truncatum (Mei). Dublin Mountains (Kin.)
Polystichum aculeatum (Newm.); var. laciniatum (Mei)? Kew and Dorset; G. B. Wollaston—*vide* remarks above.
Subvar. Truncatum (Mei). G. B. Wollaston.
Lophodium Fœnesecii (Newm.); var. laciniatum (Mei).
England: G. B. Wollaston, Esq., as mucronata.*
Subvar. Truncatum (Mei). Ardmore, Waterford.
Lophodium multiflorum (Newm.); subvar. sinuatum (Mei).
Ireland—Clare; Dublin; not uncommon in boggy places.
Var. laciniatum (Mei). Ardmore, Co. Waterford.
(Phyt., 1853, 1,037, as sinuatum).
Subvar. Truncatum (Mei). Ardmore, Waterford; Dublin. (Phyt. ut antea).
Lophodium Filix mas (Newm.); var. dissectum (Mei).
Clare (Phyt. ut supra ut cambricum) (K).
Subvar. sinuatum (Mei). Not uncommon.
Dublin, Waterford, Clare.
England: G. B. Wollaston.
Var laciniatum (Mei)? Ardmore, Dublin.
Subvar. Truncatum (Mei)? Dublin, Clare.
England: G. B. Wollaston.
N.B.—This species requires more study as to its varieties, with regard to L. Borreri.
Lophodium fragrans (Newm.).
Var. laciniatum (Mei)? Yorkshire, G. B. Wollaston, Esq.; in combination with multifidum this may be Subvar. sinuatum.
Gymnocarpium Phægopteris (Newm.); var. laciniatum? (Mei).
England: G. B. Wollaston. Sometimes multifid.
Hemestheum Oreopteris (Newm.); var. laciniatum (Mei).
England: G. B. Wollaston, Esq.
Cystopteris fragilis (Newm.); var. dissectum (Mei).
England? G. B. Wollaston, Esq.
Ctenopteris vulgare (Newm.); var. dissectum (Mei).
Ireland—Wicklow—*vide* Newman's British Ferns, &c. Second and third editions.
England, Wales, near London; G. B. Wollaston.
Syn. cambricum (Linn.). Fig. Newm. Brit. Ferns.
Subvar. sinuatum (Mei).
Ireland—Dargle, Co. Wicklow; Dartry, Co. Dublin. Common and fine in South and West.
England—Tunbridge Wells; Torbay (Miss Griffiths).
Synonymes sinuatum (Francis 22, Moore 44), Serratum (ib.), Hibernicum (ib.), Mackaii (gardens). Dargle Fern of Mackay's Flora Hibernica, first found by Miss Fitton.
[Var. laciniatum (Mei)?] England: G. B. Wollaston; closely resembling Lomaria spicant, var. lancifolium (Wol.); this may be truncatum (Mei).
Osmunda regalis (Lin.).
Var. laciniatum (Mei).†
Guernsey: Dr. H. Allchin.
Subvar. truncatum‡ (Mei). Sneem, Kenmare Bay: Professor R. W. Smith. Two fronds shown me through the kindness of its finder.

* Mucronatum (Wol.) apices of all the pinnæ truncate, midrib projecting in a spike. A most curious looking plant. Kent, G. B. Wollaston, Esq.
† Laciniatum, pinnules pinnate; segments crenate.
‡ Truncatum, pinnules rounded, and, in some cases, stalked. Killarney, Professor R. W. Smith. A most remarkable form.

Botrychium Lunaria (Smith); var. laciniatum (Mei).
Ireland—Kilnasantan, Co. Dublin.
England:
N.B.—I have referred here, in doubt, the incised leaved form of the moonwort.

BRITISH SPECIES REPRESENTED IN FOLLOWING:—

	Dissectum.	*Sinuatum.*	*Laciniatum.*	*Truncatum.*
Eupteris ...	None.	One.	One.	One.
Lomaria ...	One.	One.	One.	One.
Notolepeum ...	None.	One.	None.	None.
Phyllitis ...	One?	One.	One.	One.
Amesium ...	One?	None.	One.	One.
Asplenium ...	Two.	Two.	Two.	One.
Athyrium ...	One?	One?	One?	One?
Polystichum ...	None.	None.	Two.	Two.
Lophodium ...	One.	Two?	Five?	Three?
Hemestheum ...	None.	None.	One.	One.
Gymnocarpium ...	None.	None.	One.	None.
Cystopteris ...	One.	None.	None.	None.
Osmunda ...	None.	None.	One.	One.
Botrychium ...	None.	None.	One?	None.
Ctenopteris ...	One.	One.	One.	None.

UNREPRESENTED:—

Dissectum and Sinuatum.—Adiantum, Eupteris, Polystichum, Hemestheum, Gymnocarpium, Osmunda, Botrychium, Ophioglossum, Trichomanes, Hymenophyllum, Pseudathyrium, Allosurus, Gymnogramma.

Laciniatum and Truncatum.—Adiantum, Cystopteris, Pseudathyrium, Allosurus, Gymnogramma, Ctenopteris, Hymenophyllum, Trichomanes, Ophioglossum.

Mr. Andrews said that the specimens exhibited, and the forms illustrated, by Dr. Kinahan exemplified the numerous varieties of the fronds, and their departures from the original type that occurred even among the Ferns of this country. In England some botanists had so multiplied these subforms that it was difficult to arrange and to reconcile such alterations of species. Dr. Kinahan has proposed a classification for all these forms (among which some are really beautiful); and as he has so industriously shown the multitudinous forms of several of the genera of the Ferns of this country, Mr. Andrews considered an arrangement of the kind desirable, in order to place those departures from the original type into such divisions as their several gradations seemed to authorize. It is shown that, when Ferns exhibit extremes of monstrosity of growth, the venations become changed and confused, the character of the frond greatly altered, and a barren state sometimes consequent, which is seen in one of the forms this night exhibited, the Polypodium cambricum. In some instances the absence of fructification is supplied by bulbillæ, and the development of young plants continued. In others, as in Asplenium or Camptosorus rhizophyllum (walking Fern), a viviparous action of the apex takes root, and produces young plants. In Adiantum capillus veneris, Dr. Ball pointed out a singular vegetating principle, affecting the termination of the pinnules; and in Woodwardia radicans, young plants are produced from the backs of the fronds, and extend their range of growth similar to the Asplenium rhizophyllum. It is characteristic of these forms that most retain those deviations under cultivation. In the phænogamous plants such rules likewise occur, as are instanced in the Saxifrages, that present such variations both in foliage and inflorescence, and which they retain in garden culture. Some that have imperfect fructification, bulbillæ form in the axils of the branches, as in the case of Saxifraga leucanthemifolia, and which led Dr. Robert Brown to name an Artic species Saxifraga foliolosa.

Mr Andrews then exhibited specimens of Elymus Europæus, of Linnæus, Hordeum Sylvaticum, of Hudson, which had been sent to him by Mr. Bain, of the Botanic Gardens, Trinity College. Mr. Bain discovered this grass in the woods at Mount Merrion, the seat of the Right Hon. Sydney Herbert, and he at once detected it as new to the flora of the country. It grew in some abundance, and being of no value as an agricultural grass, it is not likely to have been introduced. It is

pleasing to observe, that among the onerous duties devolving on Mr. Bain in the College Gardens, he has directed his attention to the grasses of the country, so as thoroughly to understand their character and practical value to the agriculturist. Mr. Andrews also brought to notice and exhibited specimens of Trichomanes speciosum, and Ophrys muscifera, which were sent to him by Mr. Thos. Chandlee, of Cork, who promised to be a most assiduous botanist. Mr. Chandlee had already drawn up a flora of the Phænogamous and Cryptogamous plants of Fermoy. Mr. Chandlee observes, that he was in company with Mr. Isaac Carroll, of Cork, when the Trichomanes was discovered in a locality north of the County of Cork. The hill on which it grew is situated on the confines of Cork and Limerick, and is composed of conglomerate. It displays a curious formation, as if the whole hill had been split, and one half sunk considerably below the other. The perpendicular face of the rock thus exposed is much disintegrated, and shows many horizontal fissures, in one of which, on pulling aside a tuft of withered ferns, the Trichomanes was discovered in considerable luxuriance. A remarkable feature was the dryness of the spot. The altitude of the mountain was about 1,000 feet. The Ophrys muscifera (Fly-orchis) was found in a bog between Ballitore and Athy, County Kildare.

Dr. Kinahan exhibited a specimen of Discomyza incurva (the species kindly determined by A. R. Hogan, Esq.). This fly, now first added to the Irish lists, was found by him at Firhouse, County Dublin, in the shell of Helix nemoralis, where the insect had evidently undergone its transformation, as, when found, it was in the act of cutting its way out through the epiphragm. It was captured in the early part of April, 1854.

Mr. Williams then addressed the chairman, and said, with reference to the proceedings of the last meeting, and the discussion which took place relative to the observations made by Mr. Ffennell on the habits of the salmon, he (Mr. Williams) had received two communications from parties who had noticed the report of these proceedings in *Saunders' News-letter*, and which did not agree with the views that Mr. Ffennell had put forward. One was from a gentleman who had devoted much attention to the subject of the fisheries, and who possessed sound practical knowledge and experience of the habits of the salmon, especially with reference to the Bandon river, and that part of Ireland. He would, with the permission of the chairman, read the remarks that had been communicated to him.

The Chairman said he was afraid so much business had been before the meeting that the lateness of the hour would not permit any discussion; but, perhaps, it would be better to record the statement that had been communicated.

Mr. Williams then read the following:—

"I consider Mr. Ffennell is mistaken in his theory, that the male salmon first ascend the rivers on the approach of the spawning time, as, from close observation of the habits of the fish for eight or nine years at least, I am convinced that on the approach of the spawning season both male and female salmon arrive at the pitting ground together, or nearly so. In the 'Bandon' the greater number of the large breeding fish do not make their appearance until the middle or latter end of November; and we never see a spawning-bed on that river much before the 25th of December. I have seen male fish, killed in January and February, in company with pea-fish, and both were full of sea-lice, had not spawned, and had all the appearance of having only just come up from the sea. With respect to another part of Mr. Ffennell's theory, that 'the male salmon, after having their desires accomplished, desert the females on the beds to complete the operation of spawning;' it seems to me that he means the fish actually copulate, and that the male fish impregnates the immense body of ova contained in the female (and reaching in a compact mass from the vent to the gills), in the ordinary way adopted by land animals—viz., by copulation. This I take to be an impossibility; besides, if it was so, why should so much care be taken by artificial breeders of salmon to use the milt of the male fish with which to impregnate the ova of the female, after having pressed it from her? I have, hundreds of times, seen the pea-fish for a considerable time on the pit, upon which she remained quite motionless; at intervals she would rise twelve or sixteen inches from the bottom, throw herself on her side, and 'rig' in a curious way, which I consider to be the means to facilitate the

expulsion of the ova. After being for some time occupied in this way, I have seen the male fish, who all the time closely attended (and seemed intent on driving off the number of trout who were on the watch to snap up the pea), come and take the place of the female, and remain on the pit for five or six minutes, and I have not the slightest doubt but that he, during that time, ejected a portion of his milt on the ova already deposited. As for the males leaving the rivers together, I know they do not, any more than the females; and both drop down the rivers slowly, and at intervals—a flood greatly hurries their journey back to the sea. Mr. Ffennell remarks that the clean fish which occur in the Caragh river and lake, in the month of January, spawned the following November. Now, I would like to know when they spawned, previous to the time of their appearance as clean or spring fish in the month of January? If November was the time, then they had but two months to spawn, go to the sea, and return spring fish. I think it would not be very easy to pass for a clean run fish, one that was full of ova two months before. It would also seem by Mr. Ffennell's theory that the fish which remained all the summer in the lake and river must have been all females; as, according to his idea, the males do not arrive until after the summer had passed, and the spawning time had come. Now, it is notorious that during the summer fish (both peal and salmon), of both sexes, are continually ascending the rivers; and can it be possible that, after the close season commences, all the males turn back and remain in the sea or estuaries until the time for continuing their species arrives? I perfectly agree with Mr. Andrews that fish remaining all the summer in the fresh water are not in a healthy state for spawning; every angler knows that even the spring fish, after being in the river for any length of time, become discoloured; and the longer they remain in the fresh water the more they deteriorate, both in appearance and quality. But as for the male fish leaving the river *en masse*, I do not credit it at all; I know they do not in the Bandon river, as I every year take them quite as late in the spring as the spent pea-fish, both having the appearance resulting from a lengthened stay in the fresh water. Mr. Andrews was quite correct in styling the Bandon a late river, and that fish were in good condition late in the season. It would, I think, vastly contribute to the increase of salmon in that river, if the close season continued for at least fifteen days longer; and, at the same time, I think the open season might, with the greatest safety, be continued until the middle of October. I killed two salmon on the 29th of September last, and I never saw or eat better fish—one was a male and the other a female; the pea in the latter was not larger than snipe shot. I am, therefore, of opinion that it is not fair to close the Bandon and other late rivers, nor open them, at the same time as rivers in which the fish spawn earlier; in fact, the principal spawning time in the Bandon is from the 12th of January to the end of February."

Mr. Andrews said that he was fully prepared to make many comments on the valuable statement that Mr. Williams had just submitted, as well as upon any discussion that might arise; but he agreed with the chairman, that the time of the evening did not admit discussion, notwithstanding the vast importance of the subject. He regretted the absence of Mr. Ffennell, who, he was sure, would clear up any of the points in discussion. Mr. Andrews did not consider that the Society had anything to do with the legal question of the periods of the close or open seasons; it was the natural history and habits of the salmon it had to deal with. Mr. Andrews always placed great importance on the knowledge of practical men; and where science could be combined with such knowledge, there were no difficulties of the subject that could not be unravelled. There was, however, one class Mr. Andrews did not consider useful—non-practical philosophers; their names gave weight to their opinions; but he had seen some writings upon subjects where, through the want of that practical knowledge, scientific errors had been culled and perpetuated, to the injustice of the subject. In early days Mr. Andrews had been much devoted to fly-fishing, and had been well trained on the Slaney, under the guidance of old Foley, of Newtownbarry, who had not his equal as a salmon-fisher; and in our western rivers he had long experience with his companion, James O'Gorman, a first-rate salmon-fisher, and son of the famous O'Gorman, who wrote the "Practice of Angling in Ireland."

The meeting was then adjourned to the month of June.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

MARCH 25, 1854.

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

Dr. Ball read a paper on the Vulturidæ, being the first part of a series illustrative of the collection of birds, now in course of arrangement in the Museum.

Dr. Carte said that he had examined the ligament on the vulture's neck, and that it did not consist of muscular fibre, but of a peculiar non-elastic tissue, as thick as a man's middle finger, running along the back of the neck.

Mr. Hogan exhibited a carinated specimen of Littorina littorea, taken at Kingstown, and Mr. Walpole exhibited some Falmouth specimens. Mr. T. W. Warren exhibited a very fine series from his collection, some of them taken in Ireland. Mr. E. P. Wright brought forward a specimen from the Royal Dublin Society's Museum, which he found when arranging the British mollusca, among some shells collected by the late Mr. M'Calla, in Roundstone Bay. This specimen was beautifully carinated throughout all the whorls, and presented no appearance of accident having caused it. After some interesting conversation as to the reason of carination in shells, Mr. T. W. Warren exhibited a male specimen of the Harrier (Circus cinerarius), lately procured by him in the County of Tyrone, in fine adult plumage, and a specimen of the common Scolopax, which, from the shortness of its beak and general appearance, resembled, at first sight, Bhrems' snipe.

Rev. Joseph Greene exhibited a specimen of Gluphisia crenata. This is only the third instance of the occurrence of this very rare moth, and is, perhaps, the first time it was exhibited at a Natural History Society in Ireland. It was bred from the larva, by Mr. Greene, taken at Halton, Bucks; also a female specimen of Steropus fagi, bred from a larva, taken at the same place.

APRIL 15, 1854.

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

Dr. Ball read a paper on the Falconidæ, being in continuation of his series illustrative of the collection in the Museum.

Mr. Hogan exhibited a small Crustacean, captured by him on the sea-shore at Rhyl, N. Wales, in the act of devouring the weevil, Phytonomus punctatus, which it had seized beneath one of the elytra. The weevil was at the time alive, and floating on the surface of the incoming tide. It would appear that the circumstance is new, as Mr. J. O. Westwood, to whom the case was referred, had not heard of any similar instance.

Dr. Kinahan exhibited a curiously-elongated specimen of Helix ericetorum, from Crumlin; and a series of specimens of this species, from the same place, including the Albino variety, with translucent bands. This variety, Dr. Kinahan remarked, he had met with in Helix hortensis, H. pisana, and H. virgata. He also exhibited a curious series of damaged shells, which had been repaired; and remarked that these shells should be distinguished from those in which the distortions arose from disease of the secreting membrane, of which he also showed specimens.

Rev. R. B. B. Carmichael, F.T.C.D., being duly proposed and seconded, was elected an honorary member.

The meeting then adjourned.

MAY 6, 1854.

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

Dr. Ball read a paper on the Strigidæ, being the third of a series illustrative of the collection in the College Museum.

Mr. Lamprey read a paper, translated from the French of M. E. Claperedè, illustrated by drawings selected from Ehrenberg. Annales des Sciences and others, on alternate reproduction, and on the metamorphoses of the lower animals.

Mr. Hogan then read the following paper, by R. H. Meade, Esq., corresponding member, on the

BEST MEANS OF CAPTURING ARACHNIDA.

As a few hints on the best mode of capturing Araneidea, or spiders, and the chief localities in which they are to be found, may be useful to those naturalists who have not made this department of zoology their study, I will make some short remarks on the plan which I have found most successful in forming a collection of these interesting animals; and shall be much pleased if I can succeed in inducing any Irish entomologist to take up the study of the Arachnida of their native country.

In the first place, what is the best mode of *capturing* spiders? The collector should be furnished with a small bottle, filled with rectified spirits of wine (one holding about an ounce will generally be large enough), to hold the specimens that he may find, which will be speedily killed by immersion in the spirit. Spiders being covered with a much softer integument than most insects, require great care in handling, for slight pressure will often rupture the abdomen, and their legs are very easily detached; therefore, though by practice they may be safely secured, and taken up by the fingers without injury, it is generally better to carry a few small tin boxes, about an inch and a half or two inches deep, by an inch in diameter (if a little oval or flattened in shape they are pleasanter to carry in the pocket), with a loose lid. One of these may be held before or under the spider when it is endeavouring to escape, and, the sides being smooth, it cannot easily escape when taken, and can either be transferred at once to the spirit bottle, which is better for being furnished with rather a wide mouth, or may be shut up, and conveyed home alive for examination in that state. The late Baron Walckenäer recommends the arachnological collector to be provided with a pair of small forceps, for the purpose of capturing spiders when secreted in holes or crevices; but they must be used very carefully, or they will injure the specimens by breaking their limbs. I may here mention that most spiders have the faculty of suddenly throwing off one or two of their legs; and thus, if a specimen is held by the extremities, it will frequently escape, by giving a sudden jerk, detaching some of its limbs, and running away on the remainder.

On arriving at home with his captures, the naturalist had better place his specimens in fresh spirits; for if a number of recent spiders have been enclosed together, in a small bottle, the spirits of wine becomes weakened by mixing with the fluids contained in the bodies of the specimens, and the latter will not keep their form and colour unless removed. It is also better (if there is time) to look them over, and reject those individuals which appear to be immature, which may easily be ascertained by examination of the sexual organs in both sexes. In the males these organs are seated at the extremity of the palpi.

With regard to arachnological localities, it may be stated generally, that most spiders will be found where insects are abundant. Thus, the greatest number of species will be met with in woods, in lanes near woods, and in wild, uncultivated places where wild plants abound. Some frequent dry places, and are seen among stones and rocks; others delight in swampy and wet ground, or even live in the water. Old walls and the corners of old buildings or ruins are also favourite situations.

For the purpose of giving a few directions regarding the best places for which to look for spiders, it will be necessary to subdivide them briefly into different groups, as each group will be found, in some measure, to affect a particular locality. Thus, following Walckenäer's arrangement, the spiders comprised in his divisions, named the "Venantes" and "Vagantes," which wander about, and run after or leap upon their prey, will be found running on the ground, or hiding in holes and fissures. Some of these enclose themselves in silken tubes or cells, which they often place beneath or between loose stones: thus, I find a favourite situation for several species, and, among others, the handsome "Segestria senoculata," to be the loose coping formed by stones vertically arranged on the top of the dry or uncemented walls by which the fields are commonly subdivided in this neighbourhood. The Lycosidæ, which may be considered as the most typical of the hunting

spiders, may be commonly seen in the summer running about among the herbage. Some species, as the "Lycosa campestris," frequenting dry pastures and heaths; others, as the "Lycosa piratica," being semi-aquatic, and living in marshes and swamps, where they may be found running among the stems and roots of aquatic plants, and even on the surface of the water. The Lycosæ may also often be found secreted beneath stones. The jumping species, the most common of which is the pretty little "Salticus scenicus," are mostly seen, when the sun is shining brightly, running on the surface of walls or the trunks of trees.

None of the spiders comprised in the foregoing groups form webs for the purpose of capturing their prey; but in the "Errantes" and "Sedentes," the insects upon which they feed are entrapped in webs spun for the purpose, and the sight of these webs will often serve to direct the collector to the hiding places of the spiders. Many of the sedentary species (which are so called from this habit), particularly the "Epëiræ" and "Linyphiæ," spin large webs between the branches of trees and plants, and lie in wait in the middle or at the side of them. The "Errantes," on the contrary, prowl about in the neighbourhood of their webs, and often secrete themselves in fissures of walls, between leaves folded together, or beneath pieces of loose bark, keeping up a communication with their webs by means of long threads.

I will now briefly enumerate or recapitulate the principal places in which the arachnologist should search for his prey. *Firstly*, beneath stones which have remained for some time on the ground without being disturbed, but, at the same time, have not become deeply imbedded. Many spiders may be found in these situations at all seasons, but they should be particularly examined in the spring, as many of the web-making species—as Epëiræ, Linyphiæ, Theridionidæ, &c.—may at that season be found secreted there. *Secondly*, many spiders may be seen running among the roots of grass and underwood, and many of the small sedentary species, particularly minute Linyphiæ, make their webs in this situation across little inequalities in the ground, and beneath the surface of the leaves of herbaceous plants, particularly of ferns. *Thirdly*, examine any leaves of trees or bushes which are curled up, for the edges are often fastened together by spiders, and the animal will be found secreted within. *Fourthly*, look out for the webs which you may easily see spun in the angles of walls, between pieces of rock, and, especially at the latter end of the summer and in the autumn, in trees and hedges; in many cases you may see the architect sitting in his toil, or, if not, hidden somewhere near.

Lastly, I may mention a locality in which it is said that rare spiders may occasionally be found—I allude to the nests of some of the species of sand-wasps, which insects partially kill, and then store up a stock of spiders for the food of their young in the larva state.

Mr. Hogan exhibited the following rare Lepidoptera—viz., Notodonta cucullina, bred from a larva taken on the maple, near Halton, Buckinghamshire, and an Irish specimen of Rhodaria Hibernicalis, from the collection of the Rev. J. Greene; of Microlepidoptera, Coleophora discordella, Tortrix teterana, Iarea lineolea, Depressaria assimilella, Röslerstammia granitella, Argyrolepia Badiana, Cochylis Francillaria, from Mr. Shield's collection; and from his own collection the following:—Xylina petrificata, Anisopteryx æscularia, Anticlea derivaria, which have not been previously recorded as Irish.

MAY 27, 1854.

R. Ball, Esq., LL.D., President, in the chair.

Dr. Ball exhibited some Ruffs (Machetes pugnax), which he had purchased in Clifton, which showed great variety in their plumage, not one of them (four in number) being alike; and some beautiful Trogons.

Mr. Hogan exhibited specimens of a red Mite (Trombidium), found in great numbers in a gentleman's house, near Stourport, Worcestershire.

Dr. Carte read the following communication on the

BALISTES CAPRISCUS (EUROPEAN FILE-FISH).

"A specimen of this fish—so rare to the British seas, that it is only recorded as having been once captured on the Sussex coast—was taken lately in Galway Bay,

from whence it was forwarded, by the kindness of Professor Melville, to the Museum of the Royal Dublin Society. It belongs to the sixth order of the second subdivision of osseous fishes—namely, the Plectognathi, or fishes with soldered jaws. In structure, this fish is intermediate between the osseous and cartilaginous fishes, the skeleton, approaching the fibrous character of the former, still is slow to ossify, especially the costal arches. The palate-bone is firmly united to the skull, and, consequently, devoid of motion, in this respect differing from the osseous, as also in having the maxillary and intermaxillary bones fused together, so as to form one piece, their union being marked by a mere groove. The gill rays are completely covered by the opercula, which latter form a perpendicular slit of about one inch long. The dental formula is $\frac{4\cdot 4\cdot}{4\cdot 4\cdot}$, the teeth being set in a semi-osseous or muco-cartilaginous nidus, well adapted to the habits of the creature, as feeding for the most part on the polypi of coral reefs, the teeth are formed for browzing, and, in all probability, grow much after the manner of rodents—that is, from behind forwards.

"This specimen, indeed I may say the entire genus, though provided with pelvic bones, still are destitute of ventral fins. It is true they are furnished with a few short spines, in or about the situation of the pelvis, which may be considered as the rudiments of these organs.

"As this fish lives upon food not requiring great complexity for its digestion, we accordingly find that its internal organization is not elaborate. The stomach is capacious, but the intestinal canal, though of considerable size, is destitute of cœca. It is provided with a swim-bladder, to enable it to remain near the surface of the water whilst engaged in seeking its food among the coral reefs, where it loves to dwell. It possesses two sets of scales, those near the head tubercular or warty—hence, scleroderme; secondly, those on the centre of the body, like the scales of the osseous fishes, but that in these fishes they do not overlap as in the latter.

"It is named "File-fish," in consequence of the first dorsal spine being covered, on its anterior edge, with rough granular projections; and the term "Balistes" has reference to another peculiarity in the structure of that spine and the one immediately adjoining, which peculiarity Salviani was the first to discover—viz., that the bones, or rays, of the first dorsal fin are so contrived as to act in concert, with considerable force, in suddenly elevating the fin at the pleasure of the animal; though the foremost, or largest, be pressed ever so hard, it will not stir; but, if the last, or least, ray of all be pressed but very slightly, the other two immediately fall down with it, as a cross-bow is let off by pulling down the trigger. For this reason the fish is called, at Rome, '*pesce balestra.*'

"For the followlng measurements he was indebted to his friend, Mr. E. P. Wright:—Length of specimen, from snout to extreme end of caudal fin, sixteen inches; depth seven one-fourth inches, being something less that one-half the length; the first spine of the dorsal was unfortunately broken on its capture. The head declines gradually from the first dorsal fin, with slight depression over the eyes; width of mouth, from centre of jaws, six-eighths of an inch; number of teeth, sixteen, four on each side of both jaws, bent inwards; eye small; orbit six-eighths of an inch in diameter; from eye to eye, across forehead, one five-eighth inches; nostrils, situated close to the eye, between it and the upper jaw, consist of two small perforations. The fin ray formula is as follows:—

1st, D 3; 2nd, D 28; P 14; A 26; C 14.

"All the rays are slightly free at apex. There is a space of nearly one inch between end of anal and beginning of caudal ray; the longest ray of the latter is four inches, and the shortest two. The first ray of the dorsal fin is in a vertical line over the branchial orifice; the second dorsal and anal both begin in a vertical line. A rough skin, covered with scales, takes the place of the ventral ray. These measurements accord pretty nearly to those given by Yarrell, with the exception of the pectoral fin, which in his ray formula has fifteen rays; but both his figure and the coloured engraving in the Naturalists' Library (plate 21, vol. ii., of the British Fishes, by Dr. Hamilton), represent the caudal fin as wedge shaped; whereas in this specimen, as will be seen from the above measurements, it forms the arc of a large circle. Its colour is brownish gray."

Dr. Carte also exhibited a beautifully preserved specimen of the Globe Fish (Tetraodon lineatus), which belonged to the same family, and, along with some serpents and other things, was forwarded from Alexandria, through Mr. Wright, by the Rev. Dr. Philip, one of the corresponding members of this Association.

Dr. Ball said that a mutilated specimen of File-fish exists in the University collection; as it was found in a case with some rare specimens, known to have been obtained in Wexford, towards the close of the last century, it probably was also obtained there.

After some conversation, in which Lord Talbot de Malahide, Mr. Waller, Mr. Eyton, Drs. Ball and Allman took a part, Mr. Hogan read the following paper, by R. H. S. Smith, Esq., corresponding member:—

LIST OF LAND AND FRESH-WATER MOLLUSCA FROM THE NEIGHBOURHOOD OF SEVENOAKS, KENT.

The district to which the following list refers, is about twenty-four miles south-east of London, in the neighbourhood of Sevenoaks, Kent. Geologically, it lies in part on the southern aspect of the lower chalk formation, where the latter unites with the weald clay, and thus exhibits some variety of soil, including chalk, chalk-marl, green sand, ironstone, plastic, and other clay; but the dry nature of most of the localities in the immediate neighbourhood is unfavourable to many of our mollusca, and but few species are present in any considerable number.

The small river Darent runs at a distance of about two miles, and some ditches near it have afforded me several kinds; a few others have been obtained from a wider range. The nomenclature is that of Gray's Turton.

Bithinia tentaculata. In the Darent and ditches near it; frequent.
,, ventricosa. In the Medway, near Maidstone.
Valvata piscinalis. The Darent; not abundant.
,, cristata. Do.; rare.
Arion ater. Common.
,, hortensis. Not so frequent.
Limax maximus. Common.
,, agrestis. Do.
Vitrina pellucida. Frequent. I have found one specimen considerably larger than ordinary, not transparent, and exhibiting a pearly lustre inside. The animal has the power of producing a fine thread, by which it can suspend itself.
Helix aspersa. Common.
,, hortensis. Abundant; varying much in colour and markings; but no specimens have been obtained by me that seem to ally it to nemoralis, though Forbes and Hanley have united the two. The white peristome, more glossy surface, and less solid character of the shell, as well as its smaller size, mark it, in this neighbourhood, very distinctly. H. hybrida, which is assumed to be the connecting link between the two, has not yet rewarded my search here.
,, nemoralis. Frequent, especially near the chalk; varying as usual in tint and bands, but the dark lip well marked, its colour continued across, and for some distance within the mouth, upon the pillar.
,, Pomatia. On the chalk; frequent.
,, arbustorum. Local, and not common.
,, lapicida. Rather frequent, especially on the chalk.
,, pulchella. Well diffused, and plentiful in some localities. The var. costata is also found.
,, Cantiana. Very common.
,, fulva. Not uncommon, though rather local.
,, aculeata. Ditto, do.
,, sericea. Scarce.
,, hispida. Abundant; varying in colour and the elevation of the spire, but well distinguished by its thick, yellowish-white foot.
,, concinna. Although regarded by good authorities as a variety of hispida, yet, after examining many specimens which I have collected in various

localities near London, also in Kent, Sussex, and in Ireland, the distinction seems to me sufficiently marked; the animal is dark, and the foot less fleshy than the last; the shell is also dark, and when containing the animal alive, sometimes appears almost black.

Helix depilata. Rare and local. My few specimens answer to the description in Gray, but Forbes and Hanley regard it as a var. of the last.

,, rufescens. Common; the white var. is not unfrequent.

,, virgata. Very numerous in some localities, especially on the chalk.

,, caperata. Locally abundant.

,, ericetorum. Very abundant on the chalk.

Zonites rotundatus. Very common, as elsewhere. I have found the somewhat rare transparent and colourless variety.

,, pygmæus. Rare.

,, alliarius. Very frequent; occasionally colourless, or of a transparent greenish hue.

,, cellarius. Frequent, but not large. Sometimes colourless.

,, nitidulus. Abundant.

,, var. Helmidii. Rare.

,, lucidus. One locality; the banks of a slow stream.

,, crystallinus. Rather common.

,, purus. Less frequent.

Succinea putris. Well distributed, but usually of small size.

Bulimus obscurus. Generally diffused, but not abundant. I have found a few beautiful specimens of the transparent, almost colourless variety.

Zua lubrica. Common. Albino var.; rare.

Azeca tridens. One locality rather beyond my usual range, in moss, upon a chalky soil. One specimen of the albino variety.

Achatina acicula. Rare.

Pupa umbilicata. This usually common little shell is scarce here; at St. Leonard's and Hastings I have found it in abundance; and the specimens there and elsewhere differed slightly from those few obtained in this district. Here the peristome is not so white, nor the tooth so distinct, as is usual among the full-grown shells. The very young bear no inconsiderable resemblance to Zonites pygmæus, but, of course, the latter wants the ridge or plait within the mouth, along the column.

,, marginata. One specimen found by Lady Augusta Pratt.

Vertigo edentula. Local, and not abundant.

,, pygmæa. In several localities; but rare. At Hastings it is not unfrequent, and there I have taken the var. alpestris.

,, palustris. Rare; one locality. The first specimens I obtained were from the cases of caddis-worms.

Balea perversa. Rather numerous in one wood; hitherto I have only found it on the beech.

Clausilia bidens. Well diffused, but not very abundant. Most frequent at the roots of hedges, on the chalk. I have taken a few fine examples of the greenish white variety.

,, Rolphii. This very local and, perhaps, rare shell, is found here, but it is not common. I have obtained it near Hastings, one of the localities indicated by Gray, and I possess several specimens from Ashhurst-park, near Tunbridge Wells, collected by H. Field, jun., Esq.

,, nigricans. Common. One curious reversed specimen has been found here.

Carychium minimum. Common.

Acme fusca. Very rare.

Lymnæus peregrer. Frequent; varying much in form. I have one specimen produced to the shape of a succinea, but with the lip spreading over a profound umbilicus.

,, Var. acutus. Occasional.

,, Var. lacustris. Near the Darent. Also in one locality near St. Leonard's.

Between L. pereger and auricularius I have, from various localities, a series that seem to connect the two. In Holland, where I have obtained remarkably large and developed specimens of auricularius, some with the lip doubled inwards in a very peculiar manner, the same ponds produced regular gradations of form down to the ordinary type of pereger.

Lymnæus stagnalis. In the Darent, and ditches near it. I have observed this shell, in North Holland and near the Maes, grow to a size quite unknown to British specimens.

,, palustris. Frequent. Also the var. with a violet-brown tinge in the throat.

,, truncatulus. One locality; rare.

,, glaber. Medway, near Maidstone.

Ancylus fluviatilis. Abundant in one stream.

Velletia lacustris. One locality, a pond in Knole Park; abundant there.

Aplexus hypnorum. Scarce.

Physa fontinalis. Ditches near the Darent. One specimen resembles the figure in Turton intended to represent P. rivalis, being much large than ordinary.

Planorbis albus. Rare.

,, imbricatus. Very abundant in one small pond; scarce elsewhere.

,, marginatus. Common.

,, vortex. Local.

,, spirorbis. Common.

,, contortus. Not uncommon.

,, nitidus. Local; ponds in Knole Park.

Cyclostoma elegans. Found on the chalk in extraordinary numbers; more frequently without the dark markings.

Cyclas cornea. Very common.

,, rivicola. The Medway, near Maidstone; obtained by H. Field, jun., Esq.

Pisidium nitidum. Not uncommon, in one small pond.

,, pusillum. Locally abundant.

,, pulchellum. Local.

,, amnicum. In the Darent.

Anodon cygneus. Abundant in one large pond, and also found in the Darent.

Unio tumidus. Large ponds near Bayham Abbey, Tunbridge Wells. It is also common in the Thames.

Mr. Hogan also read the first part of a catalogue, by the Rev. J. Greene, corresponding member:—

A LIST OF LEPIDOPTERA HITHERTO TAKEN IN IRELAND, AS FAR AS THE END OF THE GEOMETRÆ.

Irish Entomologists (meaning by that term, those who have devoted their attention more particularly to Lepidoptera) have been often reproached for the apathy and indifference manifested by them in their pursuit; and the country itself frequently described as singularly barren and unproductive in this particular order of insects. There is, doubtless, *some* truth in each of these statements; Irish collectors certainly have not manifested the same untiring assiduity as their English "brethren of the net;" nor does Ireland appear to possess nearly so many indigenous species as England. We may hope, however, that the establishment of the Dublin University Zoological Association will be the means, not only of enlarging the *number* of Entomologists, but of increasing their zeal and activity, and, consequently, of lessening the, at present, large number of Irish "Desiderata." In the anxious hope of furthering these desirable objects, I have drawn up the present list, which, incomplete as it is, will yet evidence, that Ireland possesses many rare indigenous species, and would, at the same time, lead us to hope, that many others yet remain, to be discovered by active and persevering collectors.

As I myself have had but little opportunity of collecting in Ireland, I am little more than a compiler of the present list, and have to return my best thanks to those gentlemen, whose names are mentioned in it, for the kind and prompt manner

with which they supplied me with all the information in their power; and my especial thanks are due to Mr. Haliday (an Entomologist, of whom Ireland is justly proud), for his copious and carefully drawn up list, and to Dr. Ball, for his kindness in affording me many opportunities of consulting his own and Mr. Tardy's collections in the University Museum. In conclusion, I need scarcely add, that the nomenclature adopted, is that of Mr. H. Doubleday, in his elaborate "Synonymic List of British Lepidoptera."

RHOPALOCERA.

Those marked thus * from Mr. Haliday's list.

*Papilio machaon. Seen on the wing (Mr. Tardy). Larva found at the Botanical Gardens, Ball's Bridge (Mr. Coulter).
*Pieris cratægi. Mr. Hely.
,, brassicæ. Generally distributed.
,, rapæ. Do.
,, napi. Do.
Anthocaris cardamines. Do.
*Leucophasia sinapis? Mr. Hely.
Goniapteryx rhamni. Apparently scarce.
Colias edusa. Mr. Tardy's collection.
,, hyale. Do.
*Thecla betulæ?
* ,, quercus. Mr. Egan (neighbourhood of Dublin).
* ,, rubi. Mr. Clear.
Chrysophanus phlæas. Common, but local.
Polyommatus argiolus. Mr. Bristow (Belfast.)
,, alsus. Mr. Tardy's collection.
,, alexis. Common.
* ,, corydon. Mr. Hely.
,, agestis. Mr. Tardy's collection.
Nemeobius lucina. Do.
Argymnis aglaia. Generally distributed.
,, paphia. Do.
*Melitæa athalia. Mr. Tardy's collection.
* ,, artemis. Do. Mr. Clear.
Vanessa cardui. Common.
,, atalanta. Do.
,, io. Do.
,, urticæ. Do.
Satyrus semele. Generally distributed.
,, janira. Do. do.
,, tithonus. Do. do.
,, megæra. Do. do.
,, ægeria. Do. do.
,, hyperanthus. Do. do.
,, pamphilus. Do. do.
* ,, davus. Cork and Kerry.
Pamphila linea. Mr. Tardy's collection.
,, sylvanus. Do.

SPHINGES.

*Trochilium myopæformis.
* ,, formicæformis.
* ,, culiciformis.
*Ægeria bembiciformis. Mr. Clear. (Dublin and Cork.)
*Sesia bombyliformis. Neighbourhood of Dublin.
Macroglossa stellatarum. Mr. Tardy's collection; and Mr. Hogan has had the larva.
Chærocampa porcellus. Mr. Tardy.
,, elpenor. Generally distributed.

Deilephila galii. Two specimens said to have been taken on the coast (Mr. Coulter).

* ,, euphorbiæ. Mr. Hely. From descriptions given me, I have also some reason to believe, that the larva of this rare and beautiful species, has been observed on the sea-coast near Killiney Bay, where spurge grows in some plenty; but I hope to be able to supply more decisive information on the subject, this ensuing autumn.

,, lineata. Four specimens of this very rare insect were taken, some years since, by Dr. Ball, off the coast of Youghal, one of which only is in the collection of the University, the others having been unfortunately destroyed.

*Sphinx convolvuli.

,, ligustri. Larva, by Mr. Haliday.

Acherontia atropos. Generally, but sparingly distributed.

Smerinthus populi. Common.

* ,, ocellatus. This is apparently a rare species in Ireland; and Tiliæ does not appear to have been found at all.

Thanaos tages. Galway. Mr. More.

Anthrocera filipendulæ. Common.

,, minos. This new species, apparently discovered in Ireland, has been taken by Mr. H. Milner, near Galway. *Vide* Proceedings Ent. Soc. Zoologist, 4,272, Vol. xi., 1854.

Centhrocera trifoli. Galway. Mr. More.

Procris statices. Mr. Tardy and Mr. Haughton.

BOMBYCES.

Euchelia jacobeæ. Common.

Lithosia rubricollis. I have found the Pupæ in abundance under moss upon old trees at Rathfarnham Castle. Mr. Hogan has also had the larva.

* ,, complanula.

* ,, helveola.

* ,, aureola.

* ,, mesomella.

*Nudaria mundana.

*Callimorpha dominula.

Euthemonia russula. Mr. Tardy's collection; but no female.

,, plantaginis. Mr. Tardy's collection.

Phragmatobia fuliginosa. Mr. Bristow.

,, lubricepeda. Common.

,, menthrasti. Do.

* ,, mendica.

*Arctia villica.

,, caja. Common.

*Liparis monacha.

* ,, dispar. Dr. Ball.

,, salicis. Dr. Ball.

,, chrysorrhea. Mr. Tardy's collection.

Orgyia pudibunda. One pupa found by myself.

* ,, coryli. Mr. Tardy's collection.

* ,, antiqua. Common.

Clisiocampa neustria. Do.

,, castrensis? Dr. Ball.

Eriogaster lanestris. Mr. Tardy's collection.

Trichiura cratægi. Dr. Ball.

Pœcilocampa populi. Pupa found by myself in some plenty, in the neighbourhood of Dublin.

Lasiocampa quercus. Generally distributed.

,, rubi. Mr. Tardy's collection.

* ,, trifolii? Larva. (Mr. Tardy.)

Odonestis potatoria. Common.

Saturnia carpini. Generally distributed.
Cossus ligniperda. Mr. Tardy's collection.
Hepialus humuli. Common.
,, velleda. Generally distributed.
,, lupulinus. Do.
,, sylvinus. Mr. Bristow.
* ,, hectus. Generally distributed.
Cerura vinula. Common.
,, furcula. These two species appear to be generally distributed, and I have
,, bifida. found the empty cocoons, near Dublin.
Platypteryx lacertula. Dr. Ball.
*Cilix spinula.
*Petasia cassinea. Dr. Ball.
*Ptilodontis palpina.
Notodonta camelina. Not uncommon.
,, dictæa. Mr. Tardy, and Pupa by myself.
,, dictæoides. One Pupa, at Rathfarnham.
,, dromedarius. There are beautiful specimens of this insect in the University Museum.
,, zic zac. Not uncommon.
,, trepida. One empty Pupa, at Powerscourt.
,, chaonia. Mr. Tardy's collection.
,, tritophus. I am informed by Mr. Shield, that he took a larva, last September, at Howth, feeding upon alder, and which, he feels confident, was this species. As I believe, that the insect was first discovered in the neighbourhood of Dublin, it is by no means improbable, that this was the case.
Diloba ceruleocephala. Mr. Tardy's collection.
Pygæra bucephala. Common.
Clostera reclusa. Generally distributed. I am informed by Mr. Shield, that the larvæ are to be taken in the autumn, upon willows, fastening the extremities of the leaves together. If collectors would carefully search these trees, they might possibly find the allied Anachoreta, an insect said to be British, but whose capture has not hitherto been sufficiently well authenticated.

E. A. Brien, Esq., being proposed by Mr. Wright, seconded by Mr. Lamprey, was elected a corresponding member.

The meeting then adjourned to June 17.

KILKENNY LITERARY AND SCIENTIFIC INSTITUTION.

MARCH 31, 1854.

ROBERT CURTIS, Esq., in the chair.

The Rev. James Graves, honorary secretary, announced the receipt of the following donations to the Museum and Library:—

Specimen of spar from Bermuda, fashioned into a model cannon by some of the convicts of that island; presented by T. J. Rawnsley, Esq.

Pamphlets on partnerships and reformatory establishments for juvenile delinquents; presented by the Dublin Statistical Society.

The Journal of the Society of Arts; presented by that Society.

The Natural History Review for January; presented by the Editors.

Mr. Graves observed that one important feature of the last-mentioned publication was its proposal to report the proceedings of meetings—such as those of the Kilkenny Literary and Scientific Institution, giving at length all papers of importance on the subject of Natural History and Geology.

Mr. Molyneux, V.S., then read a paper on the Vinegar Plant.

Mr. J. G. Robertson read the following paper on the

CAVE OF DUNMORE.

Some time ago having submitted for the inspection of our very zealous secretary, the Rev. James Graves, manuscript notes and rough sketches descriptive of the Cave of Dunmore, which had been prepared by the late William Robertson, Esq., architect, Mr. Graves suggested that I might, from these materials, construct a paper interesting to Kilkenny people. I now appear before you with the fruits of my attempt to do so.

Previous to entering upon the description of this remarkable Cave, I will briefly state the circumstances under which such caves are supposed to have been formed, according to the theory of the highest authorities in geology—viz., Buckland and Lyell. They say "that to the solvent power of water, surcharged with carbonic acid, and percolating various winding rents and fissures, we may ascribe those innumerable subterranean cavities and winding passages, which traverse the limestone in our own and many other countries."

Dr. Buckland has also observed, that caves in limestone are usually connected with fissures in the rock in which they exist. The growth of stalactites and stalagmites in caverns and grottos is a familar example of calcareous precipitates.

The Cave of Dunmore, which possesses all these peculiarities in its formation, has been often visited and described by travellers. Amongst the works in which an account of it is given, I may mention an "Anonymous Tour;" "Guthrie's Geography" (Article, Ireland); "Watkinson's Survey;" "Tighe's Survey of the county of Kilkenny;" and that powerful work of fiction, by our own celebrated townsman, Banim, "Crohoore of the Bill-hook." I shall borrow from the above-mentioned writers; but as I think that Mr. Robertson's notes not only embrace all that has been given by these authorities, but treat the subject with greater accuracy as regards details, and, at the same time, in as picturesque a style, I purpose to make the greater use of them.

The word Dunmore is derived from two Irish words, signifying the *Great Fort*, from a rath which is situate in the parish. We learn from the following passage in the "Annals of the Four Masters," that the Cave was known at so early a period as A.D. 928:—"Godfrey, grandson of Imhar, with the foreigners of Ath-cliath, demolished and plundered Dearc-Fearna, where one thousand persons were killed in this year." Dr. O'Donovan, the learned editor, being of opinion that Dearc-Fearna was the ancient name of the Cave of Dunmore. We also find by a note in "Wilde's Beauties of the Boyne," that this remarkable Cave, under the name of Dearc-Fearna is alluded to in an ancient manuscript in the Library of Trinity College, Dublin, called the "Irish Triads," where it is mentioned as one of the darkest caves in Ireland.

The Cave of Dunmore was, perhaps, the most remarkable in Ireland until the discovery, in the year 1833, of the more extensive caves of Mitchelstown; it is still the principal natural curiosity of this county, and is thus described in the journal of Mr. Robertson, who appears to have visited it in the month of August, 1816:—

"The Cave is situated on the property of the Marquis of Ormonde, and is distant about four miles from Kilkenny, on the Castlecomer road, nearly opposite to the beautifully wooded demesne of Jenkinstown, the residence of George Bryan, Esq., upon which you look down from the summit of the hill which contains the Cave, and in which its mouth or entrance is. From the high road you approach the Cave by a narrow and bad bye-road, scarcely passable for a vehicle of any kind except a common car, and you gradually ascend one of those bold levels, which project from the ridge of hills that run towards Castlecomer. Nothing indicates the site of the Cave, until you come suddenly upon it, when an oval opening presents itself about one hundred and thirty-four feet in its longest diameter, by ninety-four feet in its shortest.

"Perpendicularly under you yawns the abyss, into which you must descend to enter the Cave; its lips, or edges, are fringed with green sward and brushwood in a very picturesque manner; but, with the exception of a few thorns, devoid of any trees. The descent into it is by a winding path, which is very precipitous, the fall being about five feet in every eleven. As you descend, the limestone rock, in which

this wondrous work of nature is formed, is visible on every side, and its various faces beautifully broken by pendent plants, sapling ash, thorns, and elder. When you have descended about seventy feet, right in front of your path a grand natural arch presents itself, formed of the rude limestone rock, the arch approaching in form to a quarter circle, about twenty-two feet high, by thirty-seven feet at the base, and the height continues along the inclined plane with some few deviations.

"The appearance which the Cave presents at this point of view (under the arch), is singularly impressive, vast horizontal strata of limestone ledges, in a descending series, seem retreating one behind the other, each supported by that beneath it; lichens, ferns, ivy, and briars hang from the joints, and, in some measure, clothe the perpendicular and otherwise naked surface, and give a picturesque appearance. Having entered the archway, to the left hand is a kind of rude but inclined platform, full of rocks, and expanding into a large and wide chamber; the roof, or ceiling nearly horizontal, and from twelve to fifteen feet above you. The view outward, towards the mouth of the Cave, was from this position singularly beautiful.

"Having advanced far enough into the Cave to prevent its mouth being visible, there was sufficient light to render objects around us perfectly distinct, although immersed in shade, while the figures of those descending the outer (or upper) path, were beautifully illumined by the uninterrupted light falling upon them. In a few minutes our guides produced another very singular effect, quite different, but not less beautiful, by the firing of some straw which they had brought to light our candles with. The chamber of the Cave was filled with smoke that, for a time, obscured every object; but owing to the dampness of the air, the smoke lingered long, and on clearing away left that agreeable kind of haze so peculiar to the evenings of autumn and spring, which added surprisingly to the effect of the objects around us, and increased their effect on the imagination tenfold. Were these guides conversant with their business, how mightily could they increase the effect of this great natural curiosity, upon the minds of all ordinary visitors, by the use of this innocent circumstance.

"From our position, now looking inward, upon our right hand lay the bottom of the Cave, visible at a greath depth; the inclined plane, by which we had originally entered, descending into it with a rapid inclination, and unbroken by any interruption. On our left, and divided from the former by a thick mass or partition of rock, lay another chamber of a very different character. To a few yards beyond us the floor on which we stood continued tolerably even; but, on a sudden, it appeared rugged and dissevered into large masses, separated from each other by deep and wide chasms, through which, following each other down an abrupt and dangerous declivity, we saw the guides precede us, with candles in their hands, the puny light of which showed but very indistinctly, the tremendously rude objects that surrounded us, and made but "darkness visible," adding extreme interest to every new object that presented itself. The descent was troublesome owing to its intricacy, and being very slippery from the water impregnated with stalactic matter, constantly dripping from the roof, and keeping the stones of the floor wet.

"We had descended from twelve to fourteen feet below our former level, and, having advanced a short way, saw before us, by the lights of our guides, who now appeared ascending, another fine natural arch of considerable height, and of the same rude materials as the arch of the mouth, which appeared to lead into another chamber of greater height, but of less dimensions than that from which we had descended. It appeared to be elliptical, its longest diameter standing obliquely to the former chamber. The floor was rough and uneven, but not composed of those rude and dangerous masses through which we had just clambered; the path appeared beaten as if frequented. The roof, or ceiling, here changed its appearance to that of an irregular conical dome of great height at its apex, probably forty feet. Scarcely had we time to bestow any attention upon this wonderfully natural excavation, when our curiosity was attracted as powerfully, by the sound of our guides' voices at an elevation far above us.

"Wonderful as the former scenes appeared to minds so fully occupied as ours were with them, that now before us excited new and strong interest. At the termination of this elliptic chamber, appeared a high and narrow cavity, filled for the most part, by what appeared to us as a rock with a broken surface, almost perpendicular;

inaccessible it must have been, but that nature's cunning hand had formed a stairs of most singular contrivance. The constant dripping of the stalactic matter upon this inclined surface, from fissures in the roof, had gradually formed lumps or nodules upon it, from four to five inches in diameter, thus forming steps or a kind of natural ladder, rather of a dangerous description, the entire surface and its lumps being equally slippery with those we had previously passed over. Up this ascent some of our guides were clambering, whilst one of them, who had gained the summit, stood in the top aperture with a lighted candle in his hand, and contributed to spread the "dim religious light," such as our candles afforded, over the grotesque parts of this singular scene. The chill of the air in the Cave we now found considerably increased, and we had long lost the cheering light of the day, and our candles afforded but a very moderate portion, barely so much as was necessary for our purpose.

"Our labour of ascending now commenced; when lookers on, it appeared difficult, but when the attempt was made we found it to be really so. The heads of the nodules being round, and wet with damp slime, it required some care to preserve our footing and prevent a fall which would have been fatal. After labouring up about thirty feet (?) we reached the summit, where our guide stood, dirty and fatigued, our curiosity on full stretch to see what farther awaited us.

"The entrance to this portion of the Cave (the third chamber) is low and narrow, but, like the others, rude and massive. As all our guides, with the exception of him who stood in this aperture, had passed on, we were left in comparative darkness. Picture to yourself our astonishment on passing this narrow entrance, that seemed to promise but fresh fatigues and labour, to see expanding before us a chamber of great extent, filled with objects that, to us, were both new and extraordinary. The guides who had left us at the stairs, whilst we were ascending, had proceeded to this chamber, and placed themselves with lights at various points, by which the different parts were made at once visible, but indistinctly so. Prepared as our minds were, both by report and the conversation of our guides, for this exhibition, the ideas we had formed of it still left ample room for an increase of pleasure on viewing the reality. From the narrow entrance of about six feet in width, the chamber gradually widened to a considerable breadth [which on measuring, Mr. Robertson found to be seventy-four feet in its widest diameter, and fifty-two feet in the direction of the entrance straightforward, and nearly at right angles to the former].

"As far as we could see, the roof, or ceiling, appeared flat, but the surface of the floor was very unequal, in some parts approaching the roof to within six feet, and at others probably about eighteen feet from it. The constant dripping of calcareous matter from the roof had added considerably to the natural irregularity of the floor, for the calcareous matter had formed large protuberances and stalagmites of singular forms upon its surface, some of these in their appearance approached nearly to works of art [of one of them Mr. Robertson made a sketch]. From the ceiling numerous stalactic pipes descended, constantly lengthening, and from their ends fell drops of calcareous matter, which formed the stalagmites mentioned above; and as they gradually approached each other, in time will be formed, by this simple operation of nature, beautiful pillars supporting the roof, and as durable as the rocks themselves.

"Our guides had now ascended a huge ledge of rock, which nearly terminated, but which still appeared to stretch out to an uncertain distance. Under them was a deep pit nearly filled with irregular masses of rock, and in front rose up, uniting with the roof, a magnificent pillar of a white material resembling marble; it is of great size, and quite insulated. The light of all the candles was thrown by the guides upon this interesting object, and the depth of shade around it gave it full relief. Our guides called this pillar the Market Cross. On closer examination we found it composed of a number of pipes, intermixed with frost-work in a beautiful manner. Its base spread out in a number of wave-like torus mouldings, as if it had originally been of soft material, and that its own weight had produced that pillowy soft appearance. Without any great stretch of the imagination, it may be compared to a fine Gothic pillar, with its base and capital, placed by the hand of art to support this immense ceiling. The pillar appeared to rise from the pit to the

height of about eighteen feet. When whole this concretion had a solid and white appearance, but when broken the fracture had all the look of spar. Adjoining to this was another large concretion of somewhat similar form, which our guides called the organ, from its numerous pipes, or flutings, having some resemblance to that instrument; but the idle curiosity of travellers and visitors has greatly mutilated this fine pillar, and this mutilation still proceeds, yet with this good effect, that it will, in all probability, protect the other, and preserve it from similar mutilation.

"To this point the ceiling of the chamber was flat, or nearly so, but over the pit, at the foot of the great pillar or market cross, it rose to a great height, somewhat in the form of an irregular conical dome. Behind the ledge of rock upon which our guides stood, the cave terminated in that direction in a wedge-like form. Numbers of stalactic pipes descending from the ceiling will, in time, close up this portion of the Cave.

"Returning behind the pillar our guides pointed out to us a fissure, through which the light was observable, it looked down into the external lower portion of the Cave at the entrance [which Mr. Robertson has described as its lowest level—being about one hundred and sixty feet below the upper surface of the hill which covers it]. We looked in vain for those glittering sparry incrustations that formed a roof and walls of pure crystal, nor were skulls and dead men's bones necessary to heighten the effect upon our imagination, these with the roaring river and the well of wonders, all vanished on examination, as suddenly as the gardens of Aladdin under the wand of the sorcerer—to which gardens, our Cave bore, indeed, no resemblance. But without those fictitious accompaniments (falsely calculated to excite an interest, which must terminate in disappointment) it contained within itself abundance of matter to gratify the curious observer, and lover of works of nature, and amply to repay the trouble of examining it; whether we attribute its formation to some convulsion of nature, or to a primitive creation. Here we see a most singular cavity, one hundred and sixty feet below the surface of the earth. There we may also behold one of Nature's great operations—the formation of stone or spar, by the water percolating through the limestone rock, and carrying with it the pure calcareous matter of which the rock is formed, and reforming spar with it. There are to be seen immense beds of limestone, far exceeding in size anything of the kind to be found in this county.

"The obelisks of Egypt were thought worthy of removal to Rome at an immense expense, amongst other reasons being much prized because they were monoliths of sixty or seventy feet in height; but were it possible to bare the beds of these quarries, I am confident that stones of one hundred feet in length could be procured."

You may observe that Mr. Robertson smiled at the idea of "skulls and dead men's bones" being found in the Cave of Dunmore. When Mr. Robertson so wrote, he had in his mind's eye, the following passage in the anonymous tour—"In several places were skulls and dead men's bones, set as it were in the crystalline substance, but no account could be given how they came there; certainly no person would make it a habitation."

It is, however, a fact that human bones have been found in abundance in this cave; Banim, in his description of it, mentions his having picked up several; and, I am informed by his brother and able assistant in his literary works, that in their exploring trips to the Cave, they frequently brought away such remains; but Alderman Banim thinks that they are now but rarely met with. I exhibit two specimens of bones which were found in this Cave, one of them (the property of the Rev. James Graves) has been pronounced to be what is technically called "The Atlas," or upper vertebra of a human body, the other specimen (which belongs to myself) is firmly imbedded in stalactite, and is too imperfect to enable one to say to what animal it had belonged.

The question naturally arises, at what time and under what circumstances were human bones deposited in this Cave? Without being able to fix the exact age of these remains we may fairly assume that they are of high antiquity, judging from the incrustation which frequently envelops them. There are legendary tales still current amongst the natives of the district, which lead us to conclude that they believe that in days of yore, people retreated to this Cave for shelter in time of

civil strife; or they may have availed themselves of such a convenient repository wherein to bury their dead. In support of each of these views, I will quote two or three short passages from the works of Buckland and Lyell:—

"The universal practice of interring the dead, and frequent custom of placing various instruments and utensils in the ground with them, offer a ready explanation of the presence of bones of men in situations accessible for the purposes of burial."

"Frequent discoveries have been made of human bones, and rude works of art, in natural caverns, sometimes enclosed in stalactite."

"Many of these caverns have been *inhabited* by savage tribes, who, for convenience of occupation, have repeatedly disturbed portions of soil in which their predecessors may have been buried."

Dr. Buckland particularly mentions a cave of mountain limestone, at Burringdon, in the Mendip Hills, supposed to have been once used as a place of *sepulture or refuge*, in which human bones have been met with, encrusted with stalactite, one of the skulls being filled with this substance in the interior. We may, therefore, attribute the abundance of human bones in the Cave of Dunmore, to its having been used for a dwelling-place, or for concealment, or sepulture; but, perhaps, we may be nearer the truth, if we look upon them as the remains of the victims of the great slaughter, to which I have already alluded in an extract from the Annals of the Four Masters.

It has been remarked to me by the Rev. James Graves, that no steps have been taken to investigate, whether the bones of any extinct species of animals have been found along with those of man in this Cave; as it is a subject worth examining into, it is to be hoped that some of our medical associates will give the aid of their anatomical skill in settling the question.

To return to legendary lore, we find that it was generally rumoured, that there was a running stream in this Cave; but for such an idea there seems to have been no grounds; but the story of the "well of wonders" may have been founded on the fact, that the Cave contains a small well, in which there may be a spring, or it may act as a reservoir of the water flowing from the higher ground. Mr. John G. A. Prim informs me, that some years ago there was a large quantity of bones in this well.

Having thus endeavoured to give you some idea of the wonders of the greatest natural curiosity in our country, I would strongly recommend all who have not seen it, to visit it, and even to those who may not wish to undertake the labour of exploring its interior, I can hold out the promise of a great treat in viewing the picturesque mouth of the Cave; of my grounds for saying so, you have the means of judging now before you, in the very excellent painting by Henry O'Neill, which has been kindly lent to me by the Rev. James Graves.

I exhibit some very beautiful specimens of stalactites and stalagmites, from the Mitchelstown Caves, you will observe that they are cleaner and brighter looking than the specimens from Dunmore, which I suppose is owing to the water at Mitchelstown flowing through strata less charged with earthy matter.

Some observations were made by the Rev. James Graves and Mr. Prim, who stated that it was evident the late Mr. Robertson had only explored the eastern branch of the Cave, and had not entered or known of the western branch, in which the well and human remains were to be seen.

APRIL 28, 1854.

Dr. JAMES in the chair.

Mr. Graves said he had much pleasure in announcing that the Right Hon. W. F. Tighe had made another most valuable donation to the Museum. In addition to the collection of casts from ancient Greek and Roman coins and medals, presented on a former occasion, that gentleman had sent them the cabinet now before the meeting, containing 188 specimens of minerals, scientifically classified and arranged. Amongst the various ores and minerals which this collection embraced were a fine specimen of Diamond from Brazil, presenting a perfect octaedral

crystal, and the following precious stones:—Hyacinth and Cinnamon stone, from Ceylon; Chrysoberyl and Chrysolite, from Brazil; Garnets, from Bohemia; an Oriental Ruby, from the East Indies; specimens of Topaz, from Brazil, Bohemia, and New Zealand; an Emerald, from South America; a Berryl and Aqua Marina, from Siberia; Tourmaline, from Switzerland; and Amethyst, from Bohemia; Calcedony, from Iceland; a Cornelian, from Persia; Hyalite and Opal, from Germany; Cats-eye, from Ceylon, &c. The collection also included fine specimens of native gold and silver ore, from Transylvania and Norway. Mr. Graves pointed out the great value and interest of this collection, and concluded by moving a special vote of thanks to the right honourable donor.

The motion passed with acclamation.

The Rev. James Mease forwarded, on the part of George Broomfield, Esq., of Maryborough, two specimens of native gold from Australia, embedded in the quartz matrix.

Dr. Cullenan, Freshford, contributed a nodule of clay-slate iron ore from that locality.

Mr. William Little, Dublin (late of William-street, Kilkenny), presented, "as a contribution to the Museum of his native city," a specimen of cloth manufactured by the natives of the Feegean Islands, from the bark of a tree.

The Dublin Statistical Society presented a pamphlet, containing the paper of John E. Cairns, Esq., A.B., "On the best means of raising the Supplies for War Expenditure," read before that society.

Thanks were voted to the various donors.

THE VINEGAR PLANT.

The minutes of the last meeting having been read, Mr. Graves proceeded to read the following communication from Dr. Keating, Callan, on the subject of the Vinegar Plant:—

"I see in the *Moderator* a good article, from Mr. Molyneux, about the Vinegar Plant. I have been much gratified at reading it, and the more so that I have been engaged for several months in making observations on one in my possession. I fully agree with him as to the purity of the vinegar, and am the better judge of the matter from having been for several years in France, where, of course, I used vinegar almost daily. I have even used that produced from the vinegar plant, for pharmaceutical purposes, and found it to answer admirably, and for family use it cannot be equalled, at least in these countries. My experience teaches me it is not so delicate a plant or fungus as is generally supposed. I have given away some, and, in parting the new from the old, have torn the mother plant (this was when I got it newly). Still the old plant did well—nay, more, about a month since, I placed some of the vinegar in a common jar, and, to my great surprise, a day or two ago, having occasion to use it, in decanting the liquid I found a young and healthy plant in it. I do not know how this occurred; but I suppose it must have been a young offshoot which passed into the jar with the vinegar at the time."

Mr. J. G. Robertson then read the following supplementary observations, completing the subject of his former paper on

THE CAVE OF DUNMORE.

At our last general meeting I had the honour of reading rather a long description of the Cave of Dunmore, having derived my information chiefly from the notes of the late William Robertson, Esq. Many of you will recollect that Mr. Robertson expressed his doubts of the existence of either dead men's bones, or of a well and running stream in the Cave; these remarks induced the Rev. James Graves and Mr. John G. A. Prim to state their belief that Mr. Robertson had not visited or, at least, inspected that chamber of the Cave in which human bones and the well are to be found. In consequence of these doubts, and with a desire to illustrate more accurately this wondrous work of nature—the greatest curiosity of our county—Mr. Graves suggested that we should make a close examination of the different chambers, and, if possible, clear up some points connected with its formation which are in general not so well understood.

Accordingly, on Saturday last, we set out for the Cave, on reaching which, we seemed with one consent to stop and gaze with feelings of admiration on the highly picturesque and grand appearance of the mouth, richly clothed as it is at this season in all the varied tints of green, as exhibited in the young foliage of the several species of shrubs with which the edges of the entrance of the Cave are fringed, from the light green of the deciduous thorn and elder to the very sombre tint of the evergreen ivy. Our feelings of admiration were, however, mingled with regret on observing that some thoughtless visitor had injured much of the brushwood at one side of the entrance to the Cave by having set fire to it.

Every well-disposed person should endeavour to prevent wanton injury of this description from being committed on our natural scenery, antiquities, or the modern decorations of places of public resort.

Amongst the plants which grow around the mouth of the Cave are two or three varieties of fern, one of them, the hart's-tongue fern (Phyllitis Scolopendrium) seems to flourish vigorously at a distance of ten or twelve feet within the arch of the Cave. Having advanced a short way into the Cave, and having ascertained the point from which O'Neill made his much-admired painting, we were struck with its correctness. I had also brought a sketch-book with me, which contained an equally faithful, but rough drawing, of the same view, made by the late George Miller.

Having now lighted our candles, we proceeded to explore the chambers, the details of which have been so well described by the late Mr. Robertson, in the notes already read to you, that I shall not further dwell upon them than to say, that we lighted up the "Market Cross," and examined Miller's sketch of it, which, although executed upwards of forty years ago, is still a most faithful likeness, even to the large fracture wantonly made in one of the stalactic flutings of this bold pillar. On arriving at the point from which the fissure disclosing "the light of day" is seen, we came to the conclusion (confirmed with the aid of a compass, brought by Mr. Graves) that we had described a semicircle in our progress through the chambers; and that the water and wet stones which we saw through the fissure, were on the ground near the entrance to the "Fairies' Floor," which is on the right hand as you enter the cave.

We now proceeded to explore the southern chamber, which is of great length, but less broken in the outline of its plan than the other chambers. Having advanced into it, until we were obliged to stoop, we arrived at the well or reservoir of water, which is formed by a hollow in a deposit of sandy mud, the rocky side of the Cave forming one brink of the pool; next to this side the water is deepest. The water is not only very pure, but agreeable to the taste, notwithstanding the large quantity of bones which it contains, proving thereby their great antiquity.

In the immediate vicinity of the well, fragments of bones are also very abundant, embedded in the sandy soil, to which I have alluded, and which appears to be the earthy deposit brought down by the water percolating through the fissures in the ceiling of the Cave. From this sandy deposit, this part of the Cave probably derives its name of the "rabbit burrow."

We collected and carried away a great many fragments of bones, but having submitted them to Dr. Johnson, I find that they are all bones which belonged to different parts of the human frame, embracing portions of the skull, jaw-bone, arms, fingers, and toes. We could observe that visitors have made many excavations in search of bones. One large bone, which is encrusted to the surface of the rocky floor, has been nearly destroyed by attempts to remove it, by striking it with hammers; a light iron wedge would have been more effective.

Having concluded our observations in this chamber, we retraced our steps towards the mouth, and in doing so we set up a few lights, which continued to burn during our retreat.

The effect was very pleasing, as the outline of the ceiling, with the inequalities of the floor, were all clearly defined. We also ascertained in this way that the current of air was *outwards*, as the flame flickered towards the mouth of the Cave, and the smoke made its exit in the same direction. After a careful examination of the several chambers of this remarkable Cave, we have come to the conclusion:— *That human and other bones are confined not only to one chamber, but to a particular part of that chamber—the immediate vicinity of the well.*

The air in all the chambers seemed to be mild and pure, owing, no doubt, to proper ventilation being carried on between the many fissures in the roof and the mouth of the Cave. The stalactites seem to be blackened, not by smoke, but by a *fungus* indigenous to the Cave; and this locality would, probably, repay examination with regard to the class of plants (very little known) which inhabit subterraneous caverns.

In conclusion I beg to express a hope that a desire to elucidate the peculiarities of our far-famed Cave, will be considered an ample apology for again taking up a subject which I had so lately treated at considerable length.

MAY 26, 1854.

Doctor LALOR was called to the chair.

Henry Clarke, Esq., Local Inspector of National Schools, was admitted a member of the Institution.

Rev. J. Graves then read the following MS., never before published, kindly communicated by the Marquis of Ormonde, from the Evidence Chamber, Kilkenny Castle:—

A SHORT TREATISE OF FIRR TREES,

CONTAINING PLAIN AND PARTICULAR DIRECTIONS, WITH OBSERVATIONS FOR THE PLANTING AND IMPROVING THEREOF.

TO HIS GRACE JAMES, DUKE OF ORMOND, LORD LIEUTENANT GENERAL, AND GENERAL GOVERNOR OF THE KINGDOM OF IRELAND, ETC.

MY LORD,

The distinguishing zeal with which your Grace prosecutes whatever is conducing to the welfare and prosperity of this kingdom setts so fair an example before our eyes, that a man seems out of countenance (I may say out of the fashion too) who, in his sphere or station, doth not endeavour to promote the good and interest of his country. From this consideration, and in imitation of so great a president, I have taken upon me to compose this short Treatise of Firr Trees, believing it may contribute in some measure to the advantage and improvement of this kingdom. The great success which those who plant this kind of tree have of late mett withall, would intimate as if the Ormond Race and the Firr Tree, being the two most noble and ancient productions of this island, there were a kind of simpathy between them, and that the one affected to grow and thrive under the government and auspicious influence of the other. Wherefore, being a most sincere well-wisher to your Grace's most noble family, and having a peculiar esteem for so usefull and beautyfull a tree, its my most earnest and hearty desire there may never be wanting those of the one worthy to govern, while there are any of the other growing in this kingdom; nor are these wishes any other than what are dayly offered up by,

My Lord,
Your Grace's most faithfull and
Most obedient, humble servant,
SAM. WARING.

Dublin, June 9, 1705.

INTRODUCTION.

Seeing there are so frequent and particular accounts given us of roots, and trunks, or stems of Firr Trees, that have been and are dayly discover'd, and taken up out of boggs or mosses in most parts of this kingdom of Ireland; and of some trees that are said to be yet standing and growing in the province of Connaught, we must be fully convinc'd that this island had, some time or other, been universally productive of them. When, again, we are given to believe that the Brittish, on their first coming over to this kingdom, made what destruction and havock they could (as in the western plantations of America) of the oakes and what other trees they then found standing, thereby to gain arable and pasture ground for the relief and support of themselves and cattel; and that, within the memory of some now living, and for

sometime after the rebellion of '41, great tracts and scopes of ground have been clear'd and made fitt for the plough and syth, that were taken up before, and cover'd with vast thickets and forrests of oak trees. When I say we find our country thus stript and depriv'd of what was once its glory and advantage, and that we have now scarce an oak or Firr left (comparatively speaking), but what may barely convince us that they have been the naturall product of this kingdom, we cann't too much resent the profuseness and negligence of some ages now past, nor enough regret the straits and exigencies we of this labour under when we are forc'd to supply ourselves from Norway and Scotland with materialls for building, &c.; which we should never have wanted had there been the least care taken to have preserv'd and continued the growth of our own country down to us.

Our late parliaments were, doubtless, very sensible of this our grievance when they so strictly enjoyned and recommended to us the improvement and preservation of such forrest trees as in acts fram'd for that purpose are exprest: taking care, among others, to nominate such trees as had little to recommend them, more than, by their speedy growth, they might the sooner answer our present necessities. Where should we search into and examine all the excellencies and particular uses of each of the kinds of trees in that act specify'd, we shall certainly find none in all respects more valuable and more deservedly to be esteem'd by us than the Firr, which Mr. Evlin, in his Silva (or Discourse of Forrest Trees), stiles the most ornamentall, usefull, and profitable tree, zealously recommending it to us, in the words of an experienc'd northern gentleman—

1stly. For the facility of its propagation.

2ndly. The nature of its growth, so as to affect such places where nothing else will thrive.

3dly. Its uniformity and beauty.

4thly. Its perpetual verdure.

5thly. Its sweetness.

6thly. Its fruitfullness, affording seed, gumm, fuel, and timber of all other woods the most usefull and easie to work; closing up all in a peculiar esteem for that which he calls the Scotch Firr; preferring it to all others for its growing so erect, and fixing itself so stoutly that it needs little or no support. To whose deserved commendations we may very materially subjoyn the success and incouragement some gentlemen of this kingdom have had in planting and propagating of this kind of Firr, some of which, not above fifty years old, afford now a scantling fit almost for any use or purpose whatever; and others, of but thirty years standing, will yield summers and principles for any ordinary building, and masts for boats of severall tunns burthen; which for the speediness of their growth is as much, perhaps, as can be said for any forrest tree this part of the world affords.

The Firrs now mentioned are such as have been produced from seed brought hither out of Scotland, and appear (to those who have seen both) to be of the very same species with those yet growing in Connaught; which (beyond what Mr. Evlin has already hinted) may be a further inducement to us to propagate this kind of Firr Tree, thereby making this kingdom a nursery of such trees, to which it had formerly been a prolifick and indulgent mother.

And now, tho we are satisfy'd that where these Firr Trees grow upon the blake and barren rocks of Norway, Scotland, and other most cold places of Europe, the young seedlins and plants, of all sizes, are found coming up as produc'd by the seed blown and scatter'd about by the wind or other accidents; yet when the very same seed is carried down to the low lands, or brought over to this kingdom, they require some attendance, and must be manag'd after a manner somewhat peculiar to themselves; which being but barely hinted or toucht at by such books as have hitherto treated of forrest trees, its presumed these following directions and observations (gather'd and gained by some years' experience) will be acceptable and prove usefull to those for the present whose judgement and experience may in time be thought needless.

To begin, then, with the seed.

NATURE OF THE FIRR SEED.

Its observable that while all other forrest trees (growing in this part of the world) cast or shed their seeds, masts, &c., in autumn (each distinct seed or kernel having

a husk or shell provided by nature to arm or defend it against the injuries of the weather, another annoyance it may receive by lying in the earth all the winter season), the seed of the Firr continues upon the tree, secur'd and guarded all the winter long, until such time as the March winds and April sun open the cones (or cloggs) they are shelter'd in, and then they fall, naked and defenceless, to the ground, where, being very smal (the least seed productive of so large a tree), they are the sooner digested, and prepar'd by the warm sun and showers, in so much, that in less than three weeks time they will begin to shew themselves above the ground, and appear as forward as those of other trees committed to the earth the Michaelmas before.

GATHERING OF THE SEED.

'Tis, therefore, the planter's business to gather or procure a quantity of the Firr cones (or clogs) some time in March, before they begin to open upon the tree, and have them laid out and spread upon a course sheet or other linnen cloth before the sun, where in three or four dayes time they will crackle, expand themselves, and so emit their seed, which must be sever'd each night from the cones, rubb'd, fan'd, made clean, and laid by for use. The cones ought to be gather'd up each night in the cloth they were laid on, and secur'd under shelter, least the rains or dews falling in the night time should close them up again, and thereby make the time of getting out the seed more tedious.

CHOICE OF SEED.

Those who can't have this convenience of the cones may be easily supply'd at the seed shops, where the blackest and weightiest seeds are the best, and of those such as are gathered in the same season they are to be sown in. It may be materiall to observe here, that what seed comes from Scotland so early to us in the spring may well be suspected to be either old or forc'd out of the cones by fire, on mault-kilns, in ovens, or the like, which must certainly very much damage so smal and tender a seed.

TIME OF SOWING THE SEED.

The time of sowing the Firr seed is from the beginning of April to the midle of May.

CHOICE OF GROUND TO SOW IN.

The bed they are to be sown in ought to consist of a clean garden mould, free from dung or any other compost, to be digg'd, rak'd, and prepar'd as for any other smal garden seeds; to be sown and cover'd after the same manner, so as that they may lye about an inch within the mould; the bed not to be above two foot and a half or three foot broad; which being of this breadth, and nine or ten yards long, may be sufficient to receive an ounce of Firr seed; from whence (all things proving right) you may expect five or six hundred trees. The narrowness of the bed affords convenience for coming round the seedlins to weed and water them, to gather up the vermin, and use such means as may best secure them against the injuries of the succeeding winter.

WAYS OF PRESERVING THE SEEDLINS.

By the time that the seed has layn in the ground about three weeks or so, the young plants will begin to appear coming up with the black husks of the seeds upon their heads; at what time you must be diligent, mornings and evenings, and after rains, to pick up and gather the vermin (especially a little, short, white snail), that will at this time be very busie among them, nipping them off close by the ground; to prevent which, some lay a train of soot or lime round the bed; some say they have lain the chaff of oats with good success. There must, likewise, be some scar-crows sett up, netts spread over the beds (supported by little forks, about half a foot above the ground), or other artifices used to keep away the small birds, which are exceeding fond of this kind of seed; and by picking at the black husks, or heads, draw up these little plants out of the earth, thus destroying all they come to.

WATERING.

The seed-bed must be water'd both before and after the coming up of the seedlins, and, at all times, as there is any need for it. Excess of moisture being more agree-able to the Firr than anything of drowth.

MOULDING.

The bed must, likewise, be kept clean wedd all summer long, and towards

Michaelmas again ; as the frosty nights draw on, it will be necessary to have some clean mould shifted thro' an open sive (or ridle) over the whole bed, so as to cover the stalks of the plants, leaving only the green heads, or turfs, above the mould ; this keeps them warm, and prevents their being thrown up, or spew'd out of the ground, which the worms and winter frosts are apt to do.

DEFENCE AGAINST FROST, ETC.

As the winter grows more severe they will require a further security from the injuries of the weather, which may be don by making a sort of shed or hovell over them, about a foot and a half or two feet high, open on all sides, and cover'd above with a thin coat of straw, or some such matter. Some make a low hedge, or sett up boughs of trees, at some distance round the bed, each being designed only to break off and abate the severities of a nipping, violent winter and March winds ; thus they may continue all winter.

Towards spring again, as the hardships of the winter and piercing winds are over, the seed-bed must be layd open by the removal of what was brought in for its winter security, which must be water'd and wedd, as formerly directed, especially while the plants continue growing, which will be from the beginning of April to the later end of June, or midle of July ; if the ground cleave or open, the chinks must be constantly fill'd up with fresh earth.

TRANSPLANTING TO THE NURSERY.

The second winter they require no such shelter or tending at all, nor the next spring (being the third, that of the sowing included), unless weeding and watering, if needfull. Its now judgment must be made whether the plants be hearty and throng in the bed, if so, they must be remov'd to the nursery, otherwise they may remain where they are for another year. There are those who raise some of these now, where thickest, with a weeding knife, or the like, and place them in another bed or nursery, at six or eight inches distance ; and when they have stood there two seasons more, remove them to that place where they design they shall allways stand ; and, indeed, it's most advisable the whole bed should be used thus—I mean sett into nurserys this third spring (that of the sowing included), where, having stood two years more, they must again be transplanted for good and all, otherwise they will grow too strong and close there again ; but when they are intended for low ground, and where there will be good shelter, they may stand in the nursery untill they be six, seven, or eight years old ; so that they may make a handsome shew and appear ornamentall upon the first setting out ; but, then, take notice, that each plant must be placed in the nursery at about two feet distance or more, that the roots may have room and liberty given them to spread and enlarge themselves suitable to the growth the trees will make during their stay there. By this means there is room likewise given for the gardner to pass thro' them, to hoe, water, and tend them as there's occasion, as also to prune them. By which means they will thrive the better, be the hardier, and better prepar'd to endure their last removal.

CHOICE OF GROUND FOR NURSERY.

The ground most proper for this nursery is some old kitchin garden that has been worn out by lying long under turnips, potato's, or the like, where the soil is loose and clean from weeds ; but if necessitated to make use of lay ground, more pains must be taken in turning it up, to make right fallow ground of it. It must be well rak'd or harrow'd, and clear'd of the roots of weeds and grass, and, above all, to be well secur'd from all sorts of cattel, and shelter'd, so as that the hedges or any other trees may not overtopp or shade the plants.

METHOD OF PLANTING IN THE NURSERY.

Upon setting out your younger plants into the nursery there's no need of being so exact as to make use of a line, &c., which will be a loss of time to little purpose. It may, therefore, suffice (the bed being once prepar'd) that a gardner, with two labourers, follow the ensuing method :—First, one of the labourers begins, and with a long pole makes a mark (by pressing it with his foot) cross the bed at every distance its design'd the plants shall stand ; this don, he enters with a narrow-mouthed spade where he made the first mark, and, being guided thereby, makes a smal rill or gutter therewith, such as the gardner judges sufficient to receive the roots of the trees ; the rill to be three or four inches deep. Thus he proceeds thro'

the whole bed, throwing the mould always the same way or side; the gardner presently follows him, having his little plants brought to hand, and, with his little rule or gage in hand, setts each tree at an equal distance, placing as many in a row as the bed will receive, spreading out the little roots of each tree, and drawing a little mould over them to keep them in their right place, untill the third man comes, who, with a broad weeding-knife or trowel, draws down the mould upon the roots, gently patting it down, and smoothing it with what he has in his hand. Thus they follow each other successively, and, when a little used to it, will make very quick work, setting out several hundreds in a day. This method is more properly design'd for those trees that are to be set out at two or more feet distance; those of six or eight inches distance only may be set by a line and large setting-stick, especially if there be any great quantity of them; but this method is allow'd of more for expedition than convenience.

LAST TRANSPLANTING INTO GROVE OR WALK.

When the Firr is to have its last remove, either into grove or walk, the ground may be prepared as already directed for the nursery; and because the soil can't of itself be thought of depth enough both to bed and cover the roots (being now much larger than when first placed in the nursery), some of the adjacent mould must be brought (the tree once placed) and thrown about the roots. Some, with good success, digg only a hole in the lay ground, about three or four foot over where they design the tree shall stand; the grassy sodd or scurf they throw aside, and with a spade they prepare and break the soyl, upon which they sett the tree, and cover the roots with mould brought elsewhere, of which a coup or box carr-full will serve for each tree: others, instead of this earth brought by carrs, make another hole near, that the tree is to be placed into, the soyl of which they prepare, as already said, and lay of this what is sufficient upon the roots of the tree, filling up the hole again with the grassy sodds of both places.

Upon all removalls, as well out of the seed-bed as nurserys, great care must be had of the roots, with their fibers, to have as many convey'd away with the tree as possible; the same is to be don by the mould, or sodd, sticking to them; nor must they be taken up only, but convey'd from place to place very gently, that the earth and root may be preserv'd together. They must, therefore, by no means be pluckt up out of the seed-bed (as some do), but by digging about, undermine a quantity of them, heave them, with one or more spades, out of the ground, and then seperate them gently with the hand. In digging up larger trees out of the nursery, it is best to be don by two spademen, who, with the edge of the spade towards the tree, digg a smal trench round, about a foot, or foot and a halfe distance, from the stem of the tree. When they have gon round thus, they then (prizing one against another) raise it gently out of the ground.

METHOD OF PLANTING.

The way of setting or planting the Firr Tree is the very same, in all respects, with that of other trees; it loves to stand shallow, the roots not above three inches deeper than the surface of the earth; the soyl or mould to be layd so high (or thick) over the roots as that when settled or trodden down, they may be cover'd about six inches. This is meant by trees of six or seven years old; those of three or four need be cover'd but three or four inches.

METHOD OF SUPPORTING THE YOUNG TREES.

And, whereas, the Firr Trees, by swagging and tossing with the wind upon their first transplanting (especially if anything large), are very apt to work a hole in the earth about their stems, thereby loosening, if not breaking their roots; it's necessary they should be often view'd, and that after high winds, when, if leaning anyway, they are to be set strait again, by inclining them the contrary way, and pressing the earth close to the stems with your heel. But if the trees be of any height or largeness, then two men must attend them—one to bring them forward, and the other with a beetle, or large mallett, to beat the earth close to the body of the tree, clapping a sod of earth (if they think needfull) to that side it inclines most to. Two men, at this rate, will cure some hundreds of trees in a day's time. This way is thought preferable, in all respects, to that of staking; which (besides the charge and trouble that staking brings) cannot but injure the trees, by reason of the softness of the bark.

Thus far has the improver been particularly directed how to manage and order his Firr Trees, from the time of his gathering the cones untill he has them secur'd in his grove or walk. He may now be pleas'd to observe:—

That tho' some have planted out their Firrs at Michaelmas, with their other forrest trees, and that with good success, yet the spring is hereby advised as the better and more proper season; and that, not only because it may be judg'd the most natural time for transplanting—as certainly it is for sowing the seed—but that those set in spring will thrive as well, if not better, and the planter eas'd of a great deal of trouble, which attends their being set out at Michaelmas, especially if anything large, and without shelter; because, their heads being charged with such a load of sappy green leaves all the winter, and the stem or stalk so very plyant and soft, they are shaken about and tost with every gust of wind; this must create the greater charge and trouble, by constant earthing and tending, or staking, as some do, in order to secure them all the winter season; whereas, by removing in the spring, all the winter and March winds are then over, and they have time given them all summer to strengthen, and secure themselves by the roots, making new shoots, and fixing themselves in the ground, where, the soil too being settled and bound together hy the roots of grass and weeds, the winds or frosts can't have the same ill effects over them. They will, indeed, require the more watering when set out in the spring, and the roots would be better to have some smal stones or other the like rubbish thrown or spread over them, otherwise, thro' the looseness of the earth for some time, they may be prejudiced by the too great heat of the sunbeams.

It may be set down for a rule, to remove the Firr at what time in the spring its little heads or buds begin to look red or swell (provided the weather favour), which may be don safely enough untill these heads have shot out an inch or two; and this without having any regard to the aspect or position it stood formerly in, as some direct and observe.

Tho' the Firr generally sends forth shootes or branches from one to two foot yearly, yet, upon removeal, it may, perhaps, set out the first year not over two or three inches; the second year (it may be) less again, and continue thus under a check a season or two more; however, if it keeps its right deep green colour, it will do well enough; but if it take a yellowish faint green cast, and that a black mould, or scale, appears above the setting of the leaves, it betokens it sickly and declining; insomuch that it's to be fear'd the planter must be forc'd to take all such trees up and plant fresh ones in their places. For this reason, and to answer other casualties, it would be convenient to leave eight or ten of each hundred standing in the nursery, to supply the places of such as thus miscarry abroad.

The Firr will bear very well with removing at six, eight, or ten foot high; at what time it must be pruned so high as that only two or three tires, or years' growth, of the boughs be left on. A tree of only three or four foot high need have only one sett of branches left on. The less head it has at setting out, the less lyable it is to the winds, which are the greatest enemy the Firr Tree has. This, among other inconveniencies, makes the bryers and thorns very ill neighbours to the Firr; they, upon every agitation, fretting and rubbing off the bark. But to remedy this again, its turpentine juice has such a healing vertue that it never suffers the tree to canker, either by this or other disasters, as most trees are apt to do.

If the Firr looseth its green head it will never shoot out again, as other forrest trees generally do, when poll'd or deprived of their branches; neither doth it send forth succours from root or stem.

The Firr takes such regular shoots every year that, by counting them, one may give a pretty just guess of how many years old the tree may be.

It hath not yet been found (tho' try'd by severall) that this Firr will grow by slips, as the spruce Firr will do.

The season for pruning the Firr is from Christmas to March, or any other time when the sapp is not stirring; but if at any time there should be a necessity of lopping off any boughs while the sapp is up, let them be cut off at two or three inches distance from the body of the tree; but, then, what is now left must be pruned away the next winter, or season of pruning. But what height the tree is to be pruned to, as it grows larger, must be according to the intent of the planter;

for if they stand in walks or avenues they ought to have a greater heed to make a shade withall, and improve the prospect; but if in groves or thicketts, or among other forrest trees, they ought to be pruned much higher, especially when design'd for timber use. And tho' there are some who don't approve of pruning Firr Trees, alleadging that the Firr will prune itself, yet the pluggs and knots so frequently seen in deal boards, &c., are the ill effects of leaving them thus to themselves; whereas, if those boughs or dead branches had been lopt off in time, the breach would, in two or three years, be quite heal'd up and covered by the succeeding coats and circles that surround and enlarge the tree on each year's growth; of which plain instances are given in trees that have been sown, pruned yearly to a considerable height, and, at length, cut down by the same hand, where, in the body, and near the hart of the tree, were seen the severall places or marks where the boughs have been cut of and grown over again to a considerable thickness, so as not the least sign or scar was to be seen where the boughs or branches were to have grown.

There are frequently among the arms or boughs of the Firr Trees those called master boughs, or proud branches, which seem to vie or contend with the chiefe or upright stem of the trees, and sometimes get the better of them, whereby the trees become crooked, disagreeable to the eye. This is no way to be prevented but by lopping them off in time; for if suffer'd to grow too long, they not only occasion large wounds even to the very head of the trees, but endanger the loss of all, by their breaking of at those places where the wounds were given, upon the first great winds that shall beat on those sides of the trees.

Let the Firr have ever so many years' growths, either on the main stem or branches only, those of the last, or two last years will be found set with the green leaves; for it sheds a set of leaves every year, about the months of August or September, as other forrest trees do the autumn following, which makes the inner part of the tree (especially if view'd from below) look very ill. This likewise makes the pruning necessary, especially when they so well answer several occasions about a house or farm, where they prove very good stakes and binders for hedges; and what is good for no other use will, if kept dry, make excellent faggots for fireing.

In setting out any number of trees into groves or walks, it seems necessary they be all of the same age or height, and taken out of the same nursery; for different ages make a disproportion, and being brought from severall nurserys, the soyl may prove unkindly to some of them, and thereby, too, make their growth unequal; this, in time, will make the weakest decline, and by being over-topt by the rest, dye, and make a breach in the whole: wherefore, as soon as any are despair'd off, they must be desplac'd, and others brought into their room the very next season, and those (as directed) of the same age; for filling up the places of trees of any considerable height with small one's, is but labour in vain.

The Firr seems not lyable to the infirmities incident to most other trees, as the rot, shake, blast, canker, vermin, or the like.

It's found by experience that they thrive and grow very well in our course, strong, sower, spouty soyl, and all such grounds as are inclinable to be woody, and throw up the strong sharp-pointed rushes; nor, indeed, can any ground be thought too course for them, provided it be moist enough, for we find them growing upon the barren inaccessable rocks and mountains, as already hinted, where they have scarce, in appearance, anything to nourish them but the waters of the melting snows, that continually sapp and drench their roots; and in Ireland here they seem to have grown in the wettest, coursest bottoms of the whole kingdom, from whence we may inferr that our rich, warm, dry, or sandy soyl, is not at all proper for them.

The Firr is an aspireing tree, running up constantly in one intire stem, or body; and may, therefore, be judg'd to take up less space of ground in walk or grove than most other forrest trees, as the oak, ash, &c., that are naturally inclined to extend their arms or boughs to a great distance: where, therefore, the oak, ash, &c., are planted in a walk or avenue, at twenty foot distance; the Firr may stand at twelve or fourteen, and so proportionably in groves or thickets, where the Firr need stand but ten foot assunder. This differance in the distance and way of standing will make a sensible alteration in the height and bulk, or thickness, of the trees, as is observ'd by some now growing in this kingdom; for where trees, in a walk of

thirty years old, measure to be about forty-five foot high, and fifteen or sixteen inches diameter in the stemm, two or three foot above the root, those in a grove or thickett, of but about twenty-seven years' standing, measure to fifty foot high, and from nine to twelve inches thick in the bole or body of the trees. This fitts them for different ends and uses, and is not improper to be hinted to the improver, who (if he pleases) may lay it down for a rule, to proportion the number of his Firrs to be sett in groves or thicketts, to that of other forrest trees, as nine is to five, or as the quincunx to the double square (if it be proper to term it so); which, to those who have but little ground to improve, and would lay that out to the best advantage, is another argument why they should propagate Firrs rather than other forrest trees.

And now to close up all: it may be pertinently enough objected, why we should be tyed up to, and troubled with, so many directions, &c., about the planting so hardy a tree, whose seed, too, of themselves take and grow so well upon the most cold and barren places in Europe? To which the chiefest answer that can be given is, experience; for should we commit our Firr seed to the earth without any further care or attendance about it, we should certainly have but a very sad account of it at the year's end; and that occasion'd mostly, either for want of water, being choaked with the weeds or grass all summer long, or thrown up and perisht by the frosts the succeeding winter; all which evills seem to be prevented or remedyed when growing in barren and mountainous places, by the snows that fall constantly every year upon those high mountains, which covers and preserves them all winter long from the frost and sharp winter winds, and by its thawing moisten and keep them cool all the summer; and for the weeds, we know too well how they like our richest, best soyles, so as not to ascend those cold, blake places. And, moreover, it's very probable that not one seed of a hundred (perhaps, not of a thousand) of those shed upon those rocky mountains, grows or comes to perfection; whereas, we have the satisfaction to find that, where the seed and soyle agree and are rightly manag'd, not one in ten will fail us.

SPRUCE FIRR.

What hath all this while been said in relation to the Scotch, Irish, or common Firr (all which are reckon'd to be the same), may, in every particular, be apply'd to the spruce Firr; which, from the experience had of it hitherto, seems to take and agree very well with this our soyl and climate.

What may be added further is, that the cones of the spruce Firr, being softer, the seed is more easily procur'd; and by quartering of them with a knife (beginning at the thicker end), and so pick out the seed.

The spruce Firr will grow from slips of the tree, set in the ground like rosemary, and that in the beginning of the spring, when the little eyes or buds of the tree begin to grow proud, or break forth; but one tree rais'd from the seed will grow more in five years than one of these in tenn.

It shews very well in potts when young, and sett out among other greens; or, if placed in the midle of a flower knot, or the like, it will cut into any shape (almost), and shew for some time as well as either cypress, yew, or holly; but when it arrives to sixteen or twenty years of age it begins to loose its beauty, by the lower boughs decaying, and leaves dropping off.

They seem to agree better with removing than the common Firr, and resist, likewise, all shocks of wind, so as there's not half the trouble with them as with the others, upon, and after setting out, occasion'd by their leaves being so much smaller, and their wood so much firmer and stronger; but, then, again, they don't grow to that bulk in so short a time, nor so easily take up with so ordinary a soyl.

PINASTER.

The pinaster, or Virginia pine, claims a place in our improvements, being a noble, stately tree. It takes very well with our soyl, and grows to a considerable height and thickness, and that in as short a time as the common Firr, but not generally so streight. It's to be propagated by the like ordering and management, only that it seems more impatient of a removeal; which, therefore, must be don the sooner.

It also proves a more brickle wood than either of the other sorts, the boughs and topps being frequently snapt of, and broken by the winds.

As for the silver Firr, domestick pine, or what other sorts there are of either kind, there are but few of them yet propagated in this kingdom; and those so lately, that it's presumed none, from their own experience, can warrant the success of them, or give us reason to believe they are understood by the Firr mention'd in the Act for Improving of Forrest Trees.

POSTSCRIPT.

I should derogate very much from my intentions in setting forth this Treatise of Firr Trees, if I did not give the curious improver the thoughts of a very observing and judicious gentleman upon this subject, in a letter to his friend, who had desir'd his opinion and remarks upon the foregoing Treatise, which are to the purpose following:—

Sr.—I have perus'd and return'd you (with a great many thanks) the inclosed Treatise of Firr Trees, and reckon it no smal compliment that you were pleas'd to set a value upon my judgement therein; what, therefore, I shall offer, in obedience to your commands, is no way in contradiction to what is so well collected and design'd for the information of our fellow-planters (for I freely own to have received several hints by it, which I knew not before), but to acquaint you with the method that I take in sowing the Firr seed, differing, in some respect, from what is sett down in that treatise, in relation to the demensions of the seed-bed; for whereas, the bed for receiving an ounce of Firr seed is thereby directed to be nine or ten yards long, I make mine but so many feet; it's true, the seed sown my way come up so very thick they would be good for little if I did not remove them into the nursery the very next year, where I set them at two foot distance one way, and one the other. The advantage I have by sowing them so thick I reckon to be this (vizt.), that by standing so close, the little roots and fibers are so interwoven and matted together that the violent frosts can't heave or lift any of them out of the ground; and, moreover, the little green heads keep one another so warm that I never cover them in the winter.

It's justly observ'd, that the Firr takes up but little room; and I find a scheme proposed therein for the distance they ought to stand at in proportion to that of other forrest trees. I could wish the way of setting them out by the equilateral triangle had been likewise added, it yielding a greater variety of rows, or prospects, where each tree appears to stand in the center of a circle, in whose periphery stand six others that are equidistant, and form a regular hexagon. But the greatest advantage gain'd by planting trees after this manner is, that a plantation acre will hold, at tenn foot asunder, near a hundred trees more than if set the quincunx way it will contain, tho' they stand at the same distance. This, upon first thoughts, may seem a paradox; but after a little consideration, nothing appears more obvious.

I think it now high time to begg your pardon for entertaining you so long upon a subject which you (your selfe) so very well understand, and remain, sr., &c.

THE

NATURAL HISTORY REVIEW.

Reviews.

INSECTA BRITANNICA. Lepidoptera Tineina. By H. T. Stainton. London: Lovell Reeve, Henrietta-street, Covent Garden. 1854. Price 25s. Ten Plates.

THIS volume is the third in a series of publications put forth, under the immediate sanction and superintendence of the President and Council of the Entomological Society, with a view to producing ultimately a complete series of works on British Entomology; introducing all the latest discoveries, and improvements in nomenclature, &c., up to the period of publication; while, in order to render them as popular and instructive as possible, general information on the habits and economy of the species are introduced as far as practicable. The present volume is devoted to the Tineina, one of the five groups of Microlepidoptera; and the execution of the work has been entrusted to Mr. Stainton, a naturalist eminently qualified for the task, not only by his extensive acquaintance with the subject, resulting from laborious personal research, but, perhaps, no less by a genuine hearty love for the beautiful subject of his investigation, which beams out in almost every page of the book before us. He is as enthusiastic as he is diligent, and the result is according to his deserts.

Of all the groups of Lepidoptera, perhaps none are more interesting than the Tineina; and few, if any, so far from being thoroughly understood. The peculiarity of their forms in numerous instances, the gorgeousness of their colouring, the wonderful beauty of the pencilled markings on their wings, the fanciful and grotesque position in which many of them delight to stand, the variety and singularity of their transformations, all these and other characteristics render them uncommonly attractive; while, on the other hand, their minuteness, the pains taken, and the expertness manifested by both larvæ and perfect insects in concealing themselves, or

escaping if discovered, as well as the difficulty of obtaining uninjured specimens (which, in many instances, is essential to a correct distinguishing of genera or species), have thrown difficulties in the way of the scientific student, if not insuperable, at least extremely perplexing and tantalizing. Nor does Mr. Stainton profess to clear away all these obscurities, and give us a full and complete description of all the British Tineina. Anything but this. Hear him—

"To avoid misconception, it is, however, necessary to remark, that the present volume does not, cannot, contain descriptions of *all* the British Tineina. The number of these is increasing upon us daily. All that has, therefore, been accomplished has been to describe *all the known and distinguished species*. The latter expression is used advisedly; for it frequently happens that a so-called new species is not really new, having lain dormant in our collections for years, but mixed with some other species, from which we have only, at length, learned to distinguish it. Consequently, in addition to the new species that will be met with in the course of years, it may be also found that many of the species of this volume are *little groups of species*, which further investigation will enable us to separate; and as the transformations of many species not now known to us will be discovered, this volume will gradually fall in arrear of the progressive science, and a new edition will become requisite."

Again—

"In some few instances, to avoid a premature multiplication of genera, species are placed in a genus, though not quite agreeing with its essential characters. In such cases care has been taken to point out wherein these differences consist; so that, should the further progress of the science require the creation of new genera, this will be facilitated by the details here given."

This spirit is something to the purpose; the author has far too deep a love and respect for his science to pretend to have already fathomed it, while he contributes his utmost towards penetrating its arstna. And to judge from the results of his labours, trouble enough these little gems of GOD's creation are likely to give him and his entomological brethren, for some time to come. We meet with genus after genus, containing, some one, some several, species, of which the larvæ are entirely unknown—for example, in the Fam. Glyphipterygidæ (taken quite at random) are seven genera, comprising seventeen species. The larvæ of three species only are known; for of that of a fourth, two such different accounts are given, that we can scarcely profess to know anything at all on which reliance can be placed. And a knowledge of these larvæ is anything but *supplemental* to a correct knowledge of the species, since, as Mr. Stainton says, in his remarks on the genus Nepticula, which will apply, with more or less truth, to nearly every family and genus in the group—"The habit of the larva, its colour, and the form and colour of its cocoon, frequently are invaluable helps to prove the distinctness of species; and it is only during the last two years that we have learned how to collect these larvæ, so that this branch of the study is completely in its infancy."

No wonder, then, that we have yet a great deal to learn. In short, difficulties, anomalies, and perplexities, meet us at present at almost every step. A curious and instructive instance is afforded by Mr. Stainton's treatment of the Fam. Nepticulidæ, which may be worth stating as a specimen of the toils through which microlepidopterists have yet to tread or force their way. "This family," says Mr. Stainton, "contains, at present, only two genera, *the distinctive characters of which lie in the neuration of the wings.*" These two genera are "Nepticula," and "Trifurcula." Of the latter of these, Mr. Stainton says, "The investigation of the generic character of these insects is rendered extremely difficult from their small size and hairy heads—smooth-headed species of equal size would be far more easily examined; it is also *difficult to examine the neuration of the wings*, and I am, therefore, doubtful whether the distinctness of this genus, from the preceding, has been sufficiently established. On the other hand, it may be that it would be more correct to divide the Nepticulidæ into a greater number of genera." That is, it is doubtful whether there have been already discovered only one, two, or several genera in this family. But this is not all. He tells us in a note, that there was a "singular insect taken by Mr. Boyd, among alders, in the New Forest, last summer;" which though he says, he "cannot consider it Lepidopterous," he allows to be "completely Nepticuliform." It must form a distinct genus if admitted as Lepidopterous; but the general facies of it induces him to think it Trichopterous. In fine, he leaves it doubtful whether this family does not include an insect, which cannot be clearly proved to belong even to the order Lepidoptera.

The above remarks may serve to show what difficulties and uncertainties surround our, at present, most limited knowledge of this delightful group of insects; from which it is clear, that the present work does not profess more accuracy or completeness than can be reasonably expected in a comparatively early stage of the science, when even the foundations are scarcely fixed beyond the chance of disturbance. This should be clearly understood and constantly remembered, and then no critic, however cynical, can find just cause for complaint; no naturalist can venture to depreciate these labours, however rapidly discoveries may henceforth follow each other; and that they will be both numerous, important, and rapid, no man, we can venture to say, is more fully persuaded than Mr. Stainton himself.

But if a great deal remains to be learned about these little Lepidoptera, there is a great deal known already, and to this, so far as it is touched on in the book before us, we will now proceed; premising, however, that we

cannot pretend to do more than notice a very few of the many interesting points brought forward by the author, nor shall we be able to do justice even to these. Limited as we are in time, much that should have been noticed must be passed over in silence.

In the present work, Mr. Stainton describes 89 indigenous genera under 13 families; but as new discoveries may, any day, add to, at least, the former, the number of those at present ascertained is of secondary importance. A remark on their geographical distribution has more interest. Beyond the limits of Europe little is known; but of the European species, comparatively few are unknown in this country; the distribution of the Tineina thus contrasting strikingly with that of the larger group of Lepidoptera, particularly the various families of the Rhopalocera—of which division we possess a very meagre list of species. From this fact, supposing that we may account for our deficiency in Rhopalocera, by the hypothesis that they were not completely distributed over Europe before the isolation of England from that continent, Mr. Stainton ingeniously and reasonably infers the original precedence, in point of time, of the Tineina—furnishing another proof, were any such required, of the mutual bearing on each other of very dissimilar sciences. A point of contact is here observed between entomology and geology; and it may be, that in future ages geologists may discover fossil Tineina in strata prior to any which contain fossil Rhopalocera. It is not by any means impossible. Fossil Lepidoptera are to be found, though, as is but natural from their extreme delicacy, they are great rarities.

The distinctive characters of the Tineina are thus given:—

Antennæ setaceæ, raro pectinatæ vel ciliatæ, Corpore longiores, Ocelli adsunt rarius, Corpus gracile, Alæ elongatæ, longe vel longissime ciliatæ, præsertim posteriores, hæ raro elongatotrapezoidales, plerumque sensim attenuatæ, sine pictura, Larva 16 aut 14 pedibus instructa.

Of these characters the most distinctive is said to be the length of the ciliation of the wings; and Mr. Stainton observes that, "there appears to be a gradual progression from the Diurnal Lepidoptera, where the cilia are shortest, to the Pterophorina and Alucitina." And although the larvæ have generally sixteen, and sometimes fourteen feet, yet their development greatly varies—as, for instance, the larvæ of the genus Tischeria have such undeveloped legs that they cannot be seen without a microscope, while those of the genus Nepticula cannot be contented with less than eighteen (the number is probably unique), all well developed; but, as if to make up for the unusual number, they are all of peculiar structure. This is the author's account of them. The six anterior *legs*, so universally present in

Lepidopterous larvæ, are wanting, and they are replaced by membraneous processes, or *prolegs;* yet neither on these segments, nor on the remaining segments, each of which is furnished with a pair of prolegs (making eighteen in all), have the prolegs the usual coronet of little hooks; these larvæ are, consequently, bad hands at walking, which, nevertheless, they have to do when full fed, &c. Between these extremes there are many gradations found, but the six true legs are uniformly present, though in the family Exapatidæ the third pair are *usually* club-shaped. So much depends on an accurate knowledge of the larvæ of this group, that it is to be hoped that entomologists will pay especial attention to them, particularly since, apart from their scientific importance, their habits are so strange and eccentric, that they would amply repay any trouble that might be spent on them, and truly they are herein sufficiently exacting.

The family Tineidæ, to which the clothes-moths belong, contains fourteen genera—the first two of which have apterous females. The three last, had they agreed in the development of the maxillary palpi, would probably have been formed into a separate group, from the great length of the antennæ in all of them; "but the development of the maxillary palpi in Nemophora, and the want of them in Adela and Nemotois, show that they are not sufficiently related *inter se* to warrant such a step; and to place Adela and Nemotois in a distinct family, leaving Nemophora among the Tineidæ, would rather outrage our ideas of relationship." After all, the present arrangement is not quite satisfactory, and we should not be sorry if increased knowledge were to open a way for a partial re-grouping of the genera of this family.

In the 2nd genus, *Solenobia*, "we meet with the singular physiological fact of unimpregnated females laying fertile eggs; and not as the exception, but as the rule." The same anomaly has, as is well known, been observed among the Aphides, but not, as far as we know, as a regular thing, although, in some cases, fertile eggs have been laid by unimpregnated females through several generations in succession; the fertile eggs laid by one female producing other females who, in like seclusion, have laid fertile eggs, and so forth. We do not know of any other instance among the Lepidoptera.

The 3rd genus, *Diplodoma*, is remarkable, as the name implies, for the *double* case in which the larva is enclosed. The 13th genus, *Adela*, is very tiresome, and "certainly requires sub-division—hardly two species showing an entire accordance;" there are but six species in it, so it must be a most inharmonious little group, and will probably be dealt upon at a future time.

The 5th family, *Gelechidæ*, is, as yet, rather tolerated than approved. Mr. Stainton says of it—"There is great discrepancy between the species composing the family; and, no doubt, future investigation, and the study of exotic forms, will enable us to sub-divide it. Many individual genera are, perhaps, only types of extensive families, which have no other representatives in the temperate climate of Europe; and the discovery of species in India, Brazil, &c., may hereafter show that these isolated species are there represented more numerously, just as we find to be the case among the Noctuina with Calpe Thalictri and Calyptra libatrix—which, though anomalous among our European species, are the representatives of extensive tropical families. As it stands at present, however, it is considerably larger than any other family of Tineina, and contains 25 genera. The perfect insects of the genus Depressaria have the peculiar power of sliding about when laid on their backs, which, we should imagine, would be a bad preparation for the cabinet. The larva of one of the species in the genus Œcophora, which generally feeds on all kinds of dry goods, has sometimes done great mischief in breeding cages, and has even been known to devour a living pupa of the Smerinthus populi; but, with one exception, all the other species of larvæ in this genus feed on decayed wood, and do no injury. We cannot omit to notice a generous effort made by Mr. Stainton, to vindicate the character of a beautiful little creature in this family, Endrosis fenestrella, greatly maligned and relentlessly persecuted, by careful housekeepers, as a clothes-moth, though it does not attack clothes of any kind; "whilst the true culprits, Tinea pellionella and Biselliella, remain unhurt in their places of concealment."

> "Thus justice, while she works at crimes,
> Stumbles on innocence sometimes."

The principal species in genus *Argyresthia*, of the 7th family, are immediately to be recognised by their grotesque fancy for standing on their heads when at rest; or, to be quite correct, standing on the first four legs only, with the hind pair of legs laid alongside the body, which is elevated at an angle of 45°, the head of the moth being almost in contact with the substance on which it rests; so that they "may be said" to stand on their heads; while, on the contrary, all the species of the next family, *Gracilariidæ*, as if actuated by the spirit of opposition in its strongest form, are equally pertinacious in sitting upright on their tails, and thus are both conspicuous and unmistakable. Indeed the antics, and affectations, and oddities of many of these beautiful insects are not a little amusing; they are as curious as they are lovely, and as shy as they are attractive. As a general rule, according to Mr. Stainton, the most gorgeously coloured

of the Tineina (and, indeed, of the Lepidoptera generally) prefer to fly in bright sunlight, to show their beauties to the best advantage; but this is not universally true, for many brilliant species fly in the dusk, or at night —some both by day and night; and the converse of the proposition is certainly not to be depended on, for numbers of the most sober-coloured species fly in broad daylight. But, as a general rule, Mr. Stainton's position is, doubtless, correct, and certainly it agrees well enough with the general coquettish character of these insects.

In the 10th fam., *Elachistidæ*, the position of the perfect insects, in repose, is rather characteristic; for "they, in most of the genera, sit closely appressed to the surface on which they rest;" and "the pupa is sometimes enclosed in a firm cocoon, sometimes in one of open network; but not unfrequently the pupa is naked, affixed by the caudal extremity, with a belt of silk round the middle, like some of the Rhopalocera; and in the genus *Bedellia*, the similarity is still more striking, the pupa being angulated, and like that of a Pieris in miniature." The larvæ also of the the genus Tischeria are peculiar, for the *very slight* development of their 16 feet.

In the 5th genus, *Buccualtrix*, of the 12th fam., *Lyonetidæ*, "the larvæ have a very singular habit, at least it has been observed in *Cratægi* and *Frangutella*, and probably it prevails throughout the genus; these larvæ, when very young, are true miners—that of Cratægi forms a short tortuous mine; that of Frangutella, a spiral one. At a certain age the larva quits the mine, and on the underside of the leaf spins a delicate whitish web or cocoon, within which the larva remains quite motionless, and in a horse-shoe shape, for a considerable time; it then emerges from this cocoon, totally different in appearance to what it was as a leaf-miner, and proceeds to eat the epidermis of the leaf, which formerly it mined. The deserted cocoon will be found to contain the previous skin of the larva. The external-feeding larva has a singular shagreen appearance; when full-fed it descends to the ground, or some convenient corner, and spins an elongate-ribbed cocoon, within which it remains, unchanged, for a considerable time."

These are but specimens of the many morsels of information which, plentifully scattered over the pages of the work before us, add materially to its liveliness and interest. We would gladly wander on further in the same direction, but must forbear.

A few words must be added with reference to the synonymy of the species, and they shall be the words of the author himself, as being more satisfactory than our own:—"With reference to the synonymy, the works

of the principal writers were carefully gone over, and the descriptions identified with known species, or set aside as undistinguishable. The synonymy of the species, described in this volume, is given more fully in the catalogue of British Microlepidoptera, which I have been conducting through the press, for the Trustees of the British Museum, simultaneously with this volume; but neither did that catalogue, any more than the present volume, admit of the introduction of critical disquisitions on the synonymy of the species. To have gone minutely and critically into the synonymy, to have described the larva of each species and its entire habits in detail, would have completely altered the design of this work; but I purpose, at no distant date, in conjunction with others, to edit a more detailed and voluminous work, 'The Natural History of the Tineina.'"

We hail the concluding words of this extract as a promise of good things for the future, believing that it will be a work of no ordinary interest; and we heartily wish Mr. Stainton good health to prosecute, successfully, his researches, and to render a new edition of the present work necessary with all possible speed. One thing is pretty clear, that whoever devotes himself to the study of the Tineina must be prepared to look after them in strange places. Inside stalks of grass, in granaries, in wood, salt, fungi, corks, &c., the larvæ are to be found, as well as in the inside of leaves of all kinds; and the perfect insects are to be caught everywhere, in the broad glare of a sunny noon and in the dingy regions of coal mines, and in all intermediate localities, also in wine cellars.

The ten plates must have, at least, a passing notice; they deserve more, but we must come to an end. "Eight illustrate the generic character," several figures being allotted to every genus described in the body of the work; "one, the various forms of the larvæ," cocoons, mines, &c.; "and one, the perfect insect of several of the most important genera (especially representing those which have any peculiarity in their posture when in repose)." These last, in particular, are highly characteristic, and provoked one or two smiles, as we saw the comic humility of one species, with his head in the dust, side by side with the pompous vanity of the one perched on his tail; and a little further on the abject appearance of a little beauty, lying flat along, pressed down hard to the earth. The plates which illustrate the generic character are very carefully executed, and will prove indispensable to a correct understanding of the very complicated and difficult generic distinctions, which are only too frequent in this group of insects.

We will only add, that we rejoice to know that the scientific public appreciate the valuable and highly-interesting work just given to the world

in general, and to the entomological world in particular; and, with sincere thanks to the author, we have done.

THE AQUARIUM. By Philip Henry Gosse, F.R.S., &c. With six Lithographs, coloured, and Plates. London: John Van Voorst. 1854. 8vo. Price 17s.

"THE noblest aspirations of man is his thirst after knowledge, and his chief characteristic the power which he possesses of communicating this knowledge to others, by records, which not only delight his contemporaries, but, surviving the time in which they were written, render the attainments of each age subservient to those of succeeding generations—so that not only individuals, but the race, is susceptible of progressive improvement; and at no previous period has this aspiration after knowledge been so general and intense, or the records calculated to diffuse it so numerous—so almost overwhelming—as at the present." So says a distinguished writer in the field of natural science, and assuredly his words are verified in the volume before us, containing records of some of our marine plants and animals, and the means of keeping them in aquariums.

The thirst after knowledge which man possesses, has led him to adopt means of knowing more of those creeping things, whose home is in the great deep, than could be enjoyed by looking into those delightful rock basins—clothed with the purple corals, and studded with the sea-stars—which one finds in many of our sea coasts; or by walking under the surface in the manner hinted at by our French neighbours—clothed in waterproof garments, and fitted with gills to prevent suffocation; and has resulted in man being able to study their history and economy at home by his own fireside.

It is not long since we pronounced favourably on Mr. Gosse's delightful work, "The Rambles of a Naturalist on the Devonshire Coast," and now we are called upon to notice its charming sequel, "The Aquarium."

The first discoverer of the marine aquarium appears to have been our friend, the author of the Eastern Borders; but we are inclined to think that our forefathers may have beguiled the happy hours of their childhood in watching the

> ——"Shell-fish slowly gliding
> O'er sunken rocks, or climbing trees of coral,"

in their natural rock basins; and may have gently placed them in more artificial ponds to admire their beauty, when the tide might be revisiting

their former abode; doubtless, if they did so, they saw much to admire, but they knew but little of what has been lately discovered; and still, with all, we are ready to exclaim with the poet—

> "Oh, sea! old sea! who yet knows half
> Of thy wonders and thy pride?"

And yet, if our knowledge increases as it has done, wonders of the sea will be wonders no longer, but plain to all beholders. We will be able to study the structure, economy, and functions of many an animal, which, until lately, we had no means of doing so; and that this is already the case, the following extract will show. We give it almost entire, as it is one of those minute but graphic descriptions, only to be attained by the careful watchings of some one animal:—

"My notions of the Cephalopoda, derived from figures of the various species in books, were anything but agreeable. I thought of them as hideous, repulsive, fierce, atrocious creatures, hated and feared whenever seen. But an acquaintance with the pretty Sepiola vulgaris has not a little modified these ideas; and its beauty, sprightliness, and curious habits have made it quite a favourite pet among the denizens of the Aquarium. It is a little creature, rarely exceeding an inch in length, though the extensibility of the arms somewhat varies its dimensions. When we turn out two or three from the net into a pail of sea water, they are, at first, restless and active; they shoot hither and thither, as if by a direct effort of will, but in reality by the impulse of rapid and forcible jets of water, directed towards various points from the mouth of the flexible funnel, situated beneath the body. After a few moments they suspend themselves in mid-water, hovering for many seconds in the same spot, scarcely moving a hair's breath either way, but waving their large, circular swimming-fins rapidly and regularly up and down, just like the wings of an insect. Indeed, the resemblance of the little Cephalopod, in these circumstances, to a brown moth hovering over a flower, is most close and striking, and cannot fail to suggest an interesting comparison. The body is held in a horizontal position; the large, protuberant eyes gazing on either side; and the arms grouped together, into a thick bundle, hang freely downwards. If you essay to count these organs, you find only eight; and even if you are aware that one of the characters of the genus is to have ten—of which two are much longer than the rest—you may search for these latter a long time in vain—of course, I mean during the life and health of the animal, when its impatience of being handled presents obstacles to a very accurate investigation—you may then turn it over and over with a stick, and look at the bundle of the arms from above and below in turn—now grouped together, and now thrown all abroad in anger at being teased—still you can make out but eight. It was not until after many trials that I, at length, caught a peep at the missing organs—the pair of long arms—and discovered that it is the animal's habit to carry them closely coiled up into little balls, and packed down upon the mouth at the bottom of the oral cavity. If we manage to insert the point of a pin in the coil, and stretch out the spiral filament, the little creature immediately snatches it away, and, in a twinkling, rolls it up again. A zealous votary of the circular system would seize on this analogy, with the spirally-folded tongue of a moth, and triumphantly adduce it as additional proof that the Cephalopoda represent, in the Molluscan circle, the Lepidoptera among insects.

"While thus hovering motionless in the water, the Sepiola presents a fair opportunity for observing its curious transitions of colour, which are great and sudden. We can scarcely assign any hue proper to it. Now it is nearly white, or pellucid, with a faint band of brown specks along the back, through which the internal vicera glisten like silver; in an instant, the specks become spots, that come and go, and change their dimensions and their forms, and appear and disappear momentarily—the whole body, arms, fins, and all—the parts, which before appeared

free, display the spots, which, when looked at attentively, are seen to play about in the most singular manner, having the appearance of a coloured fluid, injected, with constantly varying force, into cavities in the substance of the skin, of ever-changing dimensions. Now the spots become rings, like the markings of a panther's skin; and as the little creature moves slightly, either side, beneath the fin is seen to glow with metallic lustre, like that of gold leaf seen through horn. Again the rings unite and coalesce, and form a beautiful netted pattern of brown, which colour increasing, leaves the interspaces a series of white spots on the rich, dark ground. These and other phases are every instant interchanging, and passing suddenly and momentarily into each other with the utmost irregularity. But here is a change! One is hovering in quiescence—his colour pale, almost white; one of his fellows shoots along just over him; with the quickness of thought the alarmed creature turns from white to a uniform deep brown; the rich, full colour suffusing the skin in a second, like a blush on a young maiden's face. The hue is very beautiful; it is the fine, deep, sienna-tint of tortoise shell.

"Hitherto we have seen the Sepiola only in the pail of water, into which it was turned out of the net. After a little, while it drops upon the bottom, and crouching up, it remains motionless. If you rouse it, it will again swim for a few moments, but, presently, seeks some corner, into which it thrusts its rear, and huddles up as before. This is all that you will see of its habits under such circumstances; for, in all probability, the morning will reveal your little *protegé* a lump of white jelly, dead and stiff, with uncoiled arms, on the naked floor of his prison. But introduce him, while in health, into an Aquarium, where living sea plants are perpetually revivifying the water, and where the bottom, varied with sand, gravel, and pieces of rock, imitates the natural floor of the sea, and you will soon see other particulars in the economy of our little friend, which will, I doubt not, charm you as much as they have pleased me.

"The Sepiola is a burrower; and very cleverly and ingeniously does it perform a task which we might at first suppose a somewhat awkward one—the insertion of its round, corpulent body into the sand or gravel. Watch it as it approaches the bottom, after a season of hovering play, such as I have described—it drops down to within an inch of the sand, then hangs suspended, as if surveying the ground for a suitable bed; presently it selects a spot; the first indication of its choice being that a hollow about the size of a silver fourpence, is forcibly blown out of the sand immediately beneath the group of pendant arms. Into the cavity so made, the little animal drops. At that instant the sand is blown out on all sides from beneath the body backward, and the abdomen is thrust downward before the cloud of sand which has been blown up settles, but which presently falls around and upon the body. Another forcible puff in front, one on each side, another behind, follow in quick succession—the fine sand displaced at each blast settling around the animal as it thrusts itself into the hollow thus more and more deepened. I was not at first quite sure by what agency these blowings—so admirably effective and suited to the purpose, were performed. The jet in front I readily attributed to the action of the fleshy funnel projecting from beneath the mantle on the breast; but I did not see how this could blow a stream directly backwards. I, therefore, put one of my pets into a vessel with glass sides, and furnished with the requisite sand and water. I, at once, saw that the funnel was, indeed, the organ employed, and the only one in every case; and I perceived its beautiful adaptation for the work it had to do, in its extreme flexibility. This organ is very protrusile, and, being perfectly flexible, its orifice can be, and is, at will, pointed in any direction, so as to blow the jet of water forward, backward, or at either side at pleasure.

It frequently occurs, of course, that small stones are mingled with the sand, or the animal may find it convenient to burrow in the loose gravel; in either case, the arms come to the aid of the funnel—and the sucking disks, with which they are furnished, being made to adhere to the stones which are dragged out and thrown aside. You may suppose this to be a clumsy expedient, but you would think differently if you saw it; the rapidity with which the arms are thrust under the body and drawn out, bearing pieces of stone of comparatively large size, and the graceful ease with which they are then thrown forward, discharging and dropping the burden, impress the mind with admiration of the beautiful fitness of the organization for the requirement.

"This use of the funnel and of the sucking arms, so different from their normal purposes, affords additional examples of that divine economy in creation, which, when a new function is ordained, does not always form new and special organs for the necessity, but adapts some already employed in other service for the new work; while still both the one and the other function are fulfilled with such perfection as shows that every emergency was foreseen, and provided for in the mighty plan, and that it was not for want of resources that distinct actions are performed by the same instrumentality.

"Perhaps the above facts may not possess to others the novelty they had for me. Dr. Johnston, in his admirable 'Introduction to Conchology,' has not included any species of Cephalopoda, in his enumeration of burrowing mollusca; nor have I ever read of any that were known to possess the habit. I ought to have said, that it takes place to no greater extent than to bring the animal just level with the surface of the sand, which is generally thinly spread over the posterior part. The eyes and the dorsal edge of the mantle are always exposed; and if we carefully heap the sand over these parts, it is in a moment blown away by the action of the funnel, or removed by the undulation of the mantle-edge. It would be unfair, however, if I were not to allow that the little Sepiola has some unamiable traits. The pretty bright-eyed Robin, that so confidingly picks crumbs from the window-sill, sad to say, fights spitefully with his fellows, and eats nasty spiders! and, I am sorry to confess, that my little pet can be a real Cain at times. I saw one dart at an unoffending brother, that was passing, and seizing him with murderous jaws, shed out his life in a few seconds. The poor victim shot his feeble volume of ink, and sank white and motionless to the bottom, as soon as the ferocious grasp was loosened. The indictment which old Ælian brings against the whole race, that they are gluttonous (terrible fellows for their bellies—δεινοὶ κατὰ κοιλιᾶν—is his phrase), and murderous is, I am afraid, after all, not far from the truth."

Other extracts it would be easy to give, but space forbids us; and for them we send our readers to the volume. It is absolutely necessary for the naturalist who wishes to enjoy a sojourn by the sea side. There are throughout this volume many scientific details, which display an intimate acquaintance with the anatomical structure of the Actinia and other animals. The account of the Actinia parasitica is an exceedingly interesting one. We can confirm the author's view of the white filaments being withdrawn again into the body.* One which was dredged in Bantry Bay, and attached to the shell of the Buccinum undatum—which, however, was empty, not even tenanted by the hermit crab—after being in captivity for a short time, affixed itself to the side of the glass tank, and then again to a piece of rock near the centre of the Aquarium. After the lapse of some weeks, a hermit crab *(Pagurus bernhardus)*, tenanting a small whelk, was introduced into the tank, and the following insight into the habits of the Actinia amply repaid all our trouble in preparing habitations for it and its companions. One day the crab, in its peregrinations, came close to the rock to which the Actinia adhered, and *before* the crab or whelk touched it, prepared evidently to lay hold on the Pagurus; this it was not long in effecting, and in spite of the wishes of the crab to get safe off, it succeeded in transporting itself to the back of the whelk, and

* This Actinia is now in one of the glass tanks in the collection of the Royal Zoological Society, Phœnix Park, Dublin.

there it now remains, apparently satisfied with its lot—where the hermit-crab goes, there goes the Actinia. In our opinion, it has suffered from the change; it led a quiet life formerly, getting, it may be, a small, but, at least, a sure supply of food. Now, peradventure, if it passes some of its time in feasting, it must pass some of it in fasting. This comes from its love of variety, perhaps; but the old proverb tells us, that "the rolling stone gathers no moss."

Perhaps the first part of the book that may be read by those anxious to have an Aquarium, will be the last chapter, which contains instructions as to the size of the tanks, how to prepare them for the animals, &c., and how to obtain the animals for them. Were our readers ever at dredging, which is the usual way of peopling the tanks with marine inhabitants? If so, have they ever encountered that curious variety of the human species—an unlearned, learned boatman—one who talks to you quite enthusiastically about the objects of your search (like the guides of the far-famed Giant's Causeway, who are sure to puzzle our fair sisters with their Euclidean language); if not, let us, for one moment, introduce to their notice our friend, Mr. Gosse's friend, Jonah Fowler:—"A clever fellow is Jone; and though only bred as a fisherman, he is quite an amateur naturalist. There is nobody else in Weymouth Harbour that knows anything about dredging (this is from his own lips, so to be relied upon); but *he* is familiar with the feel of almost every yard of bottom, from Whitenose to Church Hope, and from St. Aldham's Head to the Bill. He follows dredging with all the zest of a savant; and it is amusing, really, to hear how he pours you forth the crackjaw, the sesquipedalian nomenclature. 'Now, sir, if you do want a gastrochæna, I can just put down your dredge upon a lot of 'em; we will bring up three or four on a stone.' 'I'm in hopes we shall have a good cribella or two off this bank, if we don't get choked up with them 'ere ophiocomas.' He tells me, in confidence, that he has been sore puzzled to find a name for his boat; but he has, at length, determined to appellate her 'The Turritella,' just to astonish the fishermen, you know, sir—with an accompanying wink and chuckle, and a patronizing nudge in my ribs. Jone is a proud man when he gets a real savant alone in his boat; and talks with delight of the feats he has achieved in the dredging line, for Mr. Bowerbank, Mr. Hanley, and Professor Forbes. I must say, I found him no idle boaster, but able to perform his professions; and can heartily recommend him to any brother naturalist who may desire to 'dredge the deep sea under,' in Weymouth Bay, as one who knows what is worth getting, and where to get it."

And now a word for the beautiful chromo-lithographs, of which there

are six in this volume. It is not too much to say, that they are executed in the highest style of this beautiful art; that the figures are drawn most accurately, by Mr. Gosse himself, and represent the sea anemonies, star-fish, &c., in all their gorgeous colouring, in their proper habitats, and in a manner undoubtedly never before attempted. With the help of these plates, this volume becomes an elegant addition to the drawing-room table, as well as to the studio of the artist who endeavours to portray animal life. In the printing, &c., no expense has been spared to make the volume worthy of its contents.

There is one chapter, in particular, which merits the attention of the Christian naturalist. We refer to the one—"On the Right Use of Natural History." We are truly glad to see this chapter. Nature might lead us to Nature's God, but there it leaves us. When an anxious conscience demands to know something more of God, something of his feelings towards offenders, of his way of dealing with rebels, whether there is forgiveness with Him and mercy—the creatures are mute. One says it is not in me, and another says it is not in me—but to enlighten us on these points is the grand object of the Word of God. It reveals to us man, a fallen creature, bound for eternal ruin, through the multitude of his sins; but it also reveals to us God, manifest in the flesh, a Saviour, who taketh away the sins of the whole world. When this grand inquiry—this *quæstio quæstionum*—is settled authoritatively by the Divine oracles, then the creatures may come again in, and teach us, subordinately, many lessons—then the world of created beings may become a mirror constantly reflecting Divine things. We will then be able to see that their habitations display his care; their instincts, his wisdom; their merriment, his love; their vast specific diversities, his solicitous and inscrutable Providence.* Our object, so far, has been to give our readers an idea of Mr. Gosse's work; this, to the best of our ability, we have done. We could linger longer over some of the pleasant walks about Weymouth, of the visit to Portland, &c., but again space forbids; short as has been our notice, we trust we have shown them that this volume contains vast mines of interest, which, until now, have never been explored; and they will find, on perusal, that it has a fascination far surpassing any work of fiction; and, indeed, why should it not? for it tells us of the handiwork of a great God, and not the idle fancies of one of his creation. So much has the sea-side and its wonders became connected with the name of Gosse, that we think him worthy of a chaplet of bright-coloured sea-coral, studded with sea-stars instead of diamonds. We shall regard him

* Dr. Williams's "Report on the British Annelida," p. 271.

in the light of one who has opened the realms of the sea to be explored by the scientific man. We shall think of his name when we come in sight of the ocean's broad expanse; and, finally thanking him sincerely for thus unveiling the great wonders of the deep, we conclude.

WESTERN HIMALAYA AND TIBET. A Narrative of a Journey through the Mountains of Northern Indian during the years 1847-48. By Thomas Thompson, M.D., F.R.S., &c. London: Lovell Reeve. 8vo. Price 15s.

AIDED, as the author fairly acknowledges in his preface to have been, by Cunningham, Strachy, Hooker, and Winterbottom—able men and well-known travellers—we cannot but expect much from his work. He appears to have paid attention to physical geography. He points out well, in his first chapter, the optical deceptions which have induced the laying down on our maps of mountain chains which have no real existence. As he proceeds, he recounts the most remarkable plants which fell under his notice, giving many interesting particulars as to their distribution, modes of growth; he notices the Prangos and other useful vegetable productions, and particularly the Coniferæ, the occurrence of the Pinus deodara, a tree which is likely to prove so important an addition to the aboriculturists of this country. He records the effect of elevation on the Flora in various places, in some of which an almost European character consequently arises. Dr. Thompson differs from the venerable Humboldt in supposing that the Himalaya was thrust up from a vast fissure by a sudden effort; on the contrary, he considers that he saw evident traces of gradual elevation. He states—

"I could not find in the structure of the mountains around Simla, any confirmation of the view entertained by Humboldt of the sudden elevation of the Himalaya out of a vast fissure in the external crust of the earth. However plausible such a view might appear when the Himalaya is contemplated as a whole (on a map), without any portion of its extent being under the eye, I found it, on the spot, quite impossible to conceive in what way, after such a sudden elevation, any power, in the least analogous to existing forces, could have excavated out of the solid rock those numerous valleys, so various in direction, so rugged in outline, and so vast in dimensions, which now furrow the mountain mass.

"On the contrary, the conclusion has been forced upon me that these mountains have emerged extremely gradually from an ocean, of the existence of which, at very various levels, the most evident traces are, I think, discoverable. The present configuration of the surface must, I do not doubt, have been given to it during periods of rest, or of very slow elevation; the action of the sea upon submerged rocks being so very superficial that no denudation takes place at any great depth. During the period of emergence of the Himalaya, from the great length of the present valleys, which extend between parallel ranges far into the interior, the coast must have borne a strong resemblance to that of Norway at the present day—numerous promonteries projecting far into the sea, and separated from one another by narrow and deep bays."

He notices the strange diurnal variations of depth which occur in the river at Rampoor, which he attributes to the "variable amount of solar action on the snows by which it is fed. This effect Major Cunningham had noticed on his former visit to the mountains, and had frequent opportunities of observing it during his journey. At Rampoor the diurnal variation was not less than three or four feet, the maximum being, I believe, during the night or only in the morning. In the immediate vicinity of snow, the streams are highest in the afternoon; but as the distance increases, the period of greatest height becomes by degrees later and later."

Dr. Thompson well describes several Glaciers, some of them of great extent, and his book is thus of special interest to geologists; he also shows evidence of Glacier action to a lower level than at present is reached by it; and proof of plasticity in the spreading terminations of existing Glaciers.

Our author also visited the Borax plain at Pugha, which he thus notices:—

"The whole of the plain is covered, to the depth of several feet at least, with white salt, principally borax, which is obtained, in a tolerably pure state, by digging; the superficial layer, which contains a little mixture of other saline matters, being rejected. There is at present little export of borax from Pugha—the demand for the sale in Upper India being very limited, and the export to Europe almost at an end.

"It has long been known that borax is produced, naturally, in different parts of Tibet; and the salt imported thence into India was at one time the principal source of supply of the European market. I am not aware that any of the places in which the borax is met with had previously been visited by any European traveller; but the nature of the localities in which it occurs has been the subject of frequent inquiry, and several more or less detailed accounts have been made public.

"These differ considerably from one another; and no description I have met with accords with that of the Pugha Valley. Mr. Saunders describes (from hearsay) the borax lake, north of Jigatzi, as twenty miles in circumference; and says that the borax is dug from its margins, the deeper and more central parts producing common salt. From the account of Mr. Blane, who describes, from the information of the natives, the borax district, north of Lucknow—and, therefore, in the more western part of the course of the Samper—it would appear that the lake there contains borax acid, and that the borax is artificially prepared, by saturating the sesquicarbonate of soda, which is so universally produced on the surface of Tibet with the acid. At least the statement, that the production of borax is dependant on the amount of soda, leads to this conclusion."

Scattered through this book are occasional observations interesting to the zoologist—such as the occurrence of the Kiang, or wild horse, at an elevation of 15,000 feet; and of fishes at the same great height.

On the whole, though the book is one not likely to be used to while away the hour, it possesses much to interest those who pursue the studies of Geology, Physical Geography, and the distribution of Plants, and it is thus a contribution of great value to science.

JOURNAL OF THE GEOLOGICAL SOCIETY OF DUBLIN. Vol. VI. Part 1. 1853-1854. Dublin: 1854. With a Plate.

OUR readers need not, for one moment, imagine that, when presenting to their notice the "Journal of the Dublin Geological Society," we intend to act the part of hostile reviewers, or to criticize the proceedings of a learned society. No; far from us be such a course; but we think it not objectionable, at the same time, to take a passing note of their sayings and doings; and, perhaps, the wisest course of doing this would be to condense the already well-condensed address of their esteemed president, J. B. Jukes, F.R.S., delivered before the society on the 8th of January of the present year. But our space forbids us to do this fairly; and so we must content ourselves with giving a brief notice of the papers, of which four are contained in the present part, which has also added to it the report from council, and the above-mentioned address of Mr. Jukes.

The first in order is one by the Rev. Professor Haughton, On the Newer Palæozoic Rocks, which border the Menai Straits, in Caernarvonshire. The newer palæozoic rocks in Caernarvonshire occur on the east side of the Menai Straits, where they form a thin patch, extending N.E. for a distance of upwards of $8\frac{1}{4}$ miles; their greatest breadth, measured in the N.W. direction, being less than one mile. They are bounded on the south-east by one of those bands of felspar porphyry which constitute so remarkable a feature in the geology of north-western Wales, and on the north-west by the Menai Straits. This district contains a complete series of deposits, extending from the Upper Devonian sandstones, and conglomerates, on the north, to the shales and marl beds of the coal measure, on the south. Professor Haughton divides his paper into three parts—the physical geology of the district; the measurements of thickness of strata; Palæontological observations, with a list of the fossils found. As one of the chief objects in examining this district was its comparison with our Irish carboniferous series, there is added a list of Irish localities and formations, divided according to Dr. Griffith's system; the list contains the names of thirteen zoophytes and seventeen mollusks, one of which—a Naticopsis—appears to be an undescribed species. The general conclusion which Mr. Haughton draws from the Menai group of rocks and fossils is—that in this district there exists no distinction between the Devonian and carboniferous deposits; but that the entire series of beds, including the red sandstone conglomerates and yellow sandstone at its base, must be considered as a continuous whole; and corresponds, in its palæontological character, with the lower limestone and yellow sandstone formations of Ireland.

The second paper is by J. Beete Jukes, and A. Wyley, Esqrs., On the Structure of the North-Eastern Part of the County of Wicklow; the third, by T. D. Triphook, Esq., On the Geology of the neighbourhood of Skull, in the County of Cork, accompanied by a geological section, from the eastern end of Long Island to western boundary of Mount Gabriel Wood; the fourth, by the Rev. Professor Haughton, On Fossils from the Carboniferous Limestone. We have here an account of five fossils—figures of two of which are lithographed—viz., Tragos semicirculare (M'Coy), Atrypa hastata (Sow.), Orthoceras unguis (Phil.), and O. fusiforme (Sow.). From numerous sections of this fossil, Mr. Haughton has ascertained that it is provided with a beaded siphuncle, differing in no respect from that of O. unguis; it also possesses the curved outline of the latter; from these circumstances, he is strongly inclined to adopt the opinion that it should be considered the same fossil. Producta gigantea (Sow.); from an examination of a great number of specimens of these fossils, *in situ*, at Vaynol Wood and Bryn Adda, Caernarvon, Mr. Haughton is satisfied that this fossil should be considered the same as P. Scotica (Sow.); the striation near the beak is the same; and it is only in large specimens, and at a considerable distance from the beak, that the longitudinal digitiform ribs, characteristic of the P. gigantea, make their appearance. We have then the report from the council, which contains a list of the donations, members, &c.; and, lastly, the president's annual address.

THE FERNS OF GREAT BRITAIN; Illustrated by John E. Sowerby; the Descriptions, Synonyms, &c., by Charles Johnson. London: J. E. Sowerby, 3, Mead-place, Lambeth. 1854. Part I. Price, partly coloured, 1s. 6d.; fully coloured, 3s. 8d. Six Plates. Eight pages.

WE think we can best introduce this work to the notice of our readers by quoting, in part, the Prospectus which accompanies it:—

"The increased attention that has, of late years, been directed to this beautiful and interesting tribe of plants, and the absence of any coloured figures on the subject, have induced the publication of the present work. When completed, it will contain figures and descriptions of forty-six species and varieties of Ferns found in the British Isles. The descriptions will be, in every instance, carefully revised and adapted to the present advanced state of Cryptogamic Botany. The figures will be all accurately drawn and engraved from the respective plants; and thus many errors in identity and general detail, which had unavoidably occurred in 'The English

Botany,' owing to the difficulty of procuring recent specimens of some of the rarer species, will, in this work, be rectified.

"The object of the Publisher will be to present to the observer of nature a book in which he may find with ease a delineation and description of every fern he is likely to meet with within the four seas. He hopes that, in so doing, he may induce many to study the natural history of these elegant plants, who have hitherto shrunk from the apparent difficulty attending its investigation; and, at the same time, to furnish with a complete, yet concise compendium on the subject, the more advanced student of these most graceful of Nature's vegetable productions."

We refrain from making any comments at present; but when the volume, which is to consist of eight parts, is complete, we shall bring it again before our readers' notice, merely saying, as to the colouring and drawing of the plates, that the engravings of the six ferns that accompany this part—viz., Polypodium (Ctenopteris) vulgare, P. (Gymnocarpium) Phegopteris, P. (G.) dryopteris, P. (G.) calcareum, Woodsia ilvensis, and W. hyperborea (Alpina)—are really beautiful; and that, if future numbers keep up to the promise of this first one, we shall have no hesitation in giving the advice which we now tender—viz., that no one who cares for the graceful ferns but should subscribe at once to these numbers.

INSECTA MADERENSIA; being an Account of the Insects of the Islands of the Madeiran Group. By T. Vernon Wollaston, M.A., F.L.S. London: John Van Voorst. 1854. Large 4to. With Thirteen Coloured Plates. Price 22s.

"MEN," says Gilbert White, the well-known naturalist, of Selborne, "that undertake only one district, are much more likely to advance natural knowledge, than those that grasp at more than they can possibly be acquainted with. Every kingdom, every province, should have its own monographer." With these sentiments we, in common with the generality of men of science, entirely agree; and we, therefore, feel much pleasure in noticing the volume which now lies before us, being a "History of the Coleoptera of Madeira."

Mr. T. V. Wollaston, having been advised by his physicians, in October, 1847, to leave England for the benefit of his health, employed a seven months' residence in Funchal in collecting such insects (and desultory information concerning them) as came beneath his notice; but without any ulterior design than that of a mere temporary amusement, and to relieve

the monotony of a winter's exile in a distant land. In November of the following year, however, another migration being recommended, Mr. Wollaston decided on "making a virtue of necessity," and turning his second banishment to a more practical account than the first one; and, consequently, started, with the full intention of accumulating matter for publication. Having been rewarded, however, in this second expedition, with more success than he had reason to anticipate, and having convinced himself that he had obtained the major part of the species which were to be met with between the limits of October and June, he felt that a summer's observation, *in situ*, was the main thing required to render his knowledge of the Coleopterous fauna tolerably complete. Hence, in May, 1850, at the instigation of the Rev. R. T. Lowe, the British chaplain and sole guardian of natural science in Madeira, having procured a tent, Mr. Wollaston again set sail for the island, prepared to take up his abode, during the hotter period, in districts as yet but imperfectly explored; and by thus applying himself in good earnest (at elevations, moreover, difficult of access, except at that peculiar season), he was in a position, at the close of his third sojourn, to attempt the lengthened and systematic treatise which is presented to the scientific world in this volume.

With regard to the fauna, Mr. Wollaston says—"The intermediate situation of Madeira, which, while pertaining artificially to Europe, has much in common with the north of Africa, imparts to it an interest, the importance of which the student of Zoological Geography cannot fail at once to recognise. If we scan the results arrived at in the following pages, we shall perceive that there is positive ground for the belief that its Coleopterous fauna is, in a large measure, of a very isolated type. Although partaking, in the main, of that particular stamp which is called Mediterranean, yet the number of endemic species (and even of genera) would seem to be so great—whilst the new modifications, which have been brought to light, are so extremely *characteristic*, and adjusted to the peculiar nature of the country in which they are placed—that we cannot resist the conclusion, that whatever may have been the extent or condition of that ancient continent, of which these several Atlantic clusters are the sure witnesses, that portion of it, at any rate, which the Madeiras may be supposed to represent, was not only singularly rich in creations adapted specially to itself, but also that the various forms must have migrated, but very slightly, ere the land of passage was destroyed; seeing that many of them had apparently not even reached those points of its area which are now the detached portions of the actual group. This fact is proved by referring to such insects as the Tarphii—only a single one of which, out of fifteen, occur in Madeira Proper; and so in other instances.

The present volume contains descriptions of no less than 213 genera. The total number of species enumerated is 482. Of this number, 270 are treated by Mr. Wollaston as novelties; in addition to which number, eleven had previously been described as Madeiran—making the entire number 281, which, out of 482, it must be admitted, is a large proportion to possess even the *chance* of being peculiar to these islands.

On refering to the systematic catalogue of this work, one will be struck at the total absence from the entomological fauna of Madeira of numerous genera (and even of whole families), which are looked upon as all but universal; thus, incredible as it may appear, not so much as a solitary instance of the Cicindelidæ, Buprestidæ or Pselaphidæ has hitherto been brought to light, whilst the great genera of Carabus, Nebria, Silpha, Necrophorus, Citonia, Telephorus, Otiorhynchus, and others, are altogether wanting. In glancing over this catalogue, we are also struck with the fact that, though Madeira is essentially a land of wood and streams, yet the Longicorns and water-beetles should be the least shadowed forth of the whole. As regards the latter of these, however, the deficiency is not difficult to understand—the rapid nature of the rivers, which are liable to sudden inundations from the mountains, and to deposit their contents in positions distant from their banks, or to pour in ceaseless torrents over the perpendicular faces of the rock, being anything but favourable to insect life.

The following particulars will be interesting to our geological readers, and tend to prove how dependent the noble science of geology is upon zoology and botany:—There is, strange though it may appear, some slight (though decided) collective assimilation in the Coleopterous fauna of Madeira with what we observe in the south-western extremity of our own country, and of Ireland—nearly all the species which are common to Madeira and the British Isles, being found in those particular regions, and this fact is strikingly illustrated by the following account of Mesites Maderensis, Woll.:—

"Viewed geographically, this insect is one of the most interesting of the Coleopterous inhabitants of these islands, as being the exact representative of the M. Tardii, *Curtis.*, hitherto peculiar to Ireland and the south-west of England. In their modes of life, indeed, the two are positively coincident, both being more particularly attached to *evergreen* trees, either in mountain or submaritime sports, whilst in their range of size, colour, and general contour, they present so great a similarity, *inter se*, that they might, at first sight, be almost confounded. Like its Irish analogue, it is purely nocturnal."

The following account of M. Tardii may not be unacceptable here; it is appended to the above account in the shape of a note:—

"This insect, which has not yet occurred in any part of the Continent of Europe, was originally discovered in decayed hollies, at Powerscourt Waterfall, in the

county of Wicklow, by Mr. Tardy, of Dublin. For many years subsequently, it appears to have been altogether lost sight of, until detected by myself, in 1844, at Mount Edgecumbe, in Devonshire, and along the coast of Cornwall, westwards as far as Menabilly and Fowey. In the north of Devon I have likewise observed it, in the valley of the Lyn, though less abundantly than on the shores of the English Channel. Thus skirting as it were the south-western extremity of our own country it passes over to Ireland, where it may be said to attain its maximum, attaching itself to the trees (especially evergreens) in the mountains of Wicklow and Kerry (and probably in other districts equally), much to the detriment of the ancient timber, in which its ravages, evidently for centuries, are but too conspicuous. Judging from the extent of the injury committed, it would seem to have been commoner formerly, and more generally diffused than now. At Killarney, I have been accustomed to mark its devastations for several years past, and had constantly met with traces of it under the form of detached elytra, and broken portions of its body, in the oldest trees; but it was not until the summer of 1853, that a perfect specimen, captured by a friend in a decayed holly, at Dinas, came beneath my notice. Being thus warned of more than its past existence, we commenced a careful research during the following September, on Innisfallen, one of the islands of the Lower Lake, where we found it still ranging in profusion, and from whence I obtained a fine series of examples, averaging a somewhat larger size than the Devonshire and Cornish ones."

"Whether or not this partial parallelism may be employed to further Professor Forbes's theory of the quondam approximation, by means of a continuous land of the Kerry and Gallician hills, and of a huge miocene continent extending beyond the Azores, and including all these Atlantic clusters within its embrace, I will not venture to suggest; nevertheless, it is impossible to deny that, so far as the Madeiras betoken, everything would go to favour this grand and comprehensive idea. Partaking, in the main, of a Mediterranean fauna, the *northern* tendency of which is in evident direction of the south-western portions of Ireland and England, and with a profusion of endemic modifications of its own (bearing witness to the engorgement of this ancient tract, with centres of radiation created expressly for itself)—whilst geology proclaims the fact that *subsidences*, on a stupendous scale, have taken place, by which means the ocean groups were constituted—we seem to trace out, on every side, records of the past, and to catch the glimpses, as it were, of a veritable Atlantis from beneath the waves of time, being well nigh tempted to inquire :—

'And though, fairest isle,
In the daylight's smile,
Hast thou sunk in the boiling ocean,
While beyond thy strand
Rose a mightier land
From the wave in alternate motion?

'Are the isles that stud
The Atlantic flood
But the peaks of thy tallest mountains,
While repose below
The great waters' flow
Thy towns, and thy towers, and fountains?

'Have the ocean powers
Made their quiet bowers
In thy fanes and thy dim recesses?
Or, in haunts of thine
Do the sea-maids twine
Coral wreaths for their dewy tresses?

'But we know not where,
'Neath the desert air,
To look for the pleasant places
Of the youth of time,
Whose austerer prime
The haunts of his childhood effaces.'"

We think those exiled from their native land, that repair to Madeira for to spend the winter months, should be extremely grateful for the pains Mr. Wollaston has been at in defining the places where such and such Coleoptera are to be found, in order to incite them to follow the captivating pursuit of entomology; however, on this point our author shall speak for himself:—

"It may, perhaps, be objected, that I have sometimes been over-minute in describing my localities, and in recording the precise circumstances under which many of the species were observed; and, indeed, had I employed myself in writing for the scientific world only, far removed from the scene of action, there would have been considerable force in the accusation; for it can clearly matter but little to the universal collector to know even what island his specimens are peculiar to (and, therefore, *à fortiori*, the exact spot in that island), so long as he be fully convinced that they have come from our present group. But let it be remembered that one of my principal designs in the following pages has been, not only to afford a complete catalogue, to the general naturalist, of Madeiran Coleoptera, but also to put into the hands of the sojourner there, for a short period (of which there are several hundreds every winter from England alone), a full and intelligible account of the actual stations in which he will, probably, be able to procure the several insects required. By this means, indeed, I am emboldened to hope that my researches may be turned to some practical account, for the amusement of that unfortunate class of wanderers, whose lot it is to submit, year after year, to an eight months' exile in Funchal. For plainly to point out one way (be it but one) in which even a few stray minds may find an ample field to sport in during a banishment, under emergencies not the most enviable, is a boon which ought not (for the sake of a useless brevity) to be overlooked, in dealing with a subject, thus voluntarily undertaken (however small it may be, and imperfectly performed), for the general good."

And for those who are resident for a longer season than that which is ordinarily appointed for invalids, and who have health and strength sufficient to tempt them beyond the limits in which the more cautious adventurers are permitted to roam, we have the following remarks on tent life, which we quote in full:—

"The admirer of Nature who has passed a long winter at the mountain's base, contented merely to gaze upon the towering peaks—which, though clear and cold at night, seldom reveal themselves during the day with sufficient constancy (through the heavy canopy of cloud which hangs around them), to warrant an ascent—hails with unbounded joy the advance of spring, knowing that the time is at hand when he will be able to revel at large on this Atlantic paradise, in remote spots, seldom

visited by strangers, and at altitudes where the fierce elements of winter shall give way, at last, to perpetual sunshine and the fresh breezes of a calmer sea. There is something amazingly luxurious in betaking oneself to tent life, after months of confinement and annoyance (it may be entirely—*partially* it must be), in the heat and noise of Funchal. We are then, perhaps, more than ever open to the favourable impression of an Alpine existence; and who can adequately tell the ecstacy of a first encampment on those invigorating hills! To turn out, morning after morning, in the solemn stillness of aerial forests, where not a sound is heard, save, ever and anon, the woodman's axe in some far-off tributary ravine, or a stray bird, hymning forth its matin song to the ascending sun; to feel the cool influence of the early dawn on the upland sward, and to mark the thin clouds of fleecy snow uniting gradually into a solid bank, affording glimpses the while, as they join and separate, of the fair creation stretched out beneath; to smell the damp, cool vapour, rising from the deep defiles around us, where vegetation is still rampant on primeval rocks, and new generations of trees are springing up, untouched by man, from the decaying carcases of the old ones; to listen, in the still, calm, evening air, to the humming of the insect world (the most active tenants of these elevated tracts); to mark, as the daylight wanes, the unnumbered orbs of night stealing, one by one, on to the wide arch of heaven, as brilliant as they were on the first evening of their birth—are the lofty enjoyments, all which the intellectual mind can grasp in these transcendant heights. It is needless, however, to pursue the picture further; for it is impossible to do justice to what *experience alone* can enable us to appreciate; and let not any one suppose that the varied objects and scenes of novelty, which administer to our superior feelings and charm the eye in these upland solitudes, are adapted only to the scrutiny of the naturalist, and are either beneath the notice of, or else cannot be sufficiently entered into by the general mass—for such is by no means the case. A single trial, we are convinced, will be more than enough to prove the reverse, provided the adventurer be not altogether insensible to perceptions from without, or incurious as to the workings of the external universe around him. This, however, we need scarcely add, is a *sine qua non;* for it has been well said, that "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.*"

But we must not forget to mention the plates which accompany this volume. They are thirteen in number, and are drawn by the masterly hand of Mr. J. O. Westwood, and engraved by Mr. F. Smith. They represent, for the most part, those insects which have been discovered or described by Mr. Wollaston, with all the necessary dissections. When we regard the immense expense attending a work like the present, we must, indeed, consider that it was undertaken, as the author tells us, as a labour of love; and with the sole aim, within its prescribed limits, of arriving at the truth; and confidently, indeed, may he appeal to others to judge of the result of his labours. We could not expect that many local faunas would be published in the expensive style of the present one, nor would it, indeed, be desirable; but we do hope that others will take example by Mr. Wollaston, and will add to the stock of our knowledge of natural science, by observations so carefully made, *in situ*, as these.

The warmest thanks of entomologists are due to Mr. Wollaston for the publication of this work. They will find it to contain everything that a scholar and an indefatigable lover of nature could bring to bear upon their favourite science; and we think Mr. Wollaston entitled to take a high

stand among those engaged in such pursuits. In conclusion, we hope, that if the return of better health permits him to remain—

φιλῃ εν πατριδι γαιᾳ—

he may give us the benefit of his large experience, by taking up the subject of our native Coleoptera, for which he would be so eminently fitted. We who sojourn not in sunny foreign lands, would be helped by his assistance, would be taught by his knowledge, and would be spurred to greater endeavours by his kindness in thinking of individuals as well as of the scientific world at large.

To such of our readers as love fine paper and beautiful typography, we can recommend this volume. Seldom have we seen a work which did more credit to the printer and publisher; but the contents will be found worthy of a fair outside.

CLASS-BOOK OF BOTANY, being an Introduction to the study of the Vegetable Kingdom. By J. H. Balfour, M.D., F.R.S.E., F.L.S., Professor of Medicine and Botany in the University of Edinburgh. With upwards of 1,800 illustrations. Edinburgh: Adam and Charles Black. 1854. Price 21s.

WE have here a manual of botany such as we need not be ashamed to put into the hands of any student. It consists of five parts, the first of which, "On Structural and Morphological Botany," can be obtained in a volume by itself. It consists of an account of the cellular tissue, vascular tissue, the organs of nutrition or vegetation, of the functions of the nutritive organs, the organs of reproduction, &c. The second treats of Physiological Botany, and has thirteen chapters, containing—Remarks on the General Phenomena of Plant Life; Chemistry of Vegetation; Physiology of the Elementary Tissues of Plants; Physiology of the Descending Axis or Root; Physiology of the Ascending Axis or Stem; Physiology of the Leaves; General Circulation or Movement of the Sap; Physiology of the Flower; Physiology of the Fruit; Physiology of the Seed; Propagation of Plants by Buds and Slips; Grafting; Development of Heat, Light, and Electricity, by Plants; Vegetable Nosology, or the Diseases and Injuries of Plants. The third part is on Taxological Botany, or the Classification of Plants, and contains general remarks on classification; the Systems of Classification, and the Arrangement and Characters of the Natural Order; this chapter contains the characters of two hundred and seventy-six families of Plants, with the names of some of the more remarkable genera, and of the species, whenever noted for medicinal or other valuable qualities. This part, in common with the others, is profusely illustrated with wood

engravings, thus presenting to the reader's view, figures, as well as descriptions of the plants. In the chapter on the systems of classification, we have an interesting account of the various authors of systems—the first of whom appears to have been Andreas Cæsalpinus, a native of Arezzo, in Florence, some time Professor of Botany at Padua, and afterwards physician to Pope Clement VIII. He is called by Linnè, *primus verus systematicus*. In his work, "De Plantis," published in 1583, he distributed the 1,520 plants then known, into fifteen classes, the distinguishing characters being taken from the fruit. About 1670, Dr. R. Morrison, of Aberdeen, published a systematic arrangement of plants; he divided them into eighteen classes, distinguishing plants according as they were woody or herbaceous, and taking into account the nature of the flowers and fruit. In 1690, Rivinus promulgated a classification, founded chiefly on the forms of the flowers. Tournefort, about the same time, took up the subject of vegetable economy; he was a contemporary of Ray, and was Professor of Botany, at Paris, in 1683; he published his systematic arrangement in 1694–1700; he described about eight thousand species of plants, and distributed them into twenty-two classes, chiefly according to the form of the corolla—distinguishing herbs and under-shrubs, on the one hand, from trees and shrubs, on the other. The system of Tournefort was, for a long time, adopted on the Continent; but was ultimately displaced by that of Linneus. It is well known how favourably the artificial system of Linneus was received; but now it is only an index to a department of the book of nature; it does not, indeed, aspire to any higher character, and, although it cannot be looked upon as a scientific and natural arrangement, still it has a certain facility of application which commends it to the tyro.

One of the first natural methods of classification was that proposed by Ray, in 1682. He separated flowering from flowerless plants, and divided the former into dicotyledons and monocotyledons; he may be said to have laid the foundation of that system, which has been more fully developed by Jussieu, in 1789, by De Candolle, in 1819, by Endlicher, in 1836, and by John Lindley, in 1846. The arrangement followed by Professor Balfour, in this class-book, has, for its basis, the system of De Candolle, while some of the divisions are derived from Jussieu and Lindley.

Part Four treats of Geographical Botany; from the recapitulation of the chief points connected with Botanical Geography, with which the chapter closes, we take the following—"The distribution of plants over the globe is regulated by climate, more especially by temperature and moisture; the climate suited to a plant is that in which it can perform all its functions

properly, and produce its characteristic secretions. The globe, as regards, temperature, is divided latitudinally and longtitudinally into different zones, and the nature of the vegetation in these zones varies; lines passing through places having the same mean annual temperature, are called Isothermal; those through places with an equal mean summer heat are Isotheral, and with an equal mean winter temperature Isocheimal. The nature of the soil influences, in some measure, the distribution of plants; but the connection between different rocks and the plants growing on them is still obscure; it would appear that the same species have been, in many instances, originally placed in very widely-separated localities; while at other times species have been created on one spot and have only extended a short distance from a centre. Zones of vegetation are given by different authors both in a latitudinal and altitudinal point of view. Meyen divides the vegetation of the globe into eight distinct zones; marine vegetation is also divided into zones, according to depth or bathymetrically. Forbes characterizes a Littoral, a Laminarian, and a deep-sea zone. The British flora has been divided into different types, both as regards latitude and altitude; it partakes more or less of the characters of that of different parts of Europe, and there are certain American forms also represented. Professor Forbes endeavours to account for the differences in the floras of Britain, by considering them as outposts, separated by geological changes from larger areas." Part Five on Palæontological Botany. In reading this chapter we are reminded of the truth of Mr. Philips's statement, that "Geology would never, perhaps, have escaped from the domain of empiricism and conjecture but for the innumerable testimonies of elapsed periods and perished creations which the stratified rocks of the globe present in the remains of ancient plants and animals—so many important questions concerning their nature, circumstances of existence, and mode of inhumation on the rocks, have been suggested by these interesting reliquiæ; and the natural sciences have received so powerful an impulse, and been directed with such great success to the solution of problems concerning the past history of the earth, that we scarcely feel disposed to dissent from the opinion, that without fossil zoology and botany, or what is denominated Palæontology, there would have been no true geology." This chapter on Palæophytology concludes this work, which, on careful examination is, in our opinion, the best as well as the safest introduction to botany that could be placed in a beginner's hands. The difficulties which beset the first steps in every science, are here made as easy of comprehension as they possibly could be; and that this work has merited the esteem of the public is, we think, proved by the several editions which

have issued from the press; but this one, in the carefulness of its definitions, in the beauty of its illustrations, and the superior manner in which it has been published, far surpasses them all. Even those who are somewhat advanced in the knowledge of botany will find many things in these volumes of great interest; combining, as it does, the result of every writer of any eminence in this school. They will find the second volume especially so, as it carries our knowledge on physiological points to a very recent date. We should not neglect saying a word or two about the appendix, which contains directions about the microscope, and hints for the manipulations attendant upon it. We hope, in our next number, in an article on modern microscopy, to present to our readers' notice some of the latest improvements in this instrument, which has, of late, become as necessary an auxiliary to the herbarium of the botanist as to the dissecting table of the surgeon. The appendix also contains ample instructions for the collecting, preserving, and arranging specimens. With respect to paper for drying plants, we can, with every confidence, recommend Bentalls' drying paper;* we have found it keep the colour of the plants much better than any other; while its not requiring to be so often changed is a great saving of time and trouble. A glossary, or an explanation of some of the most important botanical terms, closes this second volume; and we think it is not too much to say, that we have seldom noticed a work with more pleasure than the present—rejoiced, as we always are, to see the first steps to science made not only easy, but agreeable; and, with the following words of counsel and advice, which we extract from the preface, we conclude:—"In prosecuting the science of botany, the student must ever bear in mind, that it is only by the examination of plants, in the garden and in the fields, by careful dissections, and by microscopical investigations of living and dead tissues, that he can acquire a correct knowledge of the subject. No work can make up for the want of this; no descriptions or illustrations can supply its place. All that the teacher can do by his lectures and text-book is, to direct the pupil in his researches, and to refer him to the book of nature in his investigations; the student must not be led away by human authority, however distinguished; his motto must be—

"Nullius addictus jurare in verba magistri."

While he avails himself of all the aid supplied by eminent botanists, he must endeavour, by personal observation, to ascertain the correctness of their statements; he must carefully avoid hasty generalization, and a

* This paper can be had, of various sizes, on application to E. Newman, Esq., 9, Bishopsgate-street, London.

blind attachment to theories, however plausible. His foundations of facts must be solid, if his inductions are to be correct. It is by a patient and laborious search after truth, by a diligent and enlightened questioning of nature, and, above all, by an humble dependence upon Him 'who is before all things, and by whom all things consist,' that the botanical inquirer can expect to arrive at satisfactory results."

THE SEA-SIDE BOOK; being an Introduction to the Natural History of the British Coasts. By William Henry Harvey, M.D., M.R.I.A., Professor of Botany to the Royal Dublin Society, Director of the Herbarium, Trinity College, Dublin. Third Edition. With a Chapter on Fish and Fish-diet, by W. Yarrell, F.L.S., &c. London: John Van Voorst. Price 5s.

WE are glad to have the pleasure of telling our readers that this little work has reached a third edition; and shall, in the fewest words possible, point out to them the improvements they may, on perusal, expect to find. First, we have a very interesting chapter on the "World of Waters." This gives us an account of the various depths of the ocean, of the constituent parts of salt water, of the effect of the moon in producing the change of tides—this portion, as Dr. Harvey informs us, being supplied by the learned Professor of Geology in Trinity College, Dublin—and of the colour of the sea.

We have, also, a chapter on fish, and fish-diet, by Mr. Yarrell, the well-known author of that popular work, "The Fishes of Great Britain." This chapter contains an account of the various devices used for the capture of the finny race, and of the modes of curing the more valuable of them when caught. It also gives us very good medical authority for the use of fish as diet, and a table showing the relative quantity of nutritive matter contained in beef, mutton, veal, and pork, as well as the several fish, most in use among the inhabitants of Great Britain and Ireland. Also, the months of the year when these fish are in season—*i.e.*, when they are esteemed as most palatable and wholesome. We regard these two chapters as a very pleasing addition to this companion to the sea-side. It were almost useless in us to recommend this volume, as we know it is universally appreciated; and we have seldom seen a person—who cared anything about nature—stopping at the sea-side without having a copy of this fascinating, well got up, and highly-instructive little work.

Notices of Serial Publications.

ANNALES DES SCIENCES NATURELLES. IV. Series. Tome I. Nos. 2, 3. Paris: Chez Victor Masson.

No. 2. *Zoologie.*—Monographie des Ballistides, par M. Hollard—2e partil, Etude des genres et des espèces (suite); Deuscième Memoire sur les circonvolutions du cervean chez les mammifères, par M. Camille Dareste; Note sur des experience relatives au developpement des Cysterques, par M. Van Beneden; Note sur les mœurs du Gorille et du Chimpanzè, par M. Auboy; Conspectus systematis ornithologiæ Caroli Luciani Bonaparte, 1854. *Botanique*—Notice sur quelques Rubiacees de l'ameriquè tropicale, par M. H. A. Weddell; Mémoire sur la coloration de la mer de Chine, par M. Camille Dareste; Cryptogamia Guyanensis, seu Plantarum cellularium in Guyana, annis 1835-1849, a Col. Leprieur collectarum enumeratio universalis, auctore C. Montagne, D. M.

No. 3. *Zoologie.*—Conspectus systematis ornithologiæ Caroli Luciani Bonaparte, 1854 (suite); Mémoire sur le plan général du developpment des Echinodermes, par M. Müller; Analyse, par M. Camille Dareste; Recherches experimentales sur le grand sympathique, et specialement sur l'influence que la section de ce nerf exerce sur la chateur animale, par M. Col. Rernard. *Botanique*—Cryptogamia Guyanensis, seu Plantarum cellularum in Guyana, annis 1835-1849, a col. Leprieur collectarum enumeratio universalis, auctore C. Montagne, D. M. (suite); Etudes anatomiques et organo geniques sur la *Victoria regia*, et anatomie comparé du Nelumbium, du Naphar et de la Victoria, par M. A. Trecul; Revue de la familli des Urticees, par M. H. A. Weddell.

THE ANNALS AND MAGAZINE OF NATURAL HISTORY, INCLUDING ZOOLOGY, BOTANY, AND GEOLOGY. No. 78, June; No. 79, July; No. 80, August; No. 81, September. 8vo. London: Taylor and Francis.

No. 78, June:—(Sir P. G. Egerton, F.R.S.) On Some New Genera and Species of Fossil Fishes; (Rev. W. A. Leighton) Monograph of the British Graphideæ (concluded from p. 395); (E. L. Layard) Notes on the Ornithology of Ceylon (continued from p. 264). Among these notes we have a description of a new Woodpecker (Brachypternus Stricklandi, *Layard*), of which Mr. Layard procured a single female specimen, at Gillymalle, and obtained a large number of both sexes from Mr. Thwaites, Kandy. It is dedicated to the memory of the esteemed naturalist, Strickland. (J. Paget) Description of a New Helix, from Montpellier, and a new Hydrobia, from Nice, with observations on some varieties of the extramarine shells of those districts; (Rev. M. J. Berkeley and C. E. Broome) Notices of British Fungi (continued from p. 407); (Professor Milne Edwards) A Reply to

Professor Sedgwick's Article, published in the Annals and Magazine of Natural History, 2nd Series, No. 76, April, 1854. Here we have five more pages taken up with this Palæontographical dispute, which, though it may be very interesting to the parties engaged therein, still we are much mistaken if the scientific world at large would not much rather it had its beginning and ending at the same time. (P. L. Sclater) A Synopsis of the Fissirostral Family, Bucconidæ; (T. S. Cobbold, M.D.) On the Anatomy of the Giraffe (Camelopardalis giraffa, *Linn.*); (P. H. Gosse) On the Growth of Sea-weeds. Proceedings of Learned Societies—Zoological Society, May 25, J. Gould, F.R.S., V.P., in the chair; July 27, G. R. Waterhouse in the chair. Royal Society—March 2, Professor Graham, V.P., in the chair. Botanical Society of Edinburgh—April 13, Professor Balfour, President, in the chair. Miscellaneous—(C. S. Bate) On *Bellia arenaria;* (Lieut. Pegus) On the Habits of Mungoos (*Herpestes griseus*); (J. Paget) On Some Varieties of Land Shells, from the south of France. Meteorological Observations for April, 1854.

No. 79, July:—(John Miers, F.R.S.) On the Genus Lycium; (J. E. Gray, F.R.S.) Additions and corrections to the arrangement of families of Bivalve shells; (John Blackwall) Supplement to a catalogue of British spiders, including remarks on their structure, functions, economy, and systematic arrangement (continued from p. 120 of vol. xi.). This catalogue contains the names of many of the arachnida, which have been added to our British lists, principally during 1853. Thomisus floricolens is, for the first time, added to the number of our indigenous spiders, from specimens transmitted to Mr. Blackwall, in December, 1853, by Mr. R. H. Meade; they were captured at Piercefield, near Chepstow, Monmouthshire, by Mr. F. Walker. (J. Williams, M.D.) On the Mechanism of Aquatic Respiration, and on the structure of the Organs of Breathing in Invertebrate Animals, with two plates (continued from vol. xiii., p. 312); (E. L. Layard) Notes on the Ornithology of Ceylon (continued from p. 453, vol. xiii.). These notes continue as deeply interesting as ever. The account of the *Turtur humilis* will be read with much interest. Mr. Layard mentions his purchasing Cochin-China fowl for 7½d. each, which is a great contrast to the enormous and absurd prices obtained for birds of this species in England. (P. H. Gosse, A.L.S.) On Manufactured Sea-water for the Aquarium. Anxious for the general adoption of the marine aquarium, and knowing the delay and expense attendant on the procuring of sea water from the coast or ocean, Mr. Gosse had recourse to Schweitzer and Laurent's analysis of sea water; and dismissing those component parts, which, from their extreme minuteness, appeared unnecessary, took of common table salt, 3½ ounces; Epsom salts, ¼ ounce; chloride of magnesium, 200 grains, troy; and chloride of potassium, 40 grains, troy. To these salts, thrown into a jar, a little less than four quarts of water were added; so that the solution was of that density, that a specific gravity bubble 1.026, would just sink in it. Reckoning the cost of the salt and water at nil, the total expense per gallon was 5¼d.—of course, if a larger quantity were required the cost of the materials would be diminished, so that 5d. per gallo may be set down as the maximum cost of sea water thus made. It is better to filter this water through a sponge before using, and to introduce the sea-weeds, after the order of nature—plants first, then animals—for a week before the animals. Water thus manufactured was found, after six weeks' trial, by Mr. Gosse, to succeed admirably. Proceedings of Learned Societies—Royal Society; Zoological Society;

Royal Institution of Great Britain. Miscellaneous—(Dr. Garreau) On the Formation of the Stomata in the Epidermis of the Leaves of the Spiderwort, and on the Evolution of the Cells in their Neighbourhood; (H. and A. Adams) Description of a New Genus of Bivalve Mollusca; (M. Tulasne) On the Dimorphism of the Uredineæ.

No. 80, August:—(W. J. Burnett, M.D.) Researches on the development of Viviparous aphides. This paper is extracted from Silliman's American Journal for January, 1854, and being of the greatest interest, we give large extracts in the author's own words:—"Every naturalist is aware of the remarkable phenomena connected with the viviparous reproduction of Aphides or plant-lice; for their singularity has led them to be recounted in works other than those of natural science; and, from the days of the earlier observers, they have been the theme of a kind of wonder-story in zoology and physiology. I need not here go over the historical relations of this subject. The queer experiments and the amusing writings of the old entomologists are well known. The brief history of the general conditions of the development of these insects is as follows:—In the early autumn the colonies of plant-lice are composed of both male and female individuals; these pair; the males then die, and the females soon begin to deposit their eggs, after which they die also. Early in the ensuing spring, as soon as the sap begins to flow, these eggs are hatched, and the young lice immediately begin to pump up sap from the tender leaves and shoots, increase rapidly in size, and, in a short time, come to maturity. In this state it is found that the whole brood, without a single exception, consists solely of females, or rather, and more properly, of individuals which are capable of reproducing their kind. This reproduction takes place by a viviparous generation, there being formed in the individuals in question, young lice, which, when capable of entering upon individual life, escape from their progenitor and form a new and greatly-increased colony. This second generation pursues the same course as the first—the individuals of which it is composed being, like those of the first, sexless, or, at least, without any trace of the male sex throughout. These same conditions are then repeated, and so on almost indefinitely—experiments having shown that this power of reproduction, under such circumstances, may be exercised, according to Bonnet, at least, through nine generations; while Duvau obtained thus eleven generations in seven months, his experiments being curtailed at this stage, not by a failure of the reproductive power, but by the approach of winter which killed his specimens; and Kyber even observed that a colony of *Aphis dianthi* which had been brought into a constantly-heated room, continued to propagate for four years, in this manner, without the intervention of males, and even in this instance it remains to be proved how much longer these phenomena might have been continued." We have then described the various observations of Dr. Burnett on the Aphis Caryæ of Harris, and the details of the embriological development of the so-called Viviparous aphides, so far as our author had enjoyed opportunity for their study. "We will now refer for a moment to the special points which have here been made out. In the first place, it is evident that *the germs which develop these forms are not true eggs.* They have none of the structural characteristics of eggs, such as a vitellus—a germinative vesicle and dot; on the other hand, they are, at first, simple collections, in oval masses, of nucleated cells. Then, again, they receive no special fecundating power from the male, as is the necessary preliminary condition of all true eggs; and, furthermore, the appearance

of the new individual is not preceded by the phenomena of segmentation, as also is the case with all true eggs. Therefore, their primitive formation, their development, and the preparatory changes they undergo for the evolution of the new individual, are all different from those of real ova. Another point is, *these viviparous individuals have no proper ovaries and oviducts.* Distinct organs of this kind I have never been able to make out. The germs are situated in moniliform rows, like the successive joints of confervoid plants, and are not enclosed in a special tube. These rows of germs commence, each, by a single germ-mass which sprouts from the inner surface of the animal, and which increases in length and in the number of its component parts from the successive formation of new germs by a constriction-process, as already mentioned. Moreover, these rows of germs, which, at one period, closely resemble in general form the ovaries of some true insects, are not continuous with any uterine or other female organ, and, therefore, do not at all communicate directly with the external world. On the other hand, they are simply attached to the inner surface of the animal, and their component germs are detached into the abdominal cavity as fast as they are developed, and then escape outwards through a *porus genitalis*, exactly as is the case with the eggs of fishes. Here, then, comes the important question—What interpretation shall we put upon these reproductive parts—these moniliform rows of germs? Ignoring all existing special theories relating to reproduction, the observing physiologist would be left no alternative but to regard them as *buds*, true gemmæ, which sprout from the inner surface of the Aphis, exactly like the buds from the external skin of a Polype." Dr. Burnett then gives the results at which other famous naturalists have arrived upon this subject, and a discussion of the relations of the important conclusion at which he has alone arrived; and now—"The final question is, what is the legitimate interpretation to be put upon the reproductive phenomena of the Aphides we have described? My answer to this has been anticipated in the foregoing remarks. I regard the whole as constituting only a rather anomalous form of gemmiparity. As already shown, the viviparous Aphides are sexless; they are not females, for they have no proper female organs—no ovaries and oviducts. These viviparous individuals, therefore, are simply gemmiparous, and the budding is here internal instead of external as in the Polyps and Acalephs; it, moreover, takes on some of the morphological pecularities of oviparity; but all these dissimilar conditions are œconomical and extrinsic, and do not touch the intrinsic nature of the processes concerned therein. Viewed in this way, the different broods of Aphides cannot be said to constitute as many true generations, any more than the different branches of a tree can be said to constitute as many trees; on the other hand, the whole suit from the first to the last constitute but a single true generation. I would insist upon this point as illustrative of the distinction to be drawn between *sexual* and *gemmiparous* reproduction. Morphologically, they have, it is true, many points of close resemblance; but there is a grand physiological difference, the true perception of which is deeply connected with our highest appreciation of individual animal life. A true generation must be regarded as resulting only from the conjugation of two opposite sexes—from a sexual process in which the potential representations of two individuals are united for the elimination of one germ. This germ-power may be extended by gemmation or by fission; but it can be formed only by the act of generation; and its play of extension and prolongation by *budding*, or by division, must always be within a certain cycle, and this cycle is recommenced by

the new act of the conjugation again of the sexes. In this way, the dignity of the ovum as the primordium of all true individuality is maintained; and the axiom of Harvey, *omne vivum ex ovo*, stands as golden in physiology. The buds may put on the dress and the forms of the ovum, but these resemblances are extrinsic, and, in fact, only an inheritance from their great predecessor." We make no apology for the length of these extracts, fully assured that such of our readers as may not have seen the original, will be glad to have a summary of it laid before them. (H. J. Carter) On the true position of the Canaliferous structure in the shell of fossil Alveolina; (J. Alder and A. Hancock) Notices of some new species of British Nudibranchiata; (E. L. Layard) Notes on the Ornithology of Ceylon (continued from p. 64); (F. M. Coy) On some New Cretaceous Crustacea; (W. Clark) On the Aclis unica; (J. Lubbock) On some Artic species of Calanidæ; (T. V. Wollaston) Description of a new genus and species of British Curculionidæ; (J. Miers) On the Genus Lycium; (J. S. B. Sanderson, M.D.) Note on the supposed Antheridia, of Rhamnus. Proceedings of Learned Societies—Zoological Society, May 25, J. Gould, Vice-president, in the chair; Botanical Society of Edinburgh, May 11, Professor Balfour, President, in the chair. Miscellaneous—On the Embryogeny and Propagation of Intestinal Worms, by M.M. Ercolani and Vella; On two new species of South American Birds, by P. L. Sclater; Description of a new species of Hyrax, from Fernando Po, by L. Fraser. Meteorological Table.

No. 81, September:—(G. Lawson) On the occurrence of Cinchonaceous Glands in Galiaceæ, and on the relations of that order to Cinchonaceæ; (Capt. R. C. Tytler) Miscellaneous Notes on the Fauna of Dacca; (J. Alder) A reply to some statements of Dr. Williams, on the controversy respecting the Branchial currents in the Lamellibranchiata. In his paper on the mechanism of respiration in invertebrate animals, Dr. Williams, while giving Mr. Hancock due credit for most of his investigations into the mechanism of respiration in the bivalves, sets off against them certain errors which he alleges Mr. Hancock to have committed; those supposed errors Mr. Alder shows that his friend and brother naturalist has not fallen into, and most satisfactorily clears him from all the charges brought against him. (J. Miers) On the Genus Lycium (continued from p. 141); (Professor Sedgwick) Rejoinder to Professor Milne Edwards, and Mr. Bowerbank. This is, on Professor Sedgwick's part, the close of this disagreeable controversy; and we really have no inclination to sit in judgment as to which party has come off victorious. (R. K. Grenville) Notice of a new species of Caulerpa. This alga, for which the specific name of superba is selected, was found by Mr. J. E. Cox in Bass's Straits, Australia. Bibliographical Notices—Geodephaga Britannica; The Medals of Creation; General Plantarum Floræ Germanicæ; Beale, on the Microscope; Hogg on the Microscope. Proceedings of Learned Societies—Royal Society, April 6, March 30, May 11; Zoological Society, February 10; Botanical Society of Edinburgh, June 8; Linnean Society, December 20. Miscellaneous—On the Development on Cœnurus cerebralis, by Prof. Van. Beneden; On the Capture of Thecacera pennigera, by W. Thompson; Note on Athyrium rhœticum, by S. O. Gray; On the Occurrence of the Larvæ of Sarcophaga in the human eye and nose, by Dr. Grubb. Meteorological Observations.

THE QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE. No. 8, July. Edited by E. Lankester, M.D., F.R.S., and G. Busk, F.R.S., F.R.C.S.E. With woodcuts and lithographic illustrations. London: Samuel Highley. 1854. Price 4s.

(Jabez Hogg) Observations on the Development and Growth of the Water Snail (*Limneus stagnalis*), with a plate. This paper was read at the meeting of the Microscopical Society, on March 29, 1854. A Limneus, placed in a glass vase, was observed to deposit, very slowly, through a fissure, near its ventral aperture, a small, gelatinous sac, filled with transparent specks, at the same time firmly glueing it to the glass. This sac contained fifty-six ova; each egg was of an ovoid form, and consisted of a pellucid membrane, filled with a transparent fluid, having a very minute, yellow spot adhering to one side of the cell wall. Viewing it on the second day, the yolk had a central spot or nucleolus; on the fourth, it had changed its position, and doubled in size; from the sixth day it commenced to move round the interior of the cell; on the eighteenth, the tentacle was visible, with a small, black speck at its root—the eye; from the twenty-seventh to the twenty-eighth day, the little animal was actively engaged in making its way out of the egg, which it did, leaving its shell behind in the ova-sac. As soon as the gastric teeth are properly matured, the cilia that surround the extreme edge of the tentacle—no longer wanting—fall away. Speaking of the cell, Mr. Hogg says—"In this one fact—viz., that the primordial wall does not enter into the formative process of the embryo—are we not furnished with a well marked or broad line of demarcation between that of animal and vegetable life? In the development of the animal the cell wall takes no part in the formation process; in vegetable life, it enters largely into the formation process and ultimate development of all its tissues." (W. Gregory, M.D.) Observations on some Deposits of Fossil Diatomaceæ; (F. Wenham) On the Aperture of Object Glasses; (J. Gorham) On the Magnifying Power of Short Spaces; (Rev. S. G. Osborne and J. Hogg) On Closterium Lunula; (F. Currey) On two new Fungi, with a plate. Translations—(Professor H. Hoffman) On Contractile Tissues in the Hymenomycetes; (Dr. A. Braun) On some new or little-known Diseases of Plants caused by Fungi; (R. Virchow) On Chromatophores in the Frog; (C. T. V. Siebold) On the Transformation of Cysticercus pisiformis into Tænia serrata; (Dr. Eugenberg) On a Black Fur on the Tongue. Reviews; Notes and Correspondence; Proceedings of Societies.

THE ZOOLOGIST. No. 141, July; No. 142, August; No. 143, September. 8vo. London: Van Voorst. Price 1s. each.

No. 141, July:—(R. F. Tomes) Critical Observations on the Notch-eared Bat (Vespertilio emarginatus). We have here a record of every notice that has appeared of this bat, from the one by Geoffroy St. Hilaire, in the eighth volume of the Annales du Museum d'Histoire Naturelle, to some observations by G. B. Bucton, F.L.S., to the Linnean Society, in December, 1853. By the inspection of many specimens, descriptions, and figures, the author is of opinion, that the *V. emarginatus* of British Naturalists may be a variety of either V. mystacinus, V. Nattereri, or V. Daubentonii—at the same time, he considers the V. emarginatus of Baron de Selys Longchamps (a European species) to be a perfectly good species. (O. Pickard, Cambridge) Occurrence of the Hoopoe and Oriole, near

Blandford; (J. W. G. Spicer) Occurrence of the Little Bittern, and other rare birds in Surrey; (H. Stevenson) Occurrence of the Bee-eater, in Norfolk; (P. H. Gosse) A List of Marine animals obtained at Weymouth. This is an account of the rarer marine Animals that passed through Mr. Gosse's hands, in the course of the summer of 1853. Among them were specimens, obtained on the 8th July, by dredging of the very rare *Motella glauca* (mackerel midge), and a specimen of the *Rhombus punctatus* (Bloch's top-knot), brought to him by a trawler, in August. (J. H. Gurney) Note on the Dorsal Ciliary Fibres of the Five-bearded Rockling; (H. H. Crewe) List of Eupitheciæ, &c., reared from larvæ; (F. W. Grant) List of Syrphidæ, taken near Putney; (G. Guyon) Notes on a Marine Aquarium. These notes show what a fund of amusement and instruction may be obtained from a vase filled with salt water, and peopled with the inhabitants of the mighty deep. Notices of New Books—The Zoology of the Voyage of H.M.S. *Herald;* The Annals and Magazine of Natural History. Proceedings of Societies—Entomological Society, June 5; Society of British Entomologists, June 5; Dublin Natural History Society.

No. 142, August:—Proceedings of Natural History Collectors in Foreign Parts. Mr. A. R. Wallace announces his safe arrival at Singapore on the 20th April, where, in about twelve days, he captured nearly eighty species of Diurnal Lepidoptera. And among the Coleoptera, fifty species of the Longicornes. Mr. H. W. Bates from Santarem, January 18. Mr. J. Derby, Floyd Country, United States, March 7. Notices of New Books—Annals and Magazine of Natural History; Transactions of the Entomological Society, vol. iii., part I.; Transactions of the Tyneside Naturalists' Field Club, vol. ii., part 3; Shells and their Inhabitants, parts 11 to 14; A Manual of Natural History, for the use of Travellers; The Microscope and its application to Clinical Medicine. (H. Stevenson) Occurrence of the Honey Buzzard in Norfolk and Suffolk; (W. Borrer, jun.) Occurrence of Larus Sabinei, and of the Continental White Wagtail in Sussex; (A. Hancock) Observations on the Nidification of Gasterosteus aculeatus and G. spinachia. This paper is extracted from the transactions of the Tyneside Naturalists' Field Club, and is a very able resumè of all that is known concerning the nest-building of the three and fifteen-spined sticklebacks. (J. W. Watson) A few Remarks on the Pulsation of some of the Land Mollusks. The number of the pulsations in the first specimen of the common slug (Limax maximus) examined, was from 50 to 55 per minute, at a temperature of 60 degrees, or 65 degrees Fahrenheit. The pulsations of Zonites alliarius were found to be from 65 to 70 degrees per minute. A small amount of heat has a surprising effect on these seemingly-sluggish creatures; for, on placing Z. alliarius on the warm hand, the pulse beats as high as 110 per minute, whereas, on subjecting it for a few seconds to a cool atmosphere, the pulse sinks as low as 30 per minute, and these very weak—thus solving, in a satisfactory manner, the problem of how these mollusks exist during their hybernation. It does not require any very close investigation to make these researches; as the beating of the pulse of Z. alliarius is quite evident to the naked eye, at the under side of the shell, on account of its transparency, and is very distinct with the aid of a small pocket lens. Proceeding of Societies—Entomological Society, July 3, in which part I., vol. iii., and New Series of the "Transactions" were laid on the table.

No. 143, September:—(Rev. G. Gordon) A List of the Mollusca, hitherto found

in the province of Moray, and in the Moray Frith. In the list of the land, fresh-water, and marine mollusca we find nothing particular, save that the province of Moray is, like many other places, gifted with not a few rare things, which only wait the research of naturalists, like the Rev. G. Gordon, to discover their whereabouts. There is appended to his paper a list of that beautiful tribe of mollusks, the Gasteropoda Nudibranchiata, by Mr. George Murray. Owing to the interest excited among malacologists in consequence of the publication, by the Ray Society, of Messrs. Alder and Hancock's work on the Nudibranches, this class has, of late, received some attention; and the appendix to this paper is one of the attendant first fruits. (G. Norman) Some American Snails Naturalized in Yorkshire; (A. G. More) Notes on Zygæna Minos. This insect which, for the present, is an addition to the British fauna, by only being captured on the west coast of Ireland, might, on first sight, be mistaken for the common Zygæna (Anthrocera) filipendulæ. The larva, in all probability, feeds upon the Lotus corniculatus. It is curious that though this insect abounds in Germany and France, it is not to be found in England; and yet, such is the zeal and activity of our English lepidopterists, that we hardly think it could be *with* them, and yet not known *to* them. In such parts of Ireland as it has yet been captured in, it abounds in large numbers. (E. C. Buxton) Captures in Sunderland—among them, Pyrochroa pectinicornis, a species new to Britain; (F. Bates) Captures in Leicestershire. The most important among which is the *re-discovery* of the very rare Curculio (Trachodes hispidus)—four specimens of which were taken by Mr. F. Plant, on 18th June, in a wood; and on the 16th July, nine specimens more. (T. F. Buxton) Parrots at large in Norfolk; (L. H. Irby) Occurrence of the Rose-coloured Pastor, near Dublin; (E. C. Taylor) Birds Shot in Egypt; (J. Scott) Things hoped for, in which the author hopes that every microlepidopterist will aid Mr. Stainton in the discovery of the transformations of the larvæ of the Tineina. Notices of New Books—Geodephaga Britannica. Proceedings of Societies—Entomological Society, August 7.

PHYTOLOGIST.—No. 156, May; No. 157, June; No. 158, July. 8vo. London: Van Voorst. Price 1s. each.

No. 156, May:—(E. Newman) Contributions towards a History of a British Botrychium, considered as a distinct species and as entitled to a place in the British Flora. From these contributions it would appear that Botrychium rutaceum is united to B. lunaria, on account of the paucity of specimens, and that, though this may be a plausible reason, it is by no means a satisfactory one; and the matter can only be finally set at rest by the combined aid of Pteridologists—whom it is hoped will give all the information in their power to Edward Newman, Esq., London. Proceedings of Societies—The Phytological Club, March 8—R. Bentley, Esq., in the chair—March 17; Greenwich Natural History Club, February 25—George Busk, F.R.S., President, in the chair—April 13. This was the second anniversary of the Club, convened for the purpose of electing officers. The Phytologist Club, 156th Meeting, April 22—E. Newman, President, in the chair. Statice Dodartii, was recorded as having been found at Tramore, near Waterford. Notices of New Books—A Plain and Easy Account of British Ferns.

No. 157, June:—(W. Pamplin) A brief notice of some plants observed growing in the neighbourhood of Streatley, Berks, and of Goring, Oxon, in April, 1854,

with additions of such plants as have been gathered there during several visits in former years—viz., between 1833 and 1854. Notices of New Books.—The History of British Ferns, by E. Newman; First General Report of the Government Botanist on the Vegetation of the Botany of Victoria, dated September, 1853, and printed by order of the Council. By some mistake the name of the author of this able report (Dr. Müller) is not once mentioned in the pages of the June Phytologist. The full amount of the species obtained by Dr. Müller, in his journey over more than 1,500 miles, considerably exceeds 1,100. He found that the order of Leguminosæ prevails in Victoria over all the other orders, as in Western Australia; and that the Compositæ, far exceeding in South Australia, and, indeed, throughout the world, any other group, ranks here as the second order. The Report closes with an account of the Botanic Gardens, which are in a most prosperous state, and reflect great credit on their able superintendent. Annexed is a Botanical Report, principally relating to the Eucalyptidæ and Cassuarinæ of Victoria. New Holland, by W. Swainson, Esq., F.R.S., the well-known zoologist. It would appear that, in his desire to promote the cause of botany, the late Lieutenant Governor, Mr. Latrobe, commissioned Mr. Swainson to study and report on the Timber of the colony, particularly the Gum Trees (Eucalypti), and the Australian Pines (Cassuarinæ). Upon this Report of Mr. Swainson we make no comment for the present; satisfied as we are that much that looks mysterious and marvellous now will be made clear before long. Mr. Swainson is a man of acknowledged ability, and though some of his accounts be startling, yet we feel confident they will turn out correct; and, we are sure, his knowledge has not been acquired without years of study. We wish we could have from him a report of the zoology of the district surveyed, which, we think, would prove as interesting as the botany. Proceedings of Societies—the Phytologist Club, 157th Sitting, May 20—Mr. Newman, President, in the chair; Botanical Society of Edinburgh, April 13—Professor Balfour, President, in the chair. A most interesting paper was read by Dr. W. L. Lindsay, on the Dyeing Properties of Lichens. Mr. J. Kirk sent specimens of a Potamogeton from Lough Corrib, which Mr. Babbington thought was, perhaps, P. sparganifolius (*Fries*).

No. 158, July:—(W. Millen) A List of the more Interesting Plants, found lately near Belfast, and their latest discovered additional localities. This list has been revised and corrected by the Rev. W. M. Hind, F.B.S., who is particularly well acquainted with the botany of the counties Antrim and Down. We could have wished that the words rare, very rare, &c., had been affixed to the localities given—for instance, the second plant in the list, Glaucium luteum, we think, although there is nothing in the list to say so, must be very rare in the habitat given, as we, on careful search, never found more than a single specimen. Slieve-Donard—a lofty mountain in the vicinity of Newcastle Co. Down—is given as a locality for the beech fern (Gymnocarpium Phegopteris), one of the very rarest of the Irish ferns. (D. Moore) Notes on some rare plants, including Ajuga pyramidalis, in Arran. Two plants of the pyramidal Bugle were found on the island, and this is the first and only discovered Irish habitat. (J. G. Baker) Contributions to British Lichenology; (A. Hambrough) Occurrence of Arum Italicum, at Steephill, Isle of Wight; (J. R. Kinahan, M.B.) A List of the Ferns, and their allies, found in the county Dublin, with special reference to the Dodder Valley. Perhaps few more lovely localities exist in the county of Dublin, than the Vale of the

Dodder, and certainly none of such interest to the botanist. We hope soon to see all its botanical treasures as well searched after as the ferns have been by Dr. Kinahan in this very interesting paper. Notices of New Books—Botany of H.M.S. *Herald*. Proceedings of Societies—Botanical Society of Edinburgh, May 11; Dublin Natural History Society, June 16; Phytological Club, May 10; Phytologist Club, 158th sitting, June 24. Having thus presented our readers with a summary of the contents of the Phytologist for the last three months, it is our painful duty to have to announce to them, that the active and ever-attentive superintendent of this popular monthly periodical is no more; that, after a connection of nearly thirteen years with the Phytologist, Mr. Luxford breathed his last on the 12th June, 1854, at his residence, Hill-street, Walworth. Mr. Luxford was born in Surrey, on the 7th April, 1807. At the early age of eleven, he was placed under Mr. Allingham, a printer and stationer; and after a service of sixteen years, during which, through the kindness of his master, he acquired a superior knowledge of the Greek, Latin, and French languages, and a vast store of literary and scientific knowledge. Botany was ever his favourite pursuit. In 1834, he removed to Birmingham; and in 1837, returned to Reigate for a few months, and the same year commenced business as a printer in Ratcliff-highway. In 1838, he wrote, printed, and published the "Flora of Reigate." In 1841, he commenced the "Phytologist," of which he was sole editor for many years, and a superintendence of which he exercised continuously up to the June number. In 1846, he obtained the lectureship on botany in St. Thomas's Hospital. He was an associate member of the Linnean Society of London, and a fellow of the Botanical Society of Edinburgh.

> "Life is like the autumn leaf
> That trembles in the morn's pale ray,
> Its hold is frail, its date is brief,
> Restless, and soon to pass away."

The Phytologist will be discontinued until Mr. E. Newman meets with some one willing to undertake the duties of editor.

Hooker's Journal of Botany. No. 65, June; No. 66, July; No. 67, August; No. 68, September. 1854. London: Lovel Reeve, 5, Henrietta-street. Price 2s. each.

No. 65, June:—(Rev. M. J. Berkeley) Decades of Fungi—Decades 44-46—Indian Fungi (continued from p. 143); (J. S. Roe, Surveyor General) Report of a Journey of Discovery into the Interior of Western Australia (continued from p. 151); (W. H. Harvey, M.D.) Notes on the Botany of King George's Sound. These notes are contained in a letter, dated January 29, 1854, and give us Dr. Harvey's first impressions of the "golden" lands of Australia. On the shore, his first "find" was the famous Fucus peniculus, of R. Brown. Of all sea plants, it appears to be the very commonest in St. George's Sound, occurring all round the shore, at a depth of two or three feet, being washed in abundantly whenever it blows (as it does, generally, ten hours per day). The plant grows *always* on dead shells; *generally*, single valves of venus, or mussel and oyster shells. Its *spores* are remarkably large, and have very hard and tough coats. At first, every little bag is filled with green matter, like that of Codium or Bryopsis; afterwards, this matter is wholly converted into spores, which are discharged on the bursting of the membranous bag. Botanical Information, which records the death of Dr. Wallich,

F.R.S., Vice-president of the Linnean Society, Knight of the Danish Order of Danebrog—a name that will be loved and honoured as long as botanical science shall continue to be cultivated. His persevering and arduous services and literary labours in unhealthy tropical climes gradually undermined his constitution and induced organic disease, which, after two or three months' confinement, terminated fatally, at his house in Upper Gower-street, on the 28th April, 1854, in the 68th year of his age. (Mr. Swainson) Botanical Report on the Eucalypti and Cassuarinæ of Victoria, New Holland; Botanical News from Italy; Podostemon Salt. Notices of Books.

No. 66, July:—(G. Bentham) Notes on North Brazilian Gentianeæ, from the collections of Mr. Spruce and Sir R. Schomburgk; (M. J. Berkeley) Decades of Fungi—Decades 47, 48—Indian Fungi (continued from p. 174), with lithographs of Lentinus inquinans, Berk., and Poluporus spuamæformis, Berk.; (J. S. Roe) Report of a Journey of Discovery into the Interior of Western Australia, between 8th September, 1848, and 3rd February, 1849 (continued from p. 180); (W. H. Harvey) Extract of a letter from—dated Cape Riche, West Australia, March 12, 1854—in which Professor Harvey states, that owing to want of storms to drive the algæ on shore, he has not found the coast as productive as he would have wished, there being very little ground laid bare at low water-mark for examination. The Fucoids along the shore do not seem to reach their proper development—at least, none are yet to be found in fruit, and very few are properly provided with air-vessels. My dried specimens of algæ, so far, are about 5,000, but only about 120 species among them. I have got a Martensia (or Hemitrema), but very few specimens of it. It was a deep water waif. Botanical Information—Letter from M. Kralik—now collecting in Tunis—on his journey in that Regency. Notices of Books—Goodenoviceæ; (W. J. H. Hooker) Icones Plantarum. 8vo. 10 vols. 1,000 plates.

No. 67, August:—(Rev. M. J. Berkeley) Decades of Fungi—Decades 49, 50—Indian Fungi (continued from p. 212), with lithographs of Lentinus prærigidus, Berk.; Cordyceps racemosa, Berk.; C. falcata, Berk.; and Sclerographium aterrimum, Berk; (G. Bentham) On the Tree supplying the Sabicù Wood of Cuba. This tree, the Lysiloma Sabicu, appears, as far as is hitherto known, to be strictly confined to the Island of Cuba. Its timber is extensively imported into this country for its excessive hardness, which renders it so valuable for ship-building and other purposes. (C. R. Nesbitt) Vegetable Fibres of the Bahamas; (J. S. Roe) Report of a Journey of Discovery into the interior of Western Australia (continued from p. 217). Botanical Information—Oxford Herbarium. An idea of the extent of the whole collection of dried plants preserved, may be given from the total number of specimens—viz., 43,812. The Herbarium also contains the valuable collection of drawings of the animals of the Levant, executed by the celebrated F. Bauer. They consist of 11 drawings of quadrupeds, 44 of reptiles, 122 of fishes, and 115 of birds; also one of the only two copies struck off from the plates engraved, by order of the Emperor, from the MS. of Dioscorides, with illuminated figures, preserved in the imperial library, at Vienna, presented by Dr. Sibthorp, and was given him by the elder Jacquin, when he passed through Vienna, on his way to Greece, in 1786. Collections of dried plants, on sale with R. F. Hohenacker, at Esslingen, near Stutgart. Notices of Books—Sikkim—Himalayan Plants; Bryologia Britannica; Synopsis Plantarum Glumacearum; Monograph of Tropical American Oaks.

No. 68, September:—(Dr. W. H. de Vriese) Remarks on Doornia and Rykia,

two new genera of the Screw Pines, preceded by some general observations upon that class of plants—being the substance of a Lecture delivered on the 27th of May, 1854, before the Royal Academy of Science, at Amsterdam. We have an account in this lecture of a visit which Dr. de Vriese paid to the celebrated M. Gaudichaud, at Paris, in 1854, to get some information upon his new genera of the Paudaneæ; but he only spoke of what for years had been his fixed idea, the growth of the fibres in the stems of plants in a downward direction, showing beautiful drawings and specimens to prove it, but not enough to convince Dr. de Vriese of the truth of his theory; the time passed away, and he learned nothing of that for which he came. (B. Seeman) Revision of the genera Crescentia, Parmentiera, and Kigelia; (C. J. Muller) Extract of a letter from—relative to the preparations of Cannabis sativa in India. Botanical Information—Oxford Herbarium (continued from p. 252); Alexander Croall's Plants of Bræmar; Lichens of the late Pastor Schærer. Notices of Books—United States Exploring Expedition; Botany; Phanerogamia, by Dr. Asa Gray; Bryologia Javanica; Dozy, F. et J. H. Melkenboer.

THE NATURALIST: conducted by B. R. Morris, M.D. No. 41, July; No. 42, August; No. 43, September, 1854. 8vo. London: Groombridge and Sons. Price 6d. each.

No. 41, July:—Zoological Notes—(J. M'Intosh) Gleanings from my Notebook, No. 3; On Musical Animals; The Glowworm; The Sparrow in Asia; Do Rats leave Dangerous Places? (O. S. Round) Spring Birds; (J. Garland) Local Jottings, No. 12, Dorchester; (E. Parfitt) A List of the Land and Fresh-water Shells found in the neighbourhood of Exeter. This list also contains the slugs. Toward the close of it Mr. Parfitt says, that in January, 1852, he found some Cocoons of Trichiosoma tucorum on a hawthorn hedge, at Heavitree, near Exeter, from which Ichneumons came in the June following; and that these Ichneumons were the Tryphon nigriceps of Gravenhorst, which were reared by Mr. Foxcroft towards the close of last year (1853), and were announced by him as new to Britain. If Mr. Parfitt be correct in the specific nomenclature, he will be entitled to the rank of priority in the discovery. (J. M'Intosh) Notes on the Raspberry Plants, from seed found in the stomach of an Ancient Briton; (J. M'Intosh) Injurious Insects, No. 2, Sirex gigas, with a wood-cut; (J. Gray) Description of a New Coleopterous Insect, belonging to the genus Prionus; (J. M'Intosh) Utility of the Common Mole; (A. S. Moffat) Singular Breeding-place of the Rabbit; (G. R. Twinn) Nature and Harmony. Miscellaneous Notices; The Retrospect; The Querist.

No. 42, August:—Ornithological and Entomological Notes; Local Jottings, No. 13, Dorchester; White Jackdaw; Vanessa Cardui, &c.; (J. Rose) Gleanings by the Way; (M. Westcott) Occasional Notes; A Common Rat in Trouble. The individual rat in question measured, from tip of nose to end of tail, twenty-two inches, and weighed two pounds one ounce. A Canary in a trance, &c.; (G. R. Twinn) Superior Instinct in a Wagtail; (W. Webster) Land and Fresh-water Mollusks, found during a few weeks residence in Cheltenham and the vicinity. The rare and local Clausilia Rolphii was found in colonies extending from Birdlip to Cooper's Hill, among patches of Saxifraga oppositifolia. (C. Ashford) List of Land and Fresh-water Mollusks, found in the neighbourhood of Ackworth,

Yorkshire; (J. Longmuir) Notes on the Ant of Scripture. This is a very interesting resumé of all that has been written upon this subject. (G. R. Twinn) October's Farewell Week. Miscellaneous Notices; Querist.

No. 43, September:—(J. Dixon) Random Recollections of the Cat. In this cleverly-written paper we have a record of many anecdotes of this domestic animal, which tend to put "poor puss" on a *little* better footing with some of its accusers. (H. H. W.) A Young Cuckoo, reared by Wrens; (J. Dixon) The Common Gull (Larus canus); (C. H. Dashwood) Short Notes from my Notebook; (S. Hannaford) Notes on the Natural History of Melbourne. The absence of fear in birds, not yet accustomed to the presence of man, is exemplified in the case of the Kingfisher, which, on being accidentally disturbed on its nest by Mr. Hannaford, flew at him many times in great anger, uttering, at the same time, a loud scream. (J. Gatcombe) Occurrence of Hoopoes, near Plymouth; (G. R. Twinn) The Ferns &c., of Bawburgh Hill; (T. F.) Early Entomological Captures. Reviews—Natural History Review. We tender our best thanks for the kindly welcome. The Cabinet of British Entomology. Proceedings of Societies—Entomological Society, July 3. The Querist.

THE JOURNAL OF INDUSTRIAL PROGRESS. Edited by W. K. Sullivan, Chemist to the Musuem of Irish Industry. No. 7, July; No. 8, August; No. 9, September. 1854. Dublin: J. B. Kelly.

THOUGH this periodical continues as interesting as ever to the man of science, still there is not much in these numbers of special service to the naturalist, if we except an article in the September number, by M.M. Malaguti and Durocher, On the Resistance offered by Hydraulic Limes and Cements to the Destructive Action of Sea Water. Since tanks for containing salt water are now daily being manufactured, for the purposes of Aqua-vivaria, we can recommend this paper to the favourable notice of those so employed; they will find in it an account of the cements most likely to resist the influence of salt water, which they extensively employ for the above objects.

Proceedings of Societies.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JUNE 21, 1854.

ROBERT M'ADAM, Esq., Vice-president, in the Chair.

The following report for the session of 1853-54, was read by Mr. A. O'D. Taylor, one of the secretaries:—

"This time last year the council submitted to the shareholders a report, in which they had the pleasure of referring to the meeting, in this town, of the British Association for the Advancement of Science—to the collection of Irish antiquities temporarily formed for that body, within your Museum, and to other interesting topics, which are now passed away. The session which has just concluded has no such particular facts to mark its career, and the arrangements of the museum and of the Society having since fallen into their ordinary course. As regards the museum itself, various additions have been made to its collections, as detailed in the donation-list accompanying the present report. The Thompson Room is now fitted up with a number of suitable cases, in which specimens illustrative of Irish Natural History are about being deposited.

"Other arrangements, with the view of rendering part of the specimens more practically useful, are in contemplation by the council, and they expect will, at any rate, be partially matured during the summer months, by the formation, in the large middle room, of a typical collection of the animal kingdom. As usual, for the past few years, the working-classes enjoyed the benefit of visiting the Museum on Easter Monday, at a trifling admission charge. About 5,000 persons, including a large number of children, were present, and the same propriety of conduct was manifested, and the same interest in the collections evinced as had been observed on previous occasions.

"The library has been lately enriched with some valuable donations; and a large amount of space being now rendered available by recent improvements, all the books are in course of re-arrangement, to secure more easy and ready reference than has hitherto been practicable.

"The 33rd session of the Society has now terminated; and during its continuance, from October, 1853, till May, 1854, fourteen meetings have been held, nine of them ordinary or private, and five of them public. The following list will show the varied nature of the subjects discussed:—

"PAPERS READ IN THE SESSION 1853-4.

"Dr. Dickie on the relations of form and colour in plants and animals.

"Mr. R. Young on drainage: its relation to economic and sanitary aspects.

"Rev. J. S. Porter on the state of society, arts, and manners among the primeval inhabitants of Ireland.

"Professor M'Coy on experiments to determine the effect of pressure in modifying the temperature of fusion, with their application to geology.

"Mr. A. O'D. Taylor on the gigantic birds formerly found in the Mauritius and adjacent islands.

"Dr. Stevelly on the electric telegraph.
"Mr. Patterson on the instinct of animals.
"Mr. Steen on the recent discoveries in astronomy.
"Mr. Patterson, Notes on Chinese mirrors.
"Mr. MacAdam, Notes on physical geography.
"Dr. Andrews on the composition and properties of ozone.
"Mr. Murphy on the mountain chains of Europe and Asia, in their physical and political relations.
"Mr. Patterson on the uses of animals to man.
"Mr. Millan on the more remarkable plants in the neighbourhood of Belfast.
"Mr. Montgomery on the American ship canal.
"The treasurer's report will show the present state of your funds, and your council trust that you will approve of the manner in which they have expended the amount authorised at the last annual meeting to be raised for the purposes then specified. In concluding this report, the council have merely to express, in general terms, that the museum and Society are progressing steadily, and are continuing to foster that spirit of scientific inquiry which it has always been the aim of your council to develop and encourage."

After the report was read, the following gentlemen were elected members of the council for the ensuing twelve months:—Thomas Andrews, M.D., F.R.S.; George Dickie, M.D.; J. R. Garrett, Edmund Getty, M.R.I.A.; John Grainger, John Grattan, George C. Hyndman, James MacAdam, F.G.S.; Robert M'Adam, J. J. Murphy, Robert Patterson, John Stevelly, LL.D., Rev. Isaiah Steen, A. O'D. Taylor, James Thomson, C.E.

The council selected the following office-bearers out of their number:—President, Thomas Andrews, M.D., F.R.S.; Vice-presidents, John Stevelly, LL.D., George Dickie, M.D., George C. Hyndman, Robert M'Adam; Treasurer, John Grattan; Librarian, Rev. I. Steen; Secretaries, James MacAdam, F.G.S., and A. O'D. Taylor; Corresponding Secretary, John Grainger.

The thanks of the meeting were voted to Robert Patterson, Esq., on his retiring from the office of President, which he had held for the last two years; and to James MacAdam, jun., Esq., on his retirement from the office of Corresponding Secretary.

The following is a list of the donations received during the session 1853–54 to the museum:—

Mrs. Blair, Clearstream Cottage—Specimen of foreign fish.
John Porter, Esq.—Specimens of Sicilian antiquities, a number of coins, and specimens of the Papyrus.
Sir J. Emerson Tennent—A large and beautiful collection of shells from Ceylon.
T. H. Jones, Esq., Moneyglass—A pied blackbird.
Captain Turney—The jaws and part of the backbone of a shark.
William Young, Esq.—A razor-bill in winter plumage, shot in the Lagan.
V. Coates, Esq.—Two goosanders, shot in Scotland.
Captain May—A rifle-gun from Lapland.
William Verner, Esq.—Specimens of ornithorhyncus.
Mr. William Darragh—Specimens of the gadwal, shoveller, and long-tailed duck.
Mrs. Freckleton—A lizard.
Dr. Dickie—Eggs of foreign and native birds.
Rev. Alexander Mackay, Antrim—An old medal.
Major Macpherson—A large bream from Lough Neagh.
R. Garrett, Esq.—Specimens of Portland oolite.
James MacAdam, Esq.—Specimens of minerals.
John Charters, jun., Esq.—Skins of four animals from America.
A. O'D. Taylor, Esq.—Specimen of Sandwich fern.
Sir J. E. Tennent—A paraffine candle.
James Gibson, Esq.—A horn implement found near Antrim.
Mrs. Richard Thompson—Brass medal found near Woodburn.
Mr. William Darragh—A silver coin of Henry VI.
To the Library—Proceedings of the Smithsonian Institute of Washington, Maury's

Sailing Directions, Adams's Contributions to Conchology, Characteristics of American Reptiles, Girard's Revision of Astaci, Dr. Hare on Tornadoes, Maps of California, Catalogue of Indian Portraits, Contributions to Knowledge.

Dr. R. Ball—Address to Dublin Geological Society.

The Editors—The Natural History Review for January and April.

Historic Society of Lancashire and Cheshire—Their Proceedings, vol. v.

University of New York—Report of Regents, January, 1854.

London Geological Society—Their Proceedings.

Irish Census Commission—Report on Disease in 1851.

Professor E. Forbes on the Educational Uses of Museums.

George C. Hyndman, Esq.—Six scarce pamphlets.

Dublin Geological Society—Their Proceedings.

R. W. Jackson, Esq., Armagh—Manuscript in the Tamul language, on palm leaf.

Prince Bonaparte de Canino—Classification Ornithologique.

Armagh Natural History Society—Their Report.

R. Davison, Esq., M.P.—Lyell's Report on the New York Exhibition.

Dr. S. Bryson—Two volumes of Irish manuscripts.

John Cunningham, Esq., Macedon—Selby's Ornithological Illustrations.

CORK CUVIERIAN SOCIETY.

APRIL 5, 1854.

PROFESSOR BOOLE in the chair.

Professor Boole gave an account of a singular echo noticed by him, at the Warkingborough Station, on the Great Northern Railway, Lincolnshire. A fence of upright wooden rails extends for a considerable distance on one side of the railway. A blow of a stick being struck on the opposite side, the echo is a distinct whistle. The rapid succession of separate echoes from the rails of the fence, serves to account for this phenomenon. Professor Boole explained in what way a series of rails should be arranged, so that the echo of any sharp sound, produced by percussion, should be a definite musical chord, or even a cadence.

[In future, the proceedings of the Cork Cuvierian Society, as far as they relate to natural history, shall be given in our pages, as corrected by the council.—EDS. N. H. R.]

DUBLIN NATURAL HISTORY SOCIETY.

JUNE 16, 1854.

JAMES R. DOMBRAIN, ESQ., in the chair.

The minutes being confirmed,

A beautiful specimen of the pheasant fowl was presented by R. P. Williams, Esq., who observed that he was anxious to place in the collection a complete series of the best breeds of fowl introduced to this conntry. This fowl is acknowledged to be a purely English breed, but has been erroneously termed Hamburg.

Dr. Kinahan said he had twenty species of native Coleoptera to present to the Society, and which he would name and arrange in the museum.

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

Mr. Andrews said, that before commencing the papers for the evening, he was desirous of placing on record some plants that had been first noticed in this country

at the meetings of the Society. The first was a very remarkable form of Saxifraga geum—fine specimens of which he submitted to the meeting. It was first found by him in the Great Blasket Island, in 1842, and noticed in the Society at the December meeting of that year. It was remarkable for its strong growth and dark hirsute leaves, but more particularly for the glands which surround the ovary, and which, in the flowering state of the plant, present a beautiful appearance, the glands being of a deep rose-colour. It seemed remarkable in connecting the Saxifragaceæ with the Parnassiæ and Crassulaceæ; it produces perfect seeds, and the seedlings present the same characteristics as the parent plant. Dr. Harvey, who took specimens to England, writes:—"Charles Darwin was very much interested in your Blasket Saxifrage, particularly in the fact of its producing perfect seeds. He is working out some observations on the continuability of varieties by seed, and wishes much to know whether the seedlings from this Saxifrage produce the metamorphic glands of the parent. I told him I thought they did, but would get the full particulars from you." My friend, Mr. Simon Foot, who cultivated the plant, confirms the fact of the seedlings having the same formation of glands as the parent, and informed me that Dr. Lindley observed to him that he considered it would prove to be a plant of great interest. Plants of Saxifraga Pedatifida, Arabis Crantziana, and Saxifraga leucanthemifolia were exhibited, as originally noticed in the Society; the two former discovered by the Right Hon. John Wynne, of Hazlewood, the Saxifrage in Mayo, and the Arabis on Benbulben, Sligo. The Saxifraga leucanthemifolia, which exhibited numerous foliaceous buds on the flowering branches, and which, on falling off, became young plants, was brought by Dr. Scouler from Portugal. On flowering, the following year, this peculiarity in the plant was seen and brought forward, as it had not been noticed by any continental botanist. The plants do not perfect their seeds.

Mr. Andrews was then called upon to read his paper on

THE SPAWNING STATES OF THE SYNGNATHIDÆ, OR PIPE-FISH FAMILY.

It had been my intention this evening to have submitted to the Society some peculiarities that I had observed in the spawning states of the Syngnathidæ, or pipe-fish family, more especially with reference to *Syngnathus typhle*—the deep-nosed pipe-fish—and to the straight-nosed pipe-fish (*S. ophidion*), and to have added a review of the several British species (all of which I have obtained on the south-west coast), detailing their several habits and seasons of spawning. From this, however, I have been diverted by several communications that have been made relative to the habits of the salmon, and as to the identity of the fish known as the parr, or gravelling, with the Salmo salar. This being a subject of such importance, not alone in a scientific point, but in its practical application, that I again lay aside my paper upon the Syngnathidæ, with the hope that this will afford full discussion of interest for the evening. It may be in the recollection of the members that a paper of great interest was given by Mr. Ffennell, Inspecting Commissioner of Fisheries, in the month of February, 1849, "On the Habits and Spawning States of the Salmon, and upon the Salmon Fisheries of this Country." In that paper Mr. Ffennell supported the views of Mr. Shaw, of Drumlanrig, relative to the first, and the parr state of the young salmon, and its remaining two years in the river before it assumed the smolt or migratory state; and though he admitted that the seasons and the condition of salmon were not the same in all rivers, yet he maintained that a uniform system of open and close season should be adopted in order to prevent the nefarious and injurious system that might probably result in salmon being exposed for sale in a public market, taken from a close river while other rivers were open. This paper was, in some measure, an explanation with reference to an inquiry held on the fisheries of the Caragh and the Laune, in Kerry. My friend, Mr. Williams, at that meeting of the Society, energetically disputed that the fish known generally as the parr or gravelling was the young of the salmon. He had made examinations of an extensive collection of that little fish, which he had obtained throughout the seasons from the rivers of Cork and of Wicklow, and he was not disposed to agree with Mr. Shaw, of Drumlanrig, that all fish termed gravellings were the young of the salmon. At the meetings of April and of May last, notices were again brought forward by Mr. Ffennell and by Mr. Williams, and I thought

it might lead to interesting, and, I trust, useful, discussion, to submit some of the fish in the parr and in the smolt state, and to offer a few remarks. At the time of that discussion, in 1849, my attention had been chiefly directed to the sea-fisheries of the west coast; but during the seasons of 1848, 1849, and 1850, I had ample practical means of making observations in the salmon fishery connected with the project I was engaged in. Determined to follow out that inquiry as time and circumstances permitted, my friend, Mr. Williams, accompanied me on the 23rd of May to Carlow, to visit the little river Greece. Former recollections and frequent fishing excursions satisfied me that the little fish known and described as the parr by Yarrell existed there in abundance. The rivers Greece and Ler, which stream through the borders of Carlow and Kildare, and empty into the river Barrow, are famous for their excellent trout; the former, a lively stream, rapid over clean, gravelly beds, produces abundance of bright and well-fed trout.

Although the day was in every way unsuited to the wishes of a fly-fisher, we, however, soon obtained the object of our search. Many years have passed since my former visits, but there was the same purling, restless stream, the banks, the untopped wall leading to the old bridge, unchanged and untouched as it were but yesterday. Carlow is delightfully rural; its avenue-like roads, bordered with tall, fragrant hawthorn, made us buoyantly feel the change from city life. Besides, to the naturalist, every step afforded interest; along the banks of the river the Ephemeræ and the Phryganeæ, as they suddenly emerged from the pupa state, almost as suddenly merged into the stomach of some lively trout; the light and the dark ash-fox, brown and gray Coughlins, and the hawthorn flies, as they floated along, or fluttered about the stream, were all the objects of attraction. The question which we sought the elucidation of, was not as to whether salmon do or do not enter the Greece from the Barrow, or whether the shallow beds of that little stream are or are not suited for spawning-ground, but with regard to the distinctive characters of the parr existing there, its comparison with that described in Yarrel, and with that of the true salmon-fry. The local terms, lasprings, gravel-lasprings, salmon-pink, fingerlings, gravellings, parr, and samlet, have all been made of too general application, and no proper separation has been drawn distinguishing habits or characteristics; but all are confounded as gravellings, and gravellings said to be to be the parr, the young of the salmon. My friend Williams had argued that the gravelling that he had obtained in some of the rivers of Cork and of Wicklow, were not the young of the salmon, and so far he was right; for neither were those we obtained in the Greece. These latter were identical with the accurate descriptions given by Yarrell, by Dr. Heyshaw, and by several authors.

The head being of a greenish ash-colour; back and sides, above the lateral line, dusky, or olivaceous brown, marked with numerous dark spots, bordering the lateral line a series of carmine or vermilion-coloured spots; belly, silvery white, and the body marked with nine or ten bluish-coloured transverse bars; gill-covers have generally two dark-coloured spots, one more strongly marked than the other; dorsal fin with a few dusky spots; pectoral fins, larger than those of the common trout, yellowish white; anal and ventral fins, yellowish; caudal fin, much forked; body, deeper in proportion to its length; general length from four to six inches. Now, on comparing these specimens with those of the true salmon-fry, obtained from the Bandon, Laune, and the Carragh rivers, we find great distinctions in development and markings. In the true salmon-fry, the head more blunt; broader on the neck and shoulders; gill-covers marked similar with spots silvery gray; preoperculum much rounded, external edge soft; back, dusky ash-colour, with numerous minute dark spots, which do not go beneath the lateral line; nine bright orange, or approaching to vermilion-coloured spots along the lateral line, equalling in number the transverse bars; pectoral fins, long in proportion, yellowish white, tinged with black; dusky spots generally absent on the dorsal fin; caudal fin, largely developed; ventral and anal fins, yellowish white; belly, white. The body is narrower in proportion to its length than that of the parr, and the teeth in a more rudimentary state.

All the specimens of the Salmonidæ that I have obtained are more or less in the young state characterized by those transverse bars. In the rivers where it frequents, the parr is abundant in all seasons, in the same stages of growth; and even when the

memorable floods of the winter of 1849 were supposed to cause the scarcity of 1850, the parr was equally abundant. An experienced salmon-fisher, employed in the salmon-fisheries of the Laune, states that the barred gravellings are to be found there all the year round of the same growth; that he considers them to be distinct from the true salmon-fry, which is not to be found at the end of May or the month of June, of any size—all the full-grown fry having gone to the sea, while those of the season are too small to be noticed. In order to illustrate that confusion might naturally exist with regard to the gravelling, Mr. Andrews exhibited specimens of a series of the following:—Salmon-fry, from the Caragh, Laune, and Bandon rivers; parr, from the Greece, the Bandon, and the Caragh; young of the white trout, from the Laune and the Bandon rivers; young of the brown trout, from the Caragh; smolts, with migratory dress, from the Laune river. To all these species the term "gravelling" was generally applied. A most intelligent friend of Mr. Williams observes, that on the Bandon river he has marked numbers of gravelling, and that afterwards he has taken them as peal. No doubt, among them he may have marked the true salmon-fry, and, on their return from the sea, have taken them as peal; but no proof can be afforded that all marked underwent the same change. A characteristic mark in the young state of the salmon-fry and the brown trout is the yellowish-gray colour of the adipose fin of the former, while in the latter it is tinged and tipped with orange. From these specimens exhibited, and from some of the foregoing remarks, a question would arise as to the several states of growth and age of the fry and smolts. To Mr. Shaw, of Drumlanrig, undoubtedly, belongs the merit of determining the true stage of the fry from the ova; but still his observations have not all been satisfactorily conclusive. The trials and experiments of development, carried on artificially in ponds and in tanks, may, to a certain extent, illustrate extrication from the ova and changes of the fry state; but in an animal, peculiarly sensitive through those changes of growth, that growth must be more or less retarded by the deprivation of its natural acts and resources. Mr. Shaw successfully proved the experiment with regard to the character of the fry by taking them direct from the spawning-beds of the salmon; and to him much is due for so perseveringly pursuing such well-directed inquiries, and to the shame of preceding naturalists, who ought to have sifted what really was the young state and habits of a fish of such importance in the economy of our industrial resources. His experiments only so far prove what really are the young of the salmon, not that all young states of the Salmonidæ, named parr or gravelling, are the young of the salmon. In this treatise—"Experimental observations on the growth of Salmon-fry"—Mr. Shaw mentions, at page 4, "that after the so-called smolts have descended to the sea, none of the larger parr can be detected in the rivers." The idea that the male parr consorts with the female salmon is too delusive to be supported. What attainable object is advanced by such a departure from all natural laws? That the ova and the milt, in a rudimentary state, may be detected in the young stages of the true salmon-fry I do not deny; but that the female salmon, which is said to be incapable of the fecundating development of the ova until after the third year of existence, and first return and enlarged growth from the sea, can be impregnated by the male of the fry, which had not visited the sea nor undergone those changes necessary for mature growth, appears contrary to all physiological principles. It is true that parr, gravelling, and small trout, on the spawning-beds of the salmon, during the periods of spawning, may constantly be noticed; for such shoals of the river are their proper locality. O'Gorman, who wrote "The Practice of Angling in Ireland," a most experienced salmon-fisher, and who now enjoys a fine old age in the town of Ennis, could never be persuaded of the parr state of the salmon, but that all the young retreated to the sea the first season of their existence. My own observations and inquiries would lead me to consider, that from the period of the extrication of the fry from the ova to the change to its smolt or migratory state would be about thirteen or fourteen months. In some rivers the fry are in a more advanced state in the winter and spring months than in others—that is, undergoing earlier extrication from the ova, according to the temperature of localities, or to early or late breeding fish. Hence, the varied growth throughout the summer and autumn; and I further consider, that the great bulk of these assume the migratory state in the following spring, descending early in April and May to the sea. That they assume

the silvery scales and full migratory dress in the higher portions of the river, before their movement to the sea, I have frequently detected. Referring to my notes, I find that, some years since, when fishing in the county of Clare, about the first week in May, in company with the late James O'Gorman, I met the salmon-fry in abundance, with the silvery scales or migratory coat, in that part of the Cooraclare river between the bridges of Ballydoneen and Goulbourne. Some dozens were taken in a part of the stream that ran rapidly over a rocky and gravelly bed which high banks overhung—it was close to a spawning-bed of the salmon. These fish had perfectly assumed the silvery scales of the smolt, tapering in form, and with pectoral and caudal fins largely developed—the terminal parts tinged with a dark shade. Subsequent observations and application to the subject led me to consider that they were the young of the ova of the previous year, and that they had only attained their thirteenth or fourteenth month—their migration to the sea being between the eleventh and fourteenth month from the period of extrication from the ova. The river of Cooraclare—which assumes the name of Dunbeg where it falls into the Atlantic Ocean, in the little estuary of that name—is famous for its salmon. In August, 1835, I saw, in one haul, 104 salmon and 200 white trout, taken by Michael Kennedy from the lake below the bridge and fall, under Dunbeg Castle. The rivers Creegh, Annageeragh, and Annagh, which I have fished, are all excellent in their seasons for salmon and white trout. In the little river of Monmore, which runs through the great bog of that name, salmon and white trout run up the stream in the autumn floods; but I never recollect meeting the gravelling there with the markings and bright hue of the parr. It is not my intention now to enter into a statement of the salmon-fisheries, but merely to refer to some of the observations made by Mr. Ffennell in this Society. At the meeting in April, Mr. Ffennell mentioned that, at the approach of the spawning-season, the male salmon invariably first ascend the rivers from the sea. It is singular that authors have given the precedence to the females, both to the salmon and to the trout. Allowing either the priority, experience has shown that the parent fish are on the spawning-beds together, each occasionally engaged, but more especially the female, in the excavation of the furrow or channel where the ova are to be deposited; and in this labour their principal exertions are "snouting" the gravel. The clear and shoaler beds of a river, where it is necessary for the salmon to select the deposit-beds for the due maturating of the ova, can be quietly watched and all their operations noticed. In the Wandle, Mr. Gurney has seen the large trout raise ridges of gravel, and has remarked their noses or snouts to be lacerated by the work. The romantic history of Remy, the fisherman of the Vosges, pursuing his patient watchings on the habits of the trout, in the bleak nights of November, and which reflect lustre on his powers of observation, is pleasingly told. But no such endurance is now necessary to mark the operations of the parent salmon. Some have observed that the hook of the male salmon serves some purpose in the spawning operations. This curvature of the under jaw is peculiar both to the male salmon and to the trout, and is more or less developed, according to age or state of health of the fish. On the ascent from the sea the hook is merely observable, but after the exhaustion of spawning the reduced condition of the fish renders it more conspicuous; and, should obstacles prevent the proper period of return to the sea, a cartilaginous extension takes place (whence the fish is called Carraughabaugh), but which disappears on the renewed health of the fish, in its visit to the sea. In aged fish, particularly in large trout, this curvature becomes permanent in its enlargement, forming a deep fossette in the upper jaw. Without a good foundation of scientific and practical knowledge combined in the pursuits of such subjects, it is a task of great difficulty to select, with judgment, the plausible opinions that are frequently advanced by writers of known character, but who, at the time, perhaps, only possess general views of the matter of which they treat. Thus, Mr. Keiller, in "Lloyd's Scandinavian Adventures," states the habits of the salmon of the Save, in Norway, to be such as are altogether different from that of the British Isles; forming no channel for the deposit of the ova, but allowing them to float down the stream, impregnated by the milt, similarly floating, and, finally, whatever escapes the rapacity of the river fish settles in some crevice or rock until the fry is excluded. This is so contrary to the natural principles of the family of the true salmons as scarcely to be worthy of

dependence; for more probably the floating ova that escaped the maws of hungry trout would settle in some quiet pool beyond the medium of maturation, and finally perish. In fact, it is more characteristic of the Clupeidæ or herring family, which, in the spawning seasons, seek the inlets and shallows of our shores, where the excluded ova, in myriads, float away at the mercy of the tides; besides, a great distinction exists in the specific gravity of the ova of the salmon, the trout, and the herring—those of the former, the greater portion sink at once to the bed or furrow, where they are impregnated by the male, and remain without removal. In the Clupeidæ, expulsion of the ova in masses spread far, and float a considerable time, even where no force of tide or waves would drive. We know of that family that the shad—both Alosa finta and Alosa communis—ascend in the early part of summer, from the sea to the fresh water to spawn; but they seek the sluggish parts of a river, or the quiet waters of the lake, where the ova float, to be impregnated, similar in habit to the herring. The shad has been taken in salmon-nets in the lakes at Killarney, and in rivers in Kerry. Some discussion also arose in the Society, concerning the clean spring fish ascending the Caragh river, in the county Kerry, in January, remained in the fresh water throughout the summer, and spawning the following autumn without revisiting the sea in the interval. It is necessary, for the proper development of the ova and milt, that the fish should be in the healthiest state of vigour; but a sojourn in the fresh water for so many months must greatly deteriorate the condition of the fish, and render them unequal to such important functions. The wild and romantic districts in Kerry, which supply the waters of the Laune and the Caragh, have for years been familiar to me. Its salmon-fisheries, therefore, would naturally interest me. Salmon are found ascending the Caragh very early in the autumn for the spawning-beds, being at that time, in August and early in September, with the ova largely developed. These are the early breeding fish, and, subsequently, are the run of early spring salmon. After the operations are completed in the spawning-beds, the fish return to the sea to recruit, and are again to be met early in January, in the fresh water, in the primest condition. These fish do not then visit the river or lake for the purpose of spawning, nor remain until that time approaches, for salmon do not at all times enter the rivers for the object of breeding. Seasons and localities alone influence the salmon to proceed to the spawning-beds, according to the condition of the early and late breeding fish. Mr. Shaw's experiment proves that the salmon which he captured for the purpose of obtaining the ova for artificial impregnation, and placed in ponds after he had successfully effected the object, on being liberated from the ponds, at once moved towards the sea. Frequent remarks have been advanced, that to the destructive floods of 1848 and 1849 were to be attributed the scarcity of salmon the following years. I was on the south-west coast in the season of 1849 and 1850. Our salmon-fisheries in the Feohanagh and the Clehane were complete failures in 1850; and there certainly was a scarcity of peal this season. Our western rivers are very late, and salmon do not, in the generality of them, approach until late in the season. After the season had closed, the salmon were plentiful in the estuaries, and this was strikingly the case late in the season of 1850; for great quantities of fish were hanging about the mouths of the rivers, unable or uninclined to ascend until very late in the season. The season of that year was uncommonly dry, and the rivers were low the greater part of the autumn; and it was not until October that the fish entered the rivers. At that time I heard that those that were taken were in prime condition. On inquiries the same season I found that similar causes, to some extent, affected the Lee and the Slaney, and that long after the season had closed, the salmon were to be found going up the rivers, and in prime condition. This went far to prove that, in some of those late rivers, the season closes much too early (at least for the rod); and, on the other hand, the season should not commence too early. Again, there are exceptions, for in some rivers there is a good run of clean fish the greater part of the year. It is quite clear that salmon do not desert the rivers of their origin, for whatever natural causes may induce or oppose their earlier or later ascent from the sea, they invariably seek the parent stream. Their visits to the sea are confined to those depths off the coast where the river disembogues, and where rocky ledges and sandy and shingly channels afford protection, and abundance of marine animals for the proper nourishment of their rapid

growth. Experience has proved to me the unsound views advanced of the migration of fish. Cod, ling, haddock, hake, pollock, and herrings are, throughout the year, in the deep water—their proper feeding-grounds bordering the parts of the coast, and the bays and estuaries, where they each season approach to spawn. All oviparous fish visit the shoaler parts of a coast to spawn, and those periods are now the seasons of the fishermen's harvest. An experimental cruise in 1850 proved the correctness of these views. On proper sounding-grounds off the coast, the finest ling and cod were taken long after the usual season was over, thus fully bearing out the statements that had been made to the late Admiral Sir Thomas Ussher and to the Earl of Clarendon. My friend, James Edward Stopford, Esq., in connection with the Royal Irish Fisheries Company, is now on the south-west coast working out more extensively these trials. In these inquiries it is difficult to overcome the prejudices and habits of the coast fishermen: educated only in the knowledge of their fathers, they are hostile to any innovation of that knowledge, and, therefore, cannot comprehend the views of the practical naturalist, to learn accurately the nature of the soundings, the marine animals, the characteristics of and distribution of fish, which all tend to arrive at information so necessary with regard to the feeding, the spawning-grounds, and the habits of animals connected with so important a branch of resource. In concluding, these observations must only be considered general, as it is my intention to enter more minutely into the distinctive details that characterize the Salmonidæ. I have to regret, however, the absence of Mr. Ffennell, whose able assistance would have been valuable on this subject, which he had started in the Society and invited it to the discussion. It is a subject also that requires the aid of the sound judgment of the practical men of the great Scotch fisheries.

The Chairman said that the salmon-fisheries of Ireland had, for some years past, excited great and general interest, yet it was a subject that appeared not to have been understood. He would be glad to hear any remarks from the members upon the statements which Mr. Andrews had submitted.

Doctor Kinahan in connection with this subject (the spawning of fish) called the attention of the Society to recent specimens of the nidus and ova of the smooth-tailed sticklebat (Gasterosteus leiurus), taken the previous day; and stated—Yesterday, when walking along the river Dodder, above Clonskeagh, my attention was attracted by what the Norwegians call a "lēk"—*i.e.*, a number of fish assembled at the edge of the pond for spawning purposes. On examination, I was slightly surprised at finding that they were my old friends the sticklebat—as on the 23rd April, I had taken, at Moorefield, Roebuck, the nidus of this species containing ova on the point of bursting. This led me to watch the proceedings, and I had the pleasure of witnessing the process of the deposition, and, as I believe, the impregnation of the ova. Among the many "cock" pinkeens anxiously mounting guard over their nests, one in especial attracted attention by his movements; instead of boring at the upper entrance of the nest, as I formerly described, he would make convulsive darts at the edge of the nest, which seemed to me larger than usual; he also seemed more tolerant of the presence of intruders than ordinarily is the case. The cause soon appeared, as in about three minutes a large female darted out at the opposite side of the nest I now show, in which, doubtless, she had been depositing her spawn; the male immediately wriggled himself in, and remained there upwards of thirty seconds. He then came out, sailed round the nest, tucking in the loose straws with his snout, then swam off to his partner, and, after conducting her into deep water, returned to the duty of mounting guard, as I formerly described it. Another cock also attracted my attention from the brilliancy of his colours; and from observations made on him, I am strongly inclined to think that these fish are not polygamous, but monogamous. His occupation was endeavouring to persuade a "hen" pinkeen to deposit her ova in his nest. The manœuvres of both fish were most amusing. On the whole, it appeared as if he was more courted than courting. He would suddenly sail off from her, she would follow, sailing round him in circles till she almost touched him, when he would turn and look at her, and off they would sail, side by side, towards the nest. On approaching this he would impatiently dart forward, and poke his nose into the side entrance, as if to show what a grand house he had prepared for her; but she would immediately

coquettishly turn off, and sail slowly away; he immediately would follow, but after a short pursuit, would return, as if in dudgeon, to his old beat, on which she would begin her old circle-sailing and teasing of him. Sometimes another fish would intrude on him while thus engaged, when an instant chase would occur. If the fish were a gudgeon, I remarked he as often let them alone as chased them. If this chase lasted too long the hen would sail off for deep water, and then it was his turn to follow her and bring her back, darting backwards and forwards in the most ludicrously-distressed manner possible; and when he found her, pretending not to see her, but keeping aloof—a proceeding she did not at all seem to relish—as she began her old circle-sailing immediately. Neither this male pinkeen nor that first mentioned would allow a second female, on any pretence, near the nest, chasing them away even more rancourously than the males—from which, I believe these fish to be strictly monogamous, though authors state the contrary. I could not remark the fishes in their contest using any other weapon than their teeth, though I watched carefully for the side charge with their dorsal spines, described so fully by authors. From the quantity of ova in this nest you may form some slight idea of the pest that the fish can become in a pond, though there is a great check put on their numbers by the numerous individuals devoured by the full-grown males of other nests.

Dr. Kinahan made the following statement:—In the paper read by me at our last meeting, I stated that on one point I was still in doubt—viz., how far varieties combine *inter se*. Since then I have been enabled to arrive at the following conclusions on this subject—opportunely, indeed, as it completes the scheme I was endeavouring to lay before you:—I find that these combinations do take place occasionally, and that they, with a very few exceptions (more I am inclined to think seeming than real), take place only between the sub-groups of the same group—*i.e.*, between variety and variety, and sub-variety and sub-variety. These conclusions, as well as those laid before you on former occasions, were all confirmed by examinations of, I believe, the two best collections of the kind in England—viz., that of Dr. H. Allchin, in London, and that of G. B. Wollaston, Esq., in Kent. Through the kindness of both these gentlemen, I have been much indebted both for information regarding the plants and by the opportunity afforded me of examining forms, many of them unique. In Mr. Wollaston's collection there is a form of hart's-tongue, raised by him from seed, which well illustrates the combination of forms. In it the lower portion of the frond represents the var. *laciniatum*, while the apex represents the var. *cristatum*. In one frond this was shown in a remarkable manner, the stipe was cleft, one portion was diminished to a fibrous hook, about a quarter of an inch long, the other bore a frond, the base marginate serrate, and the apex divided into two, the one division cristate, the other reduced to a branched lash of bare fibrils. The establishment of this fact clears up the only difficulty in arranging the varieties I met with, establishing an additional class of mixed forms. Thus, the Athyrium, found in Joyce Country by Robert Gunning, and figured by Newman, as well, I believe, as the form found by Mr. A. Smith, near Belfast, are to be referred to a form *Laciniato-cristatum*, being a combination of laciniatum and cristatum.

Dr. Kinahan exhibited a beautiful form of Athyrium Filix-fœmina, *Newman*, obtained in June, 1854, near Castlekelly, County Dublin. In it the segments of the pinnæ are pinnatifid; the indentations entire at their edges, and bearing the sori in the angle; the spore-cases projecting beyond the edge of the frond, which, added to the bulging forwards of the substance of the pinnule, gives the plant much the appearance of a Davallia, or rather of a Loxsoma, though, of course, differing in the shape and position of the indusium from either of these genera. In habit, this plant resembled Athyrium cicutarium, especially in the remarkable fact of its segments bearing but a single vein and sorus, thus corroborating the illustrious Robert Brown's opinion, who rejects this as a distinctive character, in opposition to Smith and Bernhardi, by whom the genus Darea or Cænopteris has, owing to this character, been separated from Athyrium. This plant is also a beautiful example of the variety *laciniatum* (*Kin.*); the plant was growing in a shady nook along with a plant of the ordinary form. It is sparingly fruitful.

Doctor Farran wished to offer a few observations prior to the adjournment of the

Society for the summer recess. Ornithological facts, with the exception of Mr. Andrew's highly-interesting paper on the membranaceous duck of Australia, had occupied the attention of the Society very briefly during the late meetings; but he trusted a large accumulation of such would be in store for the ensuing session. He thought that the following notes might prove interesting:—Walking on the shore of Knocknagin, on the 3rd of April, 1854, he (Dr. Farran) saw eight or ten male wheatears (*Saxicola Œnanthe*), in fine plumage, sitting on a little eminence or sand-hill. It being a fine sun-shining day flies were abundantly about, on which the wheatears were feeding, in the manner of the flycatchers, capturing the insect on the wing, and immediately returning to the spot they left. They appeared fearless, suffering you to approach within five yards, and remaining motionless until attracted by their prey. It would appear, from such a number of male birds being together, that they preceded the females in their migration. Another fact was, the almost total disappearance of the brent goose (*Anser Brenta*) from the Dublin markets. This bird, erroneously named bernicle, has hitherto been abundant, and much esteemed for its flavour. The winter was very severe, which usually brings them in numbers to our shores. The cause of their disappearance should be inquired into.

The Chairman then stated there were the names of some distinguished men that had been approved of by the Council to be balloted for as Honorary Members. He should mention that it was a rule of the Society that "No person residing in Dublin, or within ten miles of it, can be elected as an honorary member of the Society."

Mr. Andrews, one of the secretaries, then stated that this meeting closed the session for the season. The Society in its objects had endeavoured, throughout the past session, to bring before its meetings subjects, original, useful, and instructive, and more especially of value in practical points. The mere collecting of the objects of the natural history of a country, or the records of their existence, are but limited stages in the advance of the science; our powers should be bent to trace causes of existence, and the results, useful and practical, derivable from such causes. He trusted that, during the recess, the members would aid these objects of the Society. He also mentioned that it was proposed that the usual annual dinner should take place, of which due notice would be given to the members.

The Chairman then announced that the following gentlemen had been unanimously elected honorary members:—Colonel Sabine, F.R.S., President of the British Association; Thomas Bell, Esq., F.R.S., President of the Linnean Society; Sir William Jackson Hooker, K.H., &c., Director of the Royal Botanic Gardens, Kew; Edward Newman, Esq., President of the Entomological Society; J. O. Westwood, Esq., Ex-President of the Entomological Society; Joshua Alder, Esq., and C. E. Martin, Esq., Dublin Ordinary Member.

The session was then adjourned to November.

DUBLIN UNIVERSITY ZOOLOGICAL ASSOCIATION.

JUNE 17, 1854.

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

The following donations were received to the Library:—"Sigilla Ecclesiæ Hibernicæ Illustrativæ," by R. Caulfield, Esq., A.B., Parts 1 and 2; "Walks after Wild Flowers," by Richard Dowden, Esq., of Cork; and the Natural History Review, for April, by the editors; the thanks of the Association were ordered to be given to the donors.

Dr. Ball read a paper on the Caprimulgidæ and Hirundinidæ, in reference to the often-started query, as to whether the swallow truly migrated or remained with us, in a torpid state, during the winter months. He mentioned, as an instance of

the necessity of investigating closely all statements made of cases of the latter, that, when he was a boy, an old relative, and very acute sportsman, on a discussion on the subject arising, said, "I often got swallows in winter asleep in a dark cave, and brought out clusters of them." This statement having awakened Dr. Ball's attention, he asked the old gentleman what kind of swallows they were; he seemed annoyed as if a doubt of his veracity was raised, and said, "I do not know whether they were swifts or martins, they were the fellows with the leathern wings, that's all I can tell (bats, of course)." Dr. Ball remarked, that another relative had told him that, when a midshipman, off the coast of Africa, a very large number of martins covered the rigging of the ship; of these he captured a considerable quantity, which he stowed away in the binacle. The old functionary, whose business it was to light the lamps at sun-down, on opening the door of the binacle, was astounded by the flight of swallows into his face, and fell back, upsetting his oil, &c. The youngster was mast-headed for the freak.

After some interesting conversation, in which Dr. Allman, Mr. Dowden, Dr. Kinahan, and others, took a part, the Rev. Joseph Greene read the concluding portion of his

LIST OF LEPIDOPTERA HITHERTO TAKEN IN IRELAND, AS FAR AS THE END OF THE GEOMETRÆ.

NOCTUÆ.

Semaphora psi. Common.
,, tridens. This insect, in Mr. Tardy's collection, is psi.
*Apatela leporina.
Acronycta magacephala. Pupæ, under moss on poplars.
,, rumicis. Bred by Mr. Hogan and Mr. Shield, and at Kingstown.
*Ceropacha diluta. (?)
* ,, flavicornis. A fine specimen in Mr. Tardy's collection.
,, or. Dr. Ball.
,, duplaris. Dr. Ball.
,, ocularis. I took one pupa of this rare and beautiful insect, at the roots of an oak, in Powerscourt Demesne.
Bryophila perla. Mr. Tardy's collection.
Caradrina cubicularis. Common.
,, blanda. Common.
Grammesia trilinea. Mr. Tardy's collection; Mr. Haughton.
Leucania lithargyria. Mr. Tardy's collection; Mr. Hogan (Charlton), and at Kingstown.
,, conigera. Mr. Tardy's collection.
,, pallens. Generally distributed.
*Leucania impura. (?)
* ,, comma.
*Nonagria phragmitidis. (?) Near Belfast.
,, fulva. Mr. Tardy's collection.
,, extrema. (?)
,, typhæ. Mr. Bristow.
Gortyna micacea. Kingstown.
,, flavago. Mr. Bristow.
Hydræcia nictitans. Mr. Tardy's collection.
,, leucostigma. Belfast Museum.
Miana furuncula. Generally distributed.
,, fasciuncula. Do. do.
,, strigilis. Do. do.
,, literosa. Mr. Bristow, Mr. Tardy's collection, and at Kingstown.
Apamea didyma. Common.
,, ophiogramma. One fine specimen in Mr. Tardy's collection.
,, gemina. Mr. Tardy's collection.
Luperina infesta. Do. do.
* ,, furva. Belfast Museum. One specimen at Kingstown.

Luperina testacea. Common.
,, basilinea Do.
Xylophasia rurea. Common.
,, lithoxylea. Do.
,, polyodon. Do.
,, hepatica. Bred by myself from a larva found hybernating at Powerscourt. The caterpillar of this species passes into the pupa state in spring, without feeding a second time.
Triphæna pronuba. Common.
,, orbona. Do.
* ,, interjecta. At Kingstown. Not uncommon.
* ,, janthina.
,, fimbria. Hybernating larvæ, by Mr. Hogan, and by myself at Kingstown.
Cerigo cytherea. Two specimens in Mr. Tardy's collection; also at Kingstown.
Segetia Xanthographa. Common.
Rusina ferruginea. Mr. Tardy's collection.
Noctua baja. Do.
,, umbrosa. Kingstown.
,, bella. Mr. Tardy's collection.
,, festiva. Do.
,, brunnea. Do. Mr. Bristow.
,, C. nigrum. Do.
Chersotis plecta. Pupæ not uncommon at roots of elms, at Rathfarnham and elsewhere.
,, porphyrea. (?) Mr. Tardy's collection.
,, haworthii. Do.
Spælotis augur. Mr. Haughton; at Kingstown in plenty.
* ,, ravida. (?)
,, præcox. Taken on the coast by Dr. Ball and others.
*Agrotis suffusa.
,, ripæ. This rare species has, I understand, been taken by the well-known collector, Mr. Weaver, of Birmingham.
,, segetum. Common.
,, lunigera. Mr. J. F. Stephens; Mr. Clear (Cork).
,, exclamationis. Common.
,, valligera. Mr. Hogan (Kerry).
,, tritici. Do. do.
,, putris. Pupæ common at elms.
,, fumosa. Mr. Hogan (Kerry). In reference to this genus, I cannot but think that several other species belonging to it might be found by a careful search.
*Neuria saponariæ. (?)
Cerapteryx graminis. Mr. Bristow and others.
*Heliophobus popularis. Kingstown.
Tæniocampa gothica. Common.
,, instabilis. Do.
,, stabilis. Do.
,, cruda. Do. The remark made upon the genus Agrotis applies even more to the present.
Orthosia ypsilon. Mr. Tardy's collection.
,, lota. Do.
,, macilenta (Hüb). Do.
Anthocelis litura. Do.
,, pistacina. Do. Larvæ, common at Rathfarnham and elsewhere, feeding on oak, lime, &c., in May.
Scoliopteryx libatrix. Generally distributed.
Cosmia affinis. One empty pupa, by myself. Rathfarnham.
Euperia trapetzina. Generally distributed.
* ,, fulvago. (?)
Xanthia silago. Mr. Tardy's collection; and at Kingstown, beaten from oaks and alder.

Xanthia aurago. Mr. Haughton.
,, ferruginea. Mr. Tardy's collection. Mr. Templeton.
,, rufina. Do.
Glæa vaccinii. Do.
Scopelosoma satellitia. Generally distributed.
Misselia oxyacanthæ. Do.
Chariptera aprilina. Pupæ common at roots of oak, Phœnix Park, and Powerscourt.
Dianthæcia capsincola. Mr. Tardy's collection; and Mr. Hyndman.
* ,, conspersa. (?) Belfast Museum.
* ,, carpophaga.
Polia dysodea.
,, serena. (?) Mr. Tardy's collection.
,, chi. Do. Mr. Haughton.
Aplecta herbida. Powerscourt. A wasted specimen beaten from an oak.
Hadena persicariæ. Mr. Shield.
,, brassicæ. Common.
,, oleracea. Do.
,, pisi. Do.
,, thalassina. Mr. Tardy's collection.
,, genistæ. Do.
* ,, adusta.
,, contigua. Mr. Tardy's collection; Mr. Hogan.
*Miselia bimaculosa. (?) Probably Aplecta nebulosa.
Phlogophora meticulosa. Common.
Euplexia lucipara. Mr. Bristow.
Thyatira batis. Mr. Tardy's collection.
,, derasa. Do.
Xylina rhizolitha. Larva, beaten from oaks at Powerscourt and Rathfarnham (June).
,, petrificata. Mr. Hogan bred a specimen of this rare species from a larva found at Charlton. Unfortunately the larva was not particularly noted, which is to be regretted, as, I believe, it has not been described in any British work. There is also a fine specimen in the collection of the University, where it is marked as Xylophasia lithoxylea.
Calocampa vetusta. Mr. Tardy's collection.
,, exoleta. Do.
Cucullia tanaceti. Mr. Bristow. This must be a mistake, tanaceti not being a British species; probably umbratica.
Cucullia verbasci. Mr. Tardy's collection.
,, umbratica. Do.
Xylocampa lithorhiza. Mr. Hogan and myself.
*Anarta myrtilli.
Plusia iota. Generally distributed.
,, gamma. Do.
,, festucæ. Do.
,, chrysitis. Do.
,, bractea. A fine specimen in Mr. Tardy's collection.
Abrostola urticæ. Mr. Tardy's collection.
,, triplasia. Do. Larva by Mr. Hogan.
Nænia typica. Generally distributed.
Mania maura. Do.
Philopyra tragopoginis. Do.
Catocala fraxini. I took a specimen of this insect, about nine years ago, near Kingstown.
,, nupta. Dr. Ball.
Euclidia mi. Mr. Tardy's collection.
* ,, glyphica. Mr. Hely.
Erastria fuscula. Mr. Haughton.
*Hydrelia uncana. Mr. Hely.
,, banksiana. Mr. Haughton.

PYRALES.

Pyrausta purpuralis. Mr. Clear and Mr. Bristow.
* ,, punicealis.
* ,, ostrinalis.
* ,, octomaculalis.
* ,, cespitalis.
Rhodaria sanguinalis. Mr. Shield and others.
Hypenodes humidalis. Mr. Weaver (1848).
Pyralis farinalis. Mr. Bristow.
* Aglossa pinguinalis.
*Hydrocampa lemnalis.
* ,, nymphæalis. Mr. Bristow and Mr. Hogan.
* ,, potamogalis. Do. Do.
*Ebulea sambucalis.
*Scopula prunalis. Abundant; Dalkey, &c.
,, ferrugalis.
*Rivula sericealis.
*Pionea forficalis.
*Botys verticalis.
,, olivalis. Kingstown. Common.
,, etialis. Kingstown. Do.
* ,, urticalis.
*Popypogon barbalis.
* ,, griseallis. Kingstown. One specimen.
Stenopteryx hybridalis.
*Hypena rostralis.
* ,, proboscidalis. Mr. Bristow.

GEOMETRÆ.

*Geometra papilionaria. Mr. Tardy's collection.
Hemithea cythisaria. Generally distributed.
*Chlorochroma vernaria. Belfast Museum.
,, æruginaria.
Metrocampa margaritaria. Generally distributed.
Ellopia fasciaria. Larva taken by Mr. Shield, at Howth.
*Ourapteryx sambucaria. Mr. Hogan (Charlton).
Rumia cratægaria. Generally distributed.
*Eurymene dolabraria. (?)
Epione apiciaria. Mr. Tardy's collection.
,, vespertaria. (?) The specimens placed as this species, in Mr. Tardy's collection, are apiciaria.
Ennomos Illunaria. Generally distributed.
* ,, erosaria. Mr. Clear.
* ,, lunaria.
,, angularia. Common.
Odontopera bidentaria. Do.
Crocallis elinguaria. Mr. Bristow; also at Kingstown.
Himera pennaria. Generally distributed.
Angerona prunaria. Mr. Bristow.
*Mæsia favillacearia. Belfast Museum.
*Halia wavaria. Common at Kingstown, and elsewhere.
*Aspilates gilvaria. (?)
Anisopteryx æscularia. Mr. Hogan; and pupæ by myself.
*Hibernia leucophæaria. (?)
,, rupicapraria. Common.
,, progemmaria. Do. Pupæ.
,, defoliaria. Mr. Hogan.
* ,, aurantiaria.
Phigalia pilosaria. Common. Pupæ.

Biston hirtaria. Mr. Tardy's collection.
,, prodromaria. Do. (One male.)
,, betularia. Common. Pupæ.
Boarmia repandaria. Very common at Kingstown.
,, rhomboidaria. Mr. Tardy's collection.
,, roboraria. (?) Mr. Bristow.
*Hemerophila abruptaria.
Cleora lichenaria. Generally distributed.
*Tephrosia crepuscularia.
* ,, punctularia.
Fidonia atomaria. Generally distributed.
* ,, piniaria. (?)
*Numeria pulveraria.
Gnophos pullaria. Mr. Haughton.
,, obscuraria. Mr. Wright; also four specimens at Kingstown.
Phasiane palumbaria. Generally distributed.
Lozogramma petraria. Mr. Bristow.
Anaitis plagiaria. Common.
,, imbutaria. Taken by Mr. Shield, at Howth.
*Eubolia cervinaria.
* ,, multistrigaria.
* ,, mensuraria. Kingstown. Very abundant.
*Eusebia bipunctaria.
Coremia didymaria. Mr. Shield.
,, pectinitaria. Generally distributed.
,, montanaria. Do.
,, propugnaria. Mr. Shield.
,, fluctuaria. Common.
,, ferrugaria. Mr. Haughton; also at Kingstown.
* ,, munitaria.
,, unidentaria. One pupa, at Rathfarnham.
* ,, ligustraria. Belfast Museum.
* ,, olivaria.
* ,, salicaria.
Thera simularia. Mr. Hogan. Common, at Rathfarnham.
Steganolophia ribesiaria. Generally distributed.
Anticlea derivaria. Mr. Hogan (Roebuck).
Harpalyce ruptaria. Do. do.
* ,, galiaria.
,, ocellaria. Mr. Shield.
,, fulvaria. Common.
,, achatinaria. Generally distributed.
,, russaria. Do.
,, immanaria. Do.
,, pyraliaria. Mr. Tardy's collection.
,, chenopodiaria. Mr. Haughton and Mr. Shield.
* ,, silacearia.
* ,, popularia.
* ,, marmoaria. Mr. Clear; also at Kingstown.
Phæsyle elutaria. Generally distributed.
,, impluviaria. Pupæ at Rathfarnham, under moss, on alders.
* ,, cæsiaria.
* ,, miaria. One pupa, under moss, on a sycamore, at Powerscourt.
* ,, psittacaria.
Cheimatobia dilutaria. Dr Ball.
,, brumaria. Common.
Lophobora sexalisaria. Dr. Ball.
*Triphosa cervinaria. (?)
* ,, dubitaria. Kingstown.
*Eucosmia undularia.
Camptogramma bilinearia. Common.

Venilia macularia. Mr. Bristow.
Melanippe hastaria. Dr. Ball.
,, alchemillaria. Generally distributed.
,, tristaria. Mr. Haughton.
* ,, rivaria. Mr. Clear.
* ,, amnicularia. Belfast Museum.
*Emmelesia albularia.
,, bifasciaria. Kingstown; three specimens.
* ,, tæniaria. Mr. Clear.
Zerene albicillaria. Mr. Hogan (Co. Wicklow).
,, rubiginaria. Mr. Hogan (Charlton).
Abraxas grossularia. Common.
* ,, ulmaria. (?)
Cabera pusaria. Generally distributed.
,, exanthemaria. Do.
*Ephyra pendularia. (?)
,, punctaria. Mr. Tardy's collection.
* ,, poraria.
Eupithecia rectangularia. Generally distributed.
,, exiguaria. Kingstown.
,, austeraria. Mr. Shield; also at Kingstown.
,, subnotaria. Mr. Shield.
,, centaureata. Mr. Tardy's collection; also at Kingstown.
,, elongaria. Mr. Bristow.
,, minutaria. Dr. Ball; also at Kingstown.
,, subfulvaria.
,, pumiliaria Kingstown; two specimens.
,, subumbraria. Rathfarnham.
,, sobrinaria. Kingstown; in plenty; beaten from junipers.
* ,, rufifaciaria.
,, pulchellaria. Kingstown; one specimen.
,, Nanaria. Do. do.
,, castigaria. Two pupæ, under bark, on sycamores, Bushy Park, Rathfarnham.
,, piperaria. I took three pupæ of this rare species, under loose bark, on sycamores, Bushy Park, Rathfarnham.
St. Scutularia. Kingstown.
,, virgularia. Do.
,, immutaria. Dr. Ball.
*Acidalia ossearia. Do. Mr. Clear.
,, inornaria. Kingstown.
,, aversaria. Do.
,, remutaria. Mr. Hogan.
,, sylvaria. Mr. Haughton.
* ,, subsericearia. (?)
Pæcilophasia marginaria. Generally distributed.
Timandra imitaria. Dr. Ball.
Bradyepetes amataria. One pupa
*Strenia clathraria.
Chesias spartiaria. Mr. Tardy's collection.
Odezia chærophyllaria. Mr. Bristow.

From the above list, the following results are to be drawn:—

British species of Rhopalocera, according to Doubleday's list.	65	Found in Ireland, including doubtful species.					38
,, ,, Heterocera ...	34	,,	,,	,,	,,		19
,, ,, Bombyces ...	93	,,	,,	,,	,,		57
,, ,, Noctuæ	284	,,	,,	,,	,,		138
,, ,, Pyrales	63	,,	,,	,,	,,		25
,, ,, Geometræ ...	264	,,	,,	,,	,,		138
Total, British species	803	Total, Irish species					415

From which comparison it appears, that of the "Rhopalocera" we possess nearly two-thirds; of the "Heterocera," a little more than half; of the "Bombyces," nearly two-thirds; of the "Noctuæ," somewhat under one-half; of the "Pyrales," little more than one-third; of the "Geometræ," rather more than one-half.

This is, undoubtedly, in some respects, a meagre list, but I feel confident that there are yet *many* species in Ireland, waiting ONLY the zeal of active and persevering entomologists. In proof of this, I may mention, that by digging *alone* for pupæ, *in the neighbourhood of Dublin*, during the past winter months, I have been enabled to add to the list, the following 11 species, which, according to the information I have received, have not yet been taken in Ireland, viz. :—Orgyia pudibunda, Cerura bifida, Notodonta trepida, Acronycta megacephala, Ceropacha ocularis, Cosmia affinis (Powerscourt), Xylophasia hepatica, Chariptera aprilina, Eupithecia castigaria, Eupithecia piperaria, and Exiguaria.* Mr. Haliday, it is true, has marked "Chariptera aprilina" in his list, but with doubt. I have found the empty pupæ in some plenty, at the roots of oak, near the Viceregal Lodge, Phœnix Park.

I propose, on some future occasion, to draw up a few remarks (intended solely for beginners, or inexperienced entomologists) as to the most likely *localities* for insects, the best modes of *capture*, &c.; considering that, for want of such information, many are deterred from commencing the pursuit at all, while others, who *have* commenced, grow disheartened from want of success, and forthwith cease to collect.

Where Kingstown, Rathfarnham, or Powerscourt are mentioned as localities, the insects have been taken by myself.

Mr. Haliday observed, that the list just finished, reflected a great deal of credit on the persevering diligence of Mr. Greene; the labour of making such a list was known only to those who made the attempt. With regard to the vast disproportion of species between this country and England, he thought with Mr. Greene, that, by industry of collectors, it might be greatly lessened. Mr. Haliday also exhibited some of the rarer Irish insects, and mentioned the supposed localities for them, in order that if these spots were visited, in the course of the ensuing vacation, by any of the younger members of the association, they might be aware of what to find at them.

Mr. E. P. Wright read the following catalogue, by the Rev. Aiken Irvine:—

CATALOGUE OF ZOOPHYTES FOUND IN DUBLIN BAY AND IN ITS VICINITY.

The notes from which the following catalogue was drawn up were made during the years 1849-50, and the spring of 1851; and though I feel it, in many respects, is a most imperfect one, I am induced to offer it to the members of the Dublin University Zoological Association, with the hope of inducing some of them to draw up a more perfect list of those found in the district which it includes.

I have purposely refrained from any observations on the Zoophytes contained in it, as it is my intention, at a future period, to lay before the Association some remarks on the Irish Zoophytes and their geographical distribution; and, with this view, I will be glad to receive from any member of the Association notes on those which may observed by them round the coasts of Ireland.

The nomenclature I have adopted is that used by Dr. Johnston, in the second edition of his very classic Monograph of the British Zoophytes, which, I feel confident, is the most generally adopted; while in the cases in which it differs from that I have followed, the list drawn up by Mr. Gray of the collection in the British Museum, I have added the name adopted by him within brackets—thus [ ].

ANTHOZOA HYDROIDA.

I. TUBULARINA.

FAMILY—CORYNIDÆ.

Coryne-pusilla.

FAMILY—TUBULURIDÆ.

Eudendrium rameum [Halecium rameum]. Blackrock.

* Since writing the above, I have also taken on the wing the following:—Noctua umbrosa, Aplecta herbida, Popypogon griseslis, Emmelesia bifascieria, Eupithecia pumilaria, Eupithecia sobrinaria, Eupithecia pulchellaria, and Eupithecia nanaria.—J. G.

Eudendrium ramosum.
Tubularia indivisa.
,, larynx. Ireland's Eye.
,, gracilis. Howth and Lambay. A. H. Hassal.

II. SERTULARINA.

FAMILY—SERTULARIDÆ.

Halecium Halecinum.
,, Beanii.
,, muricatum.
Sertularia polyzonias [Sertularella polyzonias]. Not common.
,, rugosa [Sertularella rugosa]. Kingstown.
,, rosacea. Parasitic, on the larger sertularias.
,, pumila. Blackrock, Booterstown, &c.
,, Marguretta. Howth. A. H. H.
,, fallax. Dalkey and Howth.
,, Tamarisca. Dalkey and Kingstown; sparingly.
,, abietina. Very common.
,, filicula?
,, operculata. Common.
,, argentea. Do.
,, cupressina. Frequent.
Theuaria articulata. Dublin Harbour, Ellis; Dublin Bay, Mr. Warren; Howth, A. H. H.
Antennularia antennina [Nemertesia antennina].
Plumaria falcata [Aglaophena fulcata].
,, cristata [Ag. Cris.].
,, Pennatecla [Ag. Pen.]
,, pinnata [Ag. pin.]
,, setæcea [Ag. set.]
,, Catharina [Ag. Cath.]. Howth and Lambay. A. H. H.
,, myrrophyllum [Ag. myr.]
,, frutescens [Ag. frut.]. Very rare.

FAMILY—CAMPANULARIADÆ.

Laomedea dichotoma. Blackrock.
,, geniculata. Very common. Killiney. A. H. H.
,, gelatinosa. Blackrock. A. H. H.
Campanularia volubilis [Capsularia volubilis]. Not common. A. H. H.
,, syringa [Cap. syr.]
,, verticillata [Cap. verticil.]. Blackrock, Howth, and Portmarnock.
,, dumosa [Cap. dum.]. Not common.

ANTHOZOA HYDROIDA.

FAMILY—PENNATULIDÆ.

Gorgonia verrucosa. Lambay. Dr. Ball.
Alcyonium degitatum. Common.
,, glomeratum.

ANTHOZOA HELIANTHOIDA.

III. OCELLINA.

Caryophylla Smithii. Dalkey Island.

IV. ACTININA.

FAMILY—ACTINIADÆ.

Actinia mesembryanthemum. Everywhere.
,, coccinea.
,, gemmacea. Common.
,, bellis. Dalkey Island.
,, Manthus. Howth and Lambay. A. H. H.

Anthea cereus [Cereus sulcata]. Sandycove.
Iluanthos scoticus. Balbriggan. After a storm.

POLYZOA INFUNDIBULATA.

I. TUBILIPORINA.

FAMILY—TUBILIPORIDÆ.

Tubilipora patina [Tub. verrucaria].
,, lobulata [Obelia lobulata]. A. H. H.
,, serpens [Obelia serpens]. Common.
Crisia eburnea.
,, aculeata. Kingstown Harbour, East Pier, A. H. H.

II. CELLIPORINA.

FAMILY—ENCRUTIADÆ.

Angrimaria spatulata [Ætea Anguina]. A. H. H.
,, hippothon.
,, calenulana.
,, divarcatai. Deep water.
Gemellaria loriculata. Common.

FAMILY—CELLEPORIDÆ.

Cellipora pumicosa. Very common.
,, ramulosa. Howth.
Lepralia hyalina [Celleporella hyalina]. Common.
,, tenuis [Lepralia jacotini]. Can only be distinguished by microscope from L. Hyalina. A. H. H.
,, assimilis. Four specimens on Pecten maximus. A. H. H.
,, Hassalii [Celleporina Hassalii].
,, Ventricosa. Two specimens, Dublin Bay, A. H. H.
,, ovalis. A distinct and very rare species on granite, Kingstown Harbour, A. H. H.
,, linearis.
,, quatuor dentata.
,, auriculata. Bray, Killiney.
,, punctata.
,, pediostoma. Blackrock and Portmarnock.
,, verrucosa. Dublin Bay, Miss Ball.
,, variolosa.
,, nitida.
,, semilunaris.
,, coccinea.
,, ciliata.
,, spinifera.
Membranipora pilosa.
,, membranacea.

FAMILY—ESCHARIDÆ.

Cellularia ciliata. Rare.
,, scruposa. Common.
,, reptans. Common.
,, avicularia.
Flustra foliacea.
,, chartacea.
,, truncata. (?)
,, carbasea. (?)
,, avicularis.
,, murrayana. Killiney Bay. Rare.
,, membranacea.
,, (?) lineata.

Salicornaria farcinimoides.
,, sinuosa. This can scarcely be considered as at all distinct from preceding species.

III. HALCYONELLA.

Alcyonidium gelatinosum. Howth and Lambay.
,, parasiticum. Common on Sertularias.
Cigcloum papillosum.

IV. VESCICULARINA.

FAMILY—VESICULARIDÆ.

Serialaria lendigera.
Vesicularia spinosa. Seapoint. A. H. H.
Valkeria cuscuta.
,, uva. Dublin Bay. Rare. A. H. H.
,, pustulosa.
,, imbricata [Bowerbankia imbricata].

FAMILY—PEDICELLINÆ.

Pedicellina echinata. Dublin Bay. Very rare. A. H. H.

The President said, such local lists, when drawn up with the care which had evidently been taken in this instance, were the surest way of advancing science, and he trusted many more such would, from time to time, be presented to the Association.

The Association then adjourned for the long vacation.

KILKENNY LITERARY AND SCIENTIFIC INSTITUTION.

MAY 26, 1854.

Doctor LALOR in the chair.

BLACK RAIN.

Mr. Graves read the following communication* from the Rev. James Mease, Freshford :—

"The phenomenon of what was called black rain, occurred over a considerable portion of the county Kilkenny, several years ago. Many of the common people attributed the potato blight to that circumstance. Although there is not the least grounds for this supposition, yet, I take it for granted, that a similar occurrence a few days ago, will not be unworthy the attention of the Institution.

"On Tuesday, the 23rd May, I was walking from Woodsgift Schoolhouse, which is about four miles to the west of Freshford, towards Clomantagh, about four o'clock. I observed a peculiarly black cloud hanging over the Kilcooly hills; and extending towards Freshford and Tullaroan. I will not say that it was the blackest cloud I ever saw; but it was so very remarkable, that I called the attention several persons, whom I met along the road, to it. Its edges presented the usual appearance of a thunder-cloud, ragged and well defined. Dark streaks appeared to descend from it in some places, in a curved or twisted form. These reminded one of the classical expression of 'torti imbris,' the 'wreathed shower,' or 'hail,' as it is always translated. This appearance was observed before the cloud burst, which it did not do for some time. There were, then, several peals of thunder; and the usual torrents of a thunder-storm followed.

* This communication was unavoidably held over from our last number.—EDS. N.H.R.

"At Freshford, however, where the thunder had been peculiarly loud, the first rain that fell appeared black, from a number of particles of some dark substance floating in it. Some of the water is now presented to the meeting. The dark particles fall to the bottom, when the water has been left to rest for some time. I shall not offer any conjecture as to the nature of these particles, but I think they are worthy of careful examination. I think it impossible that they could have come from any place but the atmosphere, along with the rain. The only other sources could have been, the vessels in which the water was caught, or the roofs of the houses, on which the rain fell. Now, the first is not likely, for the vessels were set, in order to catch the rain for washing purposes, and, therefore, were quite clean; besides it is unlikely that the same kind of substance could be found in all the vessels. With regard to the roofs of houses, it is to be observed, that there had been a great deal of rain on Sunday and Monday; and, therefore, the slates were well washed before this particular rain fell. It is also well known that rain is frequently tinged by various substances, and, therefore, there can be no prior reason for rejecting the atmospheric origin of this. It would be useless, however, to attempt a conjecture as to its nature without a more particular examination than I am capable of making. I hope I shall be considered as having done my part in bringing it under the notice of the meeting.

"Since writing the above there appears an effervescence in the fluid."